

AO 120 (Rev. 08/10)

|   |   |
|---|---|
| TO: <b>Mail Stop 8</b><br><b>Director of the U.S. Patent and Trademark Office</b><br><b>P.O. Box 1450</b><br><b>Alexandria, VA 22313-1450</b> | <b>REPORT ON THE</b><br><b>FILING OR DETERMINATION OF AN</b><br><b>ACTION REGARDING A PATENT OR</b><br><b>TRADEMARK</b> |
|---|---|

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court \_\_\_\_\_ for the District of Delaware \_\_\_\_\_ on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

|   |                                |  |
|---|--------------------------------|--|
| DOCKET NO.                              | DATE FILED<br>2/24/2015        | U.S. DISTRICT COURT<br>for the District of Delaware        |
| PLAINTIFF<br>SUPERIOR OIL COMPANY, INC. |                                | DEFENDANT<br>SOLENIS TECHNOLOGIES L.P. and<br>SOLENIS, LLC |
| PATENT OR<br>TRADEMARK NO.              | DATE OF PATENT<br>OR TRADEMARK | HOLDER OF PATENT OR TRADEMARK                              |
| 1 US 8,962,059 B1                       | 2/24/2015                      | Superior Oil Company, Inc.                                 |
| 2 US 8,841,469 B2                       | 9/23/2014                      | Solenis Technologies, L.P.                                 |
| 3                                       |                                |  |
| 4                                       |                                |  |
| 5                                       |                                |  |

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

|                            |   |                               |
|----------------------------|---|-------------------------------|
| DATE INCLUDED              | INCLUDED BY<br><input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading |                               |
| PATENT OR<br>TRADEMARK NO. | DATE OF PATENT<br>OR TRADEMARK  | HOLDER OF PATENT OR TRADEMARK |
| 1                          |   |                               |
| 2                          |   |                               |
| 3                          |   |                               |
| 4                          |   |                               |
| 5                          |   |                               |

In the above—entitled case, the following decision has been rendered or judgement issued:

|                    |
|--------------------|
| DECISION/JUDGEMENT |
|--------------------|

|       |                   |      |
|-------|-------------------|------|
| CLERK | (BY) DEPUTY CLERK | DATE |
|-------|-------------------|------|

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
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Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|------------|------------|---------------------|------------------|
| 13/117,301      | 02/24/2015 | 8962059    | 13044-9A            | 7354             |

32841 7590 02/04/2015  
BAHRET & ASSOCIATES  
320 NORTH MERIDIAN STREET  
SUITE 510  
INDIANAPOLIS, IN 46204

**ISSUE NOTIFICATION**

The projected patent number and issue date are specified above.

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**  
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 81 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Christopher S. Froderman, Avon, IN;  
William C. Hildebrand, Indianapolis, IN;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](http://SelectUSA.gov).

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
 or **Fax** (571)-273-2885

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

32841 7590 11/06/2014  
**BAHRET & ASSOCIATES**  
**320 NORTH MERIDIAN STREET**  
**SUITE 510**  
**INDIANAPOLIS, IN 46204**

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

|                    |
|--------------------|
| (Depositor's name) |
| (Signature)        |
| (Date)             |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR     | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|--------------------------|---------------------|------------------|
| 13/117,301      | 05/27/2011  | Christopher S. Froderman | 13044-9A            | 7354             |

TITLE OF INVENTION: BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME

| APPLN. TYPE    | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | SMALL         | \$480         | \$0                 | \$0                  | \$480            | 02/06/2015 |

| EXAMINER              | ART UNIT | CLASS-SUBCLASS |
|-----------------------|----------|----------------|
| PRAKASH, SUBBALAKSHMI | 1793     | 426-601000     |

|  |  |
|--|--|
| <p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.</p> | <p>2. For printing on the patent front page, list</p> <p>(1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 <u>William F. Bahret</u></p> <p>(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____</p> <p>3 _____</p> |
|--|--|

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE  
 Superior Oil Company, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)  
 Indianapolis, IN

Please check the appropriate assignee category or categories (will not be printed on the patent):  Individual  Corporation or other private group entity  Government

|  |   |
|--|---|
| <p>4a. The following fee(s) are submitted:</p> <p><input checked="" type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p> | <p>4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input checked="" type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 502176 (enclose an extra copy of this form).</p> |
|--|---|

5. Change in Entity Status (from status indicated above)

Applicant certifying micro entity status. See 37 CFR 1.29

Applicant asserting small entity status. See 37 CFR 1.27

Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature William F. Bahret Date January 6, 2015

Typed or printed name William F. Bahret Registration No. 31,087

| Electronic Patent Application Fee Transmittal      |   |          |        |                      |
|--|---|----------|--------|----------------------|
| <b>Application Number:</b>                         | 13117301  |          |        |                      |
| <b>Filing Date:</b>                                | 27-May-2011   |          |        |                      |
| <b>Title of Invention:</b>                         | BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME |          |        |                      |
| <b>First Named Inventor/Applicant Name:</b>        | Christopher S. Froderman                                    |          |        |                      |
| <b>Filer:</b>                                      | William F. Bahret/Joyce Eden                                |          |        |                      |
| <b>Attorney Docket Number:</b>                     | 13044-9A  |          |        |                      |
| Filed as Small Entity                              |   |          |        |                      |
| <b>Filing Fees for Utility under 35 USC 111(a)</b> |   |          |        |                      |
| Description  | Fee Code  | Quantity | Amount | Sub-Total in USD(\$) |
| <b>Basic Filing:</b>                               |   |          |        |                      |
| <b>Pages:</b>                                      |   |          |        |                      |
| <b>Claims:</b>                                     |   |          |        |                      |
| <b>Miscellaneous-Filing:</b>                       |   |          |        |                      |
| <b>Petition:</b>                                   |   |          |        |                      |
| <b>Patent-Appeals-and-Interference:</b>            |   |          |        |                      |
| <b>Post-Allowance-and-Post-Issuance:</b>           |   |          |        |                      |
| Utility Appl Issue Fee                             | 2501  | 1        | 480    | 480                  |

| Description               | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|---------------------------|----------|----------|--------|----------------------|
| <b>Extension-of-Time:</b> |          |          |        |                      |
| <b>Miscellaneous:</b>     |          |          |        |                      |
| <b>Total in USD (\$)</b>  |          |          |        | <b>480</b>           |

| <b>Electronic Acknowledgement Receipt</b>   |   |
|---|---|
| <b>EFS ID:</b>                              | 21132258  |
| <b>Application Number:</b>                  | 13117301  |
| <b>International Application Number:</b>    |   |
| <b>Confirmation Number:</b>                 | 7354  |
| <b>Title of Invention:</b>                  | BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME |
| <b>First Named Inventor/Applicant Name:</b> | Christopher S. Froderman                                    |
| <b>Customer Number:</b>                     | 32841   |
| <b>Filer:</b>                               | William F. Bahret/Joyce Eden                                |
| <b>Filer Authorized By:</b>                 | William F. Bahret   |
| <b>Attorney Docket Number:</b>              | 13044-9A  |
| <b>Receipt Date:</b>                        | 06-JAN-2015   |
| <b>Filing Date:</b>                         | 27-MAY-2011   |
| <b>Time Stamp:</b>                          | 15:25:45  |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                 |

**Payment information:**

|  |                   |
|--|-------------------|
| Submitted with Payment                   | yes               |
| Payment Type                             | Credit Card       |
| Payment was successfully received in RAM | \$480             |
| RAM confirmation Number                  | 1689              |
| Deposit Account                          | 502176            |
| Authorized User                          | BAHRET, WILLIAM F |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

**File Listing:**

| Document Number | Document Description        | File Name                        | File Size(Bytes)/ Message Digest                   | Multi Part /.zip | Pages (if appl.) |
|-----------------|-----------------------------|----------------------------------|--|------------------|------------------|
| 1               | Issue Fee Payment (PTO-85B) | Part_B_Issue_Fee_Transmittal.PDF | 156166<br>9e8a7c42bb1e8ba7b1bf31c0b11178780e5be662 | no               | 1                |

**Warnings:**

**Information:**

|   |                      |              |   |    |   |
|---|----------------------|--------------|---|----|---|
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 30560<br>de1b96b67de15c9fd668e5d6e4327513c6dca592 | no | 2 |
|---|----------------------|--------------|---|----|---|

**Warnings:**

**Information:**

**Total Files Size (in bytes):** 186726

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for Christopher S. Froderman and examiner Prakash, Subbalakshmi.

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

joyce@bahretlaw.com
bahret@bahretlaw.com
rfrisk@bahretlaw.com



|                               |   |   |  |
|-------------------------------|---|---|--|
| <b>Notice of Allowability</b> | <b>Application No.</b><br>13/117,301    | <b>Applicant(s)</b><br>FRODERMAN ET AL. |  |
|                               | <b>Examiner</b><br>Subbalakshmi Prakash | <b>Art Unit</b><br>1793                 | <b>AIA (First Inventor to File) Status</b><br>No |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to paper filed 8/5/2014.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2.  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3.  The allowed claim(s) is/are 6-8, 11-14, 18-26. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a)  All    b)  Some    \*c)  None of the:
1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
 including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 5. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                  |
| 2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____    | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 7. <input type="checkbox"/> Other _____.   |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____.                     |  |

/Subbalakshmi Prakash/  
Examiner, Art Unit 1793

/HUMERA SHEIKH/  
Supervisory Patent Examiner, Art Unit 1784

***Supplemental Notice of Allowability***

A Notice of Allowance was mailed on 11/6/2014. An examiner's amendment to the record was made therein to correct numbering of claims. However, subject matter in claims 11 (renumbered as claim 9) and 12 (renumbered as claim 10) that was previously canceled by the applicant in an amendment filed 8/5/2014 inadvertently appeared therein. A Supplemental Notice of Allowability is therefore issued to correct the previous Examiner's Amendment to the record.

**SUPPLEMENTAL EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

9. (Currently amended) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 1, the method further comprising: ~~evaporating water from the byproduct stream prior to said applying step;~~ and drying the byproduct stream after said oil separating step to produce a distillers dried grains product suitable for animal feed.

10. (Currently amended) An organic composition produced according to the method of claim 1, said organic composition comprising oil derived from a byproduct stream of a bio-based ethanol production process and an oil concentrator, ~~the oil concentrator comprising a surfactant compound including an ethoxylated sorbitan ester and having a~~

Art Unit: 1793

~~hydrophilic group and a lipophilic group providing the oil concentrator a hydrophilic lipophile balance (HLB) of about 12 to about 18.~~

The following is an examiner's statement of reasons for allowance:

The closest art is *Scheimann* et al. (US 2007/021007A1).

*Scheimann* discloses an emulsion polymer, which is an invertible water-in-oil polymer emulsion comprising an anionic polymer, a hydrocarbon oil, a water-in-oil emulsifying agent and potentially an inverting surfactant in separating solids and oil from an aqueous by-product stream from a bioethanol production process. The water-in-oil emulsifying agent useful for preparing the emulsion polymers of *Scheimann* can include ethoxylated sorbitan esters of fatty acids including polyoxyethylene sorbitan. However, *Scheimann* does not teach the application of ethoxylated sorbitan ester by itself as an oil concentrator in recovering bound oil from a by-product stream from a bio-based ethanol production process. In *Scheimann*, the ethoxylated sorbitan ester is incorporated into an emulsion polymer which also comprises an anionic polymer, hydrocarbon oil, and potentially an inverting surfactant.

Related art published after the filing date of the instant application, is US 2012/0245370 A1 (published September 27, 2012, now US patent number US 8,841,469 B2 September 13, 2014) which discloses sorbitan esters of fatty acids in recovering bound oil from stillage.

***Correspondence***

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Subbalakshmi Prakash whose telephone number is (571)270-3685. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michele Jacobson can be reached on 571-272-8905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUMERA SHEIKH/  
Supervisory Patent Examiner, Art Unit 1784

/Subbalakshmi Prakash/  
Examiner, Art Unit 1793

|                                   |                                       |   |             |
|-----------------------------------|---------------------------------------|---|-------------|
| <b>Notice of References Cited</b> | Application/Control No.<br>13/117,301 | Applicant(s)/Patent Under Reexamination<br>FRODERMAN ET AL. |             |
|                                   | Examiner<br>Subbalakshmi Prakash      | Art Unit<br>1793  | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name             | Classification |
|---|--|-----------------|------------------|----------------|
|   | A US-  |                 |                  |                |
| * | B US-2007/0238891 A1                             | 10-2007         | Winsness et al.  | 554/008        |
| * | C US-2007/0210007 A1                             | 09-2007         | Scheimann et al. | 210/728        |
| * | D US-2012/0245370 A1                             | 09-2012         | Sheppard et al.  | 554/204        |
|   | E US-  |                 |                  |                |
|   | F US-  |                 |                  |                |
|   | G US-  |                 |                  |                |
|   | H US-  |                 |                  |                |
|   | I US-  |                 |                  |                |
|   | J US-  |                 |                  |                |
|   | K US-  |                 |                  |                |
|   | L US-  |                 |                  |                |
|   | M US-  |                 |                  |                |


**FOREIGN PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | Classification |
|---|--|-----------------|---------|------|----------------|
|   | N  |                 |         |      |                |
|   | O  |                 |         |      |                |
|   | P  |                 |         |      |                |
|   | Q  |                 |         |      |                |
|   | R  |                 |         |      |                |
|   | S  |                 |         |      |                |
|   | T  |                 |         |      |                |

**NON-PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code  | Date<br>MM-YYYY | Country | Name  | Classification |
|---|---|-----------------|---------|---|----------------|
|   | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |                 |         |   |                |
| * | U   |                 |         | HUI WANG, TONG WANG, AND LAWRENCE A. JOHNSON Effect of Low-Shear Extrusion on Corn Fermentation and Oil Partition. J. Agric. Food Chem. 2009, 57, 2302-2307 |                |
|   | V   |                 |         |   |                |
|   | W   |                 |         |   |                |
|   | X   |                 |         |   |                |


\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

|  |  |  |
|--|--|--|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br>1793  |

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| <b>CPC</b>    |             |                |
| <b>Symbol</b> | <b>Type</b> | <b>Version</b> |
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| <b>CPC Combination Sets</b> |             |            |                |                |
| <b>Symbol</b>               | <b>Type</b> | <b>Set</b> | <b>Ranking</b> | <b>Version</b> |
|                             |             |            |                |                |

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| /SUBBALAKSHMI PRAKASH/<br>Examiner.Art Unit 1793<br><br>(Assistant Examiner)           | 10/30/14<br><br>(Date)   | <b>Total Claims Allowed:</b><br><br>16 |                            |
| /HUMERA SHEIKH/<br>Supervisory Patent Examiner.Art Unit 1784<br><br>(Primary Examiner) | 11/01/2014<br><br>(Date) | O.G. Print Claim(s)<br><br>1           | O.G. Print Figure<br><br>1 |

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| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br>1793  |

| US ORIGINAL CLASSIFICATION |                                   |          |  | INTERNATIONAL CLASSIFICATION |   |   |   |             |  |  |  |
|----------------------------|-----------------------------------|----------|--|------------------------------|---|---|---|-------------|--|--|--|
| CLASS                      |                                   | SUBCLASS |  | CLAIMED                      |   |   |   | NON-CLAIMED |  |  |  |
| 426                        |                                   | 601      |  | C                            | 1 | 1 | B | 3 / 16      |  |  |  |
| <b>CROSS REFERENCE(S)</b>  |                                   |          |  | C                            | 1 | 1 | B | 13 / 00     |  |  |  |
| CLASS                      | SUBCLASS (ONE SUBCLASS PER BLOCK) |          |  |                              |   |   |   |             |  |  |  |
| 554                        | 206                               |          |  |                              |   |   |   |             |  |  |  |
| 426                        | 623                               |          |  |                              |   |   |   |             |  |  |  |
|                            |                                   |          |  |                              |   |   |   |             |  |  |  |
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| /SUBBALAKSHMI PRAKASH/<br>Examiner.Art Unit 1793<br><br>(Assistant Examiner)           | 10/30/14<br><br>(Date)   | <b>Total Claims Allowed:</b><br><br>16 |                            |
| /HUMERA SHEIKH/<br>Supervisory Patent Examiner.Art Unit 1784<br><br>(Primary Examiner) | 11/01/2014<br><br>(Date) | O.G. Print Claim(s)<br><br>1           | O.G. Print Figure<br><br>1 |

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| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br>1793  |

| <input type="checkbox"/> <b>Claims renumbered in the same order as presented by applicant</b> <input type="checkbox"/> <b>CPA</b> <input type="checkbox"/> <b>T.D.</b> <input type="checkbox"/> <b>R.1.47</b> |          |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
|---|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|
| Final   | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original |
|   | 1        |       | 17       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 2        | 1     | 18       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 3        | 2     | 19       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 4        | 3     | 20       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 5        | 4     | 21       |       |          |       |          |       |          |       |          |       |          |       |          |
| 6   | 6        | 5     | 22       |       |          |       |          |       |          |       |          |       |          |       |          |
| 7   | 7        | 13    | 23       |       |          |       |          |       |          |       |          |       |          |       |          |
| 8   | 8        | 14    | 24       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 9        | 15    | 25       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 10       | 16    | 26       |       |          |       |          |       |          |       |          |       |          |       |          |
| 9   | 11       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
| 10  | 12       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
| 11  | 13       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
| 12  | 14       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 15       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 16       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |

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|--|--------------------------|--|----------------------------|
| /SUBBALAKSHMI PRAKASH/<br>Examiner.Art Unit 1793<br><br>(Assistant Examiner)           | 10/30/14<br><br>(Date)   | <b>Total Claims Allowed:</b><br><br>16 |                            |
| /HUMERA SHEIKH/<br>Supervisory Patent Examiner.Art Unit 1784<br><br>(Primary Examiner) | 11/01/2014<br><br>(Date) | O.G. Print Claim(s)<br><br>1           | O.G. Print Figure<br><br>1 |





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**BIB DATA SHEET**
**CONFIRMATION NO. 7354**

| SERIAL NUMBER  | FILING or 371(c) DATE   | CLASS                         | GROUP ART UNIT  | ATTORNEY DOCKET NO.       |                                |
|--|---|-------------------------------|---|---------------------------|--------------------------------|
| 13/117,301   | 05/27/2011  | 426                           | 1793  | 13044-9A                  |                                |
| <b>APPLICANTS</b><br><b>INVENTORS</b><br>Christopher S. Froderman, Avon, IN;<br>William C. Hildebrand, Indianapolis, IN;<br><b>** CONTINUING DATA *****</b><br><b>** FOREIGN APPLICATIONS *****</b><br><b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY **</b><br>06/08/2011 |   |                               |   |                           |                                |
| Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Verified and /SUBBALAKSHMI<br>PRAKASH/<br>Acknowledged Examiner's Signature                | <input type="checkbox"/> Met after Allowance<br>Initials  | <b>STATE OR COUNTRY</b><br>IN | <b>SHEETS DRAWINGS</b><br>5   | <b>TOTAL CLAIMS</b><br>17 | <b>INDEPENDENT CLAIMS</b><br>2 |
| <b>ADDRESS</b><br>BAHRET & ASSOCIATES<br>320 NORTH MERIDIAN STREET<br>SUITE 510<br>INDIANAPOLIS, IN 46204<br>UNITED STATES   |   |                               |   |                           |                                |
| <b>TITLE</b><br>BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME  |   |                               |   |                           |                                |
| <b>FILING FEE RECEIVED</b><br>680  | FEES: Authority has been given in Paper<br>No. _____ to charge/credit DEPOSIT ACCOUNT<br>No. _____ for following: |                               | <input type="checkbox"/> All Fees<br><input type="checkbox"/> 1.16 Fees (Filing)<br><input type="checkbox"/> 1.17 Fees (Processing Ext. of time)<br><input type="checkbox"/> 1.18 Fees (Issue)<br><input type="checkbox"/> Other _____<br><input type="checkbox"/> Credit |                           |                                |

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| <b>Search Notes</b><br><br> | <b>Application/Control No.</b><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br>1793  |

| CPC- SEARCHED         |         |          |
|-----------------------|---------|----------|
| Symbol                | Date    | Examiner |
| C11B 1/10, C11B 13/00 | 10/2014 | SP       |

| CPC COMBINATION SETS - SEARCHED |      |          |
|---------------------------------|------|----------|
| Symbol                          | Date | Examiner |
|                                 |      |          |

| US CLASSIFICATION SEARCHED |          |                 |          |
|----------------------------|----------|-----------------|----------|
| Class                      | Subclass | Date            | Examiner |
| 426                        | 601,623  | 2/2013, 10/2014 | SP       |
| 554                        | 204,206  |                 |          |

| SEARCH NOTES  |               |          |
|---|---------------|----------|
| Search Notes  | Date          | Examiner |
| EAST: Search Terms: water/aqueous, oil/grease, dissolved solids, separation/extraction/recovery, surfactant/surface active agent/concentrator, byproduct/waste stream, demulsification, emulsification, stillage, corn, ethanol, HLB, inventors, wetting agent, emulsifier, polyoxyethylene, sorbitan ester, Tween, Polysorbate | 2/2013,5/2014 | SP       |
| Google Scholar  | 2/2013,5/2014 | SP       |

| INTERFERENCE SEARCH     |                         |                 |          |
|-------------------------|-------------------------|-----------------|----------|
| US Class/<br>CPC Symbol | US Subclass / CPC Group | Date            | Examiner |
| 426                     | 601,623                 | 5/2014, 10/2014 | SP       |
| 554                     | 206                     |                 |          |

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NOTICE OF ALLOWANCE AND FEE(S) DUE

32841 7590 11/06/2014
BAHRET & ASSOCIATES
320 NORTH MERIDIAN STREET
SUITE 510
INDIANAPOLIS, IN 46204

EXAMINER

PRAKASH, SUBBALAKSHMI

ART UNIT PAPER NUMBER

1793

DATE MAILED: 11/06/2014

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

13/117,301 05/27/2011 Christopher S. Froderman 13044-9A 7354

TITLE OF INVENTION: BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME

Table with 7 columns: APPLN. TYPE, ENTITY STATUS, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

nonprovisional SMALL \$480 \$0 \$0 \$480 02/06/2015

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

**PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

32841 7590 11/06/2014  
**BAHRET & ASSOCIATES**  
 320 NORTH MERIDIAN STREET  
 SUITE 510  
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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

|                             |
|-----------------------------|
| _____<br>(Depositor's name) |
| _____<br>(Signature)        |
| _____<br>(Date)             |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR     | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|--------------------------|---------------------|------------------|
| 13/117,301      | 05/27/2011  | Christopher S. Froderman | 13044-9A            | 7354             |

TITLE OF INVENTION: BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME

| APPLN. TYPE    | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | SMALL         | \$480         | \$0                 | \$0                  | \$480            | 02/06/2015 |

| EXAMINER              | ART UNIT | CLASS-SUBCLASS |
|-----------------------|----------|----------------|
| PRAKASH, SUBBALAKSHMI | 1793     | 426-601000     |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).  
 Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
 "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list  
 (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_  
 (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_  
 3 \_\_\_\_\_

**3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.  
 (A) NAME OF ASSIGNEE \_\_\_\_\_ (B) RESIDENCE: (CITY AND STATE OR COUNTRY) \_\_\_\_\_

Please check the appropriate assignee category or categories (will not be printed on the patent) :  Individual  Corporation or other private group entity  Government

4a. The following fee(s) are submitted:  
 Issue Fee  
 Publication Fee (No small entity discount permitted)  
 Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)  
 A check is enclosed.  
 Payment by credit card. Form PTO-2038 is attached.  
 The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)  
 Applicant certifying micro entity status. See 37 CFR 1.29  
 Applicant asserting small entity status. See 37 CFR 1.27  
 Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.  
**NOTE:** If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.  
**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

**NOTE:** This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes details for application 13/117,301 filed 05/27/2011 by Christopher S. Froderman, attorney docket no. 13044-9A, confirmation no. 7354. Also includes examiner PRAKASH, SUBBALAKSHMI, art unit 1793, and date mailed 11/06/2014.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

|                               |   |   |  |
|-------------------------------|---|---|--|
| <b>Notice of Allowability</b> | <b>Application No.</b><br>13/117,301    | <b>Applicant(s)</b><br>FRODERMAN ET AL. |  |
|                               | <b>Examiner</b><br>Subbalakshmi Prakash | <b>Art Unit</b><br>1793                 | <b>AIA (First Inventor to File) Status</b><br>No |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to paper filed 8/5/2014.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2.  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3.  The allowed claim(s) is/are 6-8, 11-14, 18-26. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a)  All    b)  Some    \*c)  None of the:
1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
 including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date _____</li> <li>3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material</li> <li>4. <input type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____</li> </ol> | <ol style="list-style-type: none"> <li>5. <input checked="" type="checkbox"/> Examiner's Amendment/Comment</li> <li>6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>7. <input type="checkbox"/> Other _____.</li> </ol> |
|--|---|

/Subbalakshmi Prakash/  
Examiner, Art Unit 1793

/HUMERA SHEIKH/  
Supervisory Patent Examiner, Art Unit 1784

***Notice of Allowability***

Receipt is acknowledged of the Amendment and Response filed 8/5/2014. Claims 6-8, 11-14 and 18-26 are pending in the application. Claims 6, 11 and 12 were amended, claims 1-5, 9, 10 and 15-17 were canceled and new claims 24-26 were added by the applicants. Claims 6-8, 11-14, and 11-16 are allowable. An examiner's amendment to the record is made to correct numbering of claims.

**EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

6. (Currently amended) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim ~~1~~ ~~48~~, wherein the byproduct stream comprises an aqueous liquid byproduct stream with dissolved solids.

~~{11}~~ 9. (Currently amended) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim ~~1~~ ~~48~~, the method further comprising: evaporating water from the byproduct stream prior to said applying step; and drying the byproduct stream after said oil separating step to produce a distillers dried grains product suitable for animal feed.

~~{12}~~ 10. (Currently amended) An organic composition produced according to the method of claim ~~{48}~~ 1, said organic composition comprising oil derived from a byproduct stream



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of a bio- based ethanol production process and an oil concentrator, the oil concentrator comprising a surfactant compound including an ethoxylated sorbitan ester and having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophilic lipophile balance (HLB) of about 12 to about 18.

~~43~~ 11. (Currently amended) The organic composition of claim ~~42~~ 10, wherein the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is whole stillage remaining from a distillation bottom.

~~44~~ 12. (Currently amended) The organic composition of claim ~~42~~ 10, wherein the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is a thin stillage or syrup derived therefrom separated from the whole stillage by centrifugation.

~~48~~ 1. (Currently amended) A method of extracting oil from a byproduct stream of a bio-based ethanol production process, comprising:

mixing an ethoxylated sorbitan ester with the byproduct stream;

centrifuging the mixture of the ethoxylated sorbitan ester and the byproduct

stream; and

separating the oil from the mixture.

~~49~~ 2. (Currently amended) The method of claim ~~48~~ 1, wherein the ethoxylated sorbitan ester includes polyoxyethylene (20) sorbitan.

~~20~~ 3. (Currently amended) The method of claim ~~49~~ 2, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan monooleate.

Art Unit: 1793

~~21~~ 4. (Currently amended) The method of claim ~~19~~ 2, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan trioleate.

~~22~~ 5. (Currently amended) The method of claim ~~19~~ 2, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan tristearate.

~~23~~ 13. (Currently amended) A method of extracting oil from a liquid stillage byproduct of a bio-based ethanol production process, comprising:

evaporating water from the liquid stillage to produce a syrup;

processing the syrup to a temperature between 100° F and 212° F and a pH between 3 and 7;

mixing a polyoxyethylene (20) sorbitan ester with the syrup;

centrifuging the mixture; and

separating the oil from the mixture.

~~24~~ 14. (Currently amended) The method of claim ~~23~~ 13, wherein the sorbitan ester includes polyoxyethylene (20) sorbitan monooleate.

~~25~~ 15. (Currently amended) The method of claim ~~23~~ 13, wherein the sorbitan ester includes polyoxyethylene (20) sorbitan trioleate.

~~26~~ 16. (Currently amended) The method of claim ~~23~~ 13, wherein the sorbitan ester includes polyoxyethylene (20) sorbitan tristearate.

The following is an examiner's statement of reasons for allowance:

The closest art is *Scheimann* et al. (US 2007/0210007A1).

*Scheimann* discloses an emulsion polymer, which is an invertible water-in-oil polymer emulsion comprising an anionic polymer, a hydrocarbon oil, a water-in-oil emulsifying agent and potentially an inverting surfactant in separating solids and oil from an aqueous by-product stream from a bioethanol production process. The water-in-oil emulsifying agent useful for preparing the emulsion polymers of *Schiemann* can include ethoxylated sorbitan esters of fatty acids including polyoxyethylene sorbitan. However, *Scheimann* does not teach the application of ethoxylated sorbitan ester by itself as an oil concentrator in recovering bound oil from a by-product stream from a bio-based ethanol production process. In *Scheimann*, the ethoxylated sorbitan ester is incorporated into an emulsion polymer which also comprises an anionic polymer, hydrocarbon oil, and potentially an inverting surfactant.

Related art published after the filing date of the instant application, is US 2012/0245370 A1 (published September 27, 2012, now US patent number US 8,841,469 B2 September 13, 2014) which discloses sorbitan esters of fatty acids in recovering bound oil from stillage.

### ***Correspondence***

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Subbalakshmi Prakash whose telephone number is (571)270-3685. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michele Jacobson can be reached on 571-272-8905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUMERA SHEIKH/  
Supervisory Patent Examiner, Art Unit 1784

/Subbalakshmi Prakash/  
Examiner, Art Unit 1793

|                                   |                                       |   |             |
|-----------------------------------|---------------------------------------|---|-------------|
| <b>Notice of References Cited</b> | Application/Control No.<br>13/117,301 | Applicant(s)/Patent Under Reexamination<br>FRODERMAN ET AL. |             |
|                                   | Examiner<br>Subbalakshmi Prakash      | Art Unit<br>1793  | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name             | Classification |
|---|--|-----------------|------------------|----------------|
|   | A US-  |                 |                  |                |
| * | B US-2007/0238891 A1                             | 10-2007         | Winsness et al.  | 554/008        |
| * | C US-2007/0210007 A1                             | 09-2007         | Scheimann et al. | 210/728        |
| * | D US-2012/0245370 A1                             | 09-2012         | Sheppard et al.  | 554/204        |
|   | E US-  |                 |                  |                |
|   | F US-  |                 |                  |                |
|   | G US-  |                 |                  |                |
|   | H US-  |                 |                  |                |
|   | I US-  |                 |                  |                |
|   | J US-  |                 |                  |                |
|   | K US-  |                 |                  |                |
|   | L US-  |                 |                  |                |
|   | M US-  |                 |                  |                |


**FOREIGN PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | Classification |
|---|--|-----------------|---------|------|----------------|
|   | N  |                 |         |      |                |
|   | O  |                 |         |      |                |
|   | P  |                 |         |      |                |
|   | Q  |                 |         |      |                |
|   | R  |                 |         |      |                |
|   | S  |                 |         |      |                |
|   | T  |                 |         |      |                |

**NON-PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code  | Date<br>MM-YYYY | Country | Name  | Classification |
|---|---|-----------------|---------|---|----------------|
|   | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |                 |         |   |                |
| * | U   |                 |         | HUI WANG, TONG WANG, AND LAWRENCE A. JOHNSON Effect of Low-Shear Extrusion on Corn Fermentation and Oil Partition. J. Agric. Food Chem. 2009, 57, 2302-2307 |                |
|   | V   |                 |         |   |                |
|   | W   |                 |         |   |                |
|   | X   |                 |         |   |                |

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

|  |  |  |
|--|--|--|
| <b>Search Notes</b><br><br> | <b>Application/Control No.</b><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br>1793  |

| CPC- SEARCHED         |         |          |
|-----------------------|---------|----------|
| Symbol                | Date    | Examiner |
| C11B 1/10, C11B 13/00 | 10/2014 | SP       |

| CPC COMBINATION SETS - SEARCHED |      |          |
|---------------------------------|------|----------|
| Symbol                          | Date | Examiner |
|                                 |      |          |

| US CLASSIFICATION SEARCHED |          |                 |          |
|----------------------------|----------|-----------------|----------|
| Class                      | Subclass | Date            | Examiner |
| 426                        | 601,623  | 2/2013, 10/2014 | SP       |
| 554                        | 204,206  |                 |          |

| SEARCH NOTES  |               |          |
|---|---------------|----------|
| Search Notes  | Date          | Examiner |
| EAST: Search Terms: water/aqueous, oil/grease, dissolved solids, separation/extraction/recovery, surfactant/surface active agent/concentrator, byproduct/waste stream, demulsification, emulsification, stillage, corn, ethanol, HLB, inventors, wetting agent, emulsifier, polyoxyethylene, sorbitan ester, Tween, Polysorbate | 2/2013,5/2014 | SP       |
| Google Scholar  | 2/2013,5/2014 | SP       |

| INTERFERENCE SEARCH     |                         |                 |          |
|-------------------------|-------------------------|-----------------|----------|
| US Class/<br>CPC Symbol | US Subclass / CPC Group | Date            | Examiner |
| 426                     | 601,623                 | 5/2014, 10/2014 | SP       |
| 554                     | 206                     |                 |          |

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**BIB DATA SHEET**
**CONFIRMATION NO. 7354**

| SERIAL NUMBER  | FILING or 371(c) DATE   | CLASS                         | GROUP ART UNIT  | ATTORNEY DOCKET NO.       |                                |
|--|---|-------------------------------|---|---------------------------|--------------------------------|
| 13/117,301   | 05/27/2011  | 426                           | 1793  | 13044-9A                  |                                |
| <b>APPLICANTS</b><br><b>INVENTORS</b><br>Christopher S. Froderman, Avon, IN;<br>William C. Hildebrand, Indianapolis, IN;<br><b>** CONTINUING DATA *****</b><br><b>** FOREIGN APPLICATIONS *****</b><br><b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY **</b><br>06/08/2011 |   |                               |   |                           |                                |
| Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Verified and /SUBBALAKSHMI<br>PRAKASH/<br>Acknowledged Examiner's Signature                | <input type="checkbox"/> Met after Allowance<br>Initials  | <b>STATE OR COUNTRY</b><br>IN | <b>SHEETS DRAWINGS</b><br>5   | <b>TOTAL CLAIMS</b><br>17 | <b>INDEPENDENT CLAIMS</b><br>2 |
| <b>ADDRESS</b><br>BAHRET & ASSOCIATES<br>320 NORTH MERIDIAN STREET<br>SUITE 510<br>INDIANAPOLIS, IN 46204<br>UNITED STATES   |   |                               |   |                           |                                |
| <b>TITLE</b><br>BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME  |   |                               |   |                           |                                |
| <b>FILING FEE RECEIVED</b><br>680  | FEES: Authority has been given in Paper<br>No. _____ to charge/credit DEPOSIT ACCOUNT<br>No. _____ for following: |                               | <input type="checkbox"/> All Fees<br><input type="checkbox"/> 1.16 Fees (Filing)<br><input type="checkbox"/> 1.17 Fees (Processing Ext. of time)<br><input type="checkbox"/> 1.18 Fees (Issue)<br><input type="checkbox"/> Other _____<br><input type="checkbox"/> Credit |                           |                                |

## EAST Search History

## EAST Search History (Prior Art)

| Ref # | Hits | Search Query  | DBs  | Default Operator | Plurals | Time Stamp          |
|-------|------|---|--|------------------|---------|---------------------|
| L1    | 8    | stillage sorbitan<br>((426/601,424,623).ccls. OR<br>(554/8,9.121.204,206).ccls. OR<br>(C11B1/10 OR C11B13/00).cpc.) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND              | ON      | 2014/10/30<br>19:48 |
| S1    | 159  | oil byproduct corn (surfactant OR<br>concentrat\$3 OR hydrophil\$3 OR<br>lipophil\$3)                               | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>12:38 |
| S3    | 17   | S1 stillage   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>12:47 |
| S4    | 20   | oil byproduct corn (surfactant OR<br>detergent)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>12:55 |
| S6    | 41   | stillage alkali   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>13:08 |
| S7    | 4    | stillage (oil ADJ recovery)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR             | ON      | 2012/07/24<br>13:56 |
| S8    | 20   | HLB ("10" OR "12" OR "18" OR "19")<br>oil   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR             | ON      | 2012/07/24<br>14:05 |
| S10   | 20   | (ammonium ADJ oleate) surfactant  | US-PGPUB;  | NEAR             | ON      | 2012/07/24          |



## EAST Search History

|     |     |   |  |      |    |                     |
|-----|-----|---|--|------|----|---------------------|
|     |     |   | USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB              |      |    | 14:22               |
| S14 | 63  | oil (separation OR recover\$3) (alcohol OR ethanol) fermentation (emulsifier OR surfactant) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/24<br>14:32 |
| S15 | 0   | ("8008516").URPN.   | USPAT  | OR   | ON | 2012/07/24<br>14:37 |
| S16 | 9   | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND oil  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2012/07/24<br>15:05 |
| S17 | 0   | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND ethanol                                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2012/07/24<br>15:08 |
| S18 | 0   | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND biofuel                                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2012/07/24<br>15:09 |
| S19 | 36  | surfactant HLB (oil ADJ recovery)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:01 |
| S20 | 0   | surfactant HLB (oil ADJ extraction)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:03 |
| S21 | 21  | surfactant HLB extraction oil   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:03 |
| S22 | 718 | hlb ADJ "12"  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;                                | SAME | ON | 2012/07/25<br>20:08 |

|     |     |   |  |      |    |                     |
|-----|-----|---|--|------|----|---------------------|
|     |     |   | JPO;<br>DERWENT;<br>IBM_TDB  |      |    |                     |
| S23 | 135 | S22 oil   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:09 |
| S24 | 1   | (corn ADJ oil) recovery HLB   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/26<br>12:38 |
| S26 | 3   | (corn ADJ oil) recovery HLB<br>demulsification                        | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:39 |
| S27 | 23  | (oil ADJ recovery) HLB<br>demulsification                             | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:40 |
| S32 | 22  | ((oil ADJ recovery) HLB).ab.  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:49 |
| S34 | 4   | oil stillage HLB  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>14:56 |
| S35 | 16  | ("4662990").URPN.   | USPAT  | OR   | ON | 2012/07/26<br>14:57 |
| S36 | 3   | S35 surfactant HLB  | USPAT  | AND  | ON | 2012/07/26<br>15:00 |
| S38 | 8   | (oil NEAR release) (waste OR<br>byproduct) surfactant HLB             | USPAT  | AND  | ON | 2012/07/26<br>15:21 |
| S39 | 19  | ("4179369").URPN.   | USPAT  | OR   | ON | 2012/07/26<br>15:25 |
| S40 | 7   | water oil (dissolved ADJ solids)<br>surfactant separation             | USPAT  | SAME | ON | 2012/07/26<br>15:39 |
| S41 | 128 | water oil (dissolved ADJ solids)<br>surfactant                        | USPAT  | SAME | ON | 2012/07/26<br>15:41 |
| S52 | 464 | ((oil OR grease) NEAR (recover\$3 OR<br>extract\$3)) surfactant).clm. | USPAT  | AND  | ON | 2012/07/26<br>15:57 |

## EAST Search History

|     |     |   |  |      |    |                     |
|-----|-----|---|--|------|----|---------------------|
| S55 | 4   | ((oil ADJ extraction) surfactant).ab.   | USPAT  | AND  | ON | 2012/07/26<br>16:01 |
| S56 | 6   | ((oil ADJ extraction) surfactant).clm.  | USPAT  | AND  | ON | 2012/07/26<br>16:01 |
| S60 | 1   | (oil (ethanol ADJ production) surfactant).clm.  | USPAT  | AND  | ON | 2012/07/26<br>16:03 |
| S61 | 8   | ("4797214").URPN.   | USPAT  | OR   | ON | 2012/07/26<br>16:07 |
| S62 | 165 | stillage oil surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>12:58 |
| S67 | 45  | ("2663718" "5250182" "5662810"<br>"5795477" "6433146" "20030180415"<br>"20040087808" "20050155282"<br>"20060006116" "20080110577"<br>"20080125612" "20090227004"<br>"7601858" "7608729"<br>"20090293344").pn. | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2013/02/04<br>13:33 |
| S68 | 1   | S67 surfactant  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>13:34 |
| S69 | 0   | fermentation (by ADJ product) oil surfactant  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>14:09 |
| S70 | 406 | fermentation oil surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>14:10 |
| S71 | 0   | fermentation oil surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR | ON | 2013/02/04<br>14:10 |
| S72 | 132 | S70 corn  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>14:16 |
| S73 | 24  | S72 polyoxyethylene   | US-PGPUB;<br>USPAT;<br>USOCR;  | AND  | ON | 2013/02/04<br>14:17 |

## EAST Search History

|     |      |                                       |  |      |    |                     |
|-----|------|---------------------------------------|--|------|----|---------------------|
|     |      |                                       | FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB                                  |      |    |                     |
| S74 | 0    | surfactant HLB oil (waste ADJ stream) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>16:01 |
| S75 | 81   | surfactant HLB oil (waste ADJ stream) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>16:02 |
| S76 | 0    | surfactant syrup oil                  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR | ON | 2013/02/04<br>17:00 |
| S77 | 3003 | surfactant syrup oil                  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>17:00 |
| S78 | 0    | S77 stillage                          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:00 |
| S79 | 1700 | S77 corn ethanol                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:00 |
| S80 | 336  | S77 corn ethanol recovery             | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:01 |
| S81 | 0    | S77 (bio ADJ ethanol)                 | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:02 |
| S82 | 7    | surfactant (bio ADJ ethanol)          | US-PGPUB;  | SAME | ON | 2013/02/04          |

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## EAST Search History

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|-----|-----|--------------------------------------|--|------|----|---------------------|
|     |     |                                      | USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB              |      |    | 17:02               |
| S83 | 165 | surfactant oil stillage              | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:03 |
| S84 | 108 | S83 @py<="2011"                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:06 |
| S85 | 14  | S84 sorbitan                         | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:11 |
| S86 | 3   | S85 HLB                              | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:23 |
| S87 | 2   | surfactant HLB (oil ADJ recovery) pH | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>17:39 |
| S88 | 8   | S85 pH                               | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:39 |
| S89 | 399 | (corn ADJ oil) hlb                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/05<br>14:58 |
| S90 | 0   | (corn ADJ oil) hlb                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;            | NEAR | ON | 2013/02/05<br>14:58 |

## EAST Search History

|     |       |   | IBM_TDB  |      |    |                     |
|-----|-------|---|--|------|----|---------------------|
| S91 | 0     | (corn ADJ oil) hlb 12-18  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:59 |
| S92 | 0     | (by ADJ product) oil corn (surfactant OR concentrat\$3 OR hydrophli\$3 OR lipophil\$3 OR emulsi\$3 OR demulsi\$3)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:27 |
| S93 | 0     | (by ADJ product) oil corn (surfactant OR emulsifier)  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:27 |
| S94 | 18715 | oil corn (surfactant OR emulsifier)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:27 |
| S95 | 13330 | S94 ethanol   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:28 |
| S96 | 8194  | S95 polyoxyethylene   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:28 |
| S97 | 1     | S96 stillage  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:28 |
| S98 | 40    | ("20060041153"   "20080299632"   "20090259060"   "5605970"   "5662810"   "5837776"   "5958233"   "5985992"   "6265477"   "7497955"   "7566469"   "7601858"   "7608729"   "7641928").PN. | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:30 |
| S99 | 4     | S98 surfactant  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;                                | AND  | ON | 2013/02/07<br>14:31 |

## EAST Search History

|      |    |                                  |  |      |    |                     |
|------|----|----------------------------------|--|------|----|---------------------|
|      |    |                                  | JPO;<br>DERWENT;<br>IBM_TDB  |      |    |                     |
| S100 | 4  | S98 (surfactant OR emulsifier)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:33 |
| S101 | 0  | S98 TWEEN                        | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:34 |
| S102 | 2  | S98 polyoxyethylene              | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:34 |
| S103 | 12 | nalco stillage                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>17:10 |
| S104 | 7  | S103 (surfactant OR emulsifier)  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>17:10 |
| S105 | 0  | stillage oil (wetting ADJ agent) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>17:25 |
| S106 | 11 | stillage oil (wetting ADJ agent) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>17:25 |
| S107 | 0  | (oil ADJ concentrator) sorbitan  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:42 |
| S108 | 11 | (oil ADJ collector) sorbitan     | US-PGPUB;<br>USPAT;  | AND  | ON | 2014/05/30<br>11:43 |

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|      |     |  |  |      |    |                     |
|------|-----|--|--|------|----|---------------------|
|      |     |  | USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB                        |      |    |                     |
| S109 | 0   | (concentrated ADJ oil) sorbitan emulsion demulsification   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:47 |
| S110 | 13  | (concentrated ADJ oil) surfactant emulsion demulsification | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:47 |
| S111 | 0   | aqueous oil surfactant emulsion demulsification stillage   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:48 |
| S112 | 65  | aqueous oil surfactant emulsion stillage                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:48 |
| S113 | 0   | (oil ADJ removaql) stillage surfactant                     | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:53 |
| S114 | 13  | (oil ADJ removal) stillage surfactant                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:54 |
| S115 | 692 | syrup surfactant oil                                       | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | WITH | ON | 2014/05/30<br>16:44 |
| S116 | 0   | S115 stillage  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | WITH | ON | 2014/05/30<br>16:44 |



## EAST Search History

|      |    |                               |  |      |    |                     |
|------|----|-------------------------------|--|------|----|---------------------|
| S117 | 0  | S115 stillage                 | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>16:45 |
| S118 | 0  | S115 bioethanol               | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>16:45 |
| S119 | 0  | syrup surfactant oil recovery | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | WITH | ON | 2014/05/30<br>16:45 |
| S120 | 0  | syrup surfactant oil recover  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | WITH | ON | 2014/05/30<br>16:45 |
| S121 | 0  | syrup surfactant oil recover  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2014/05/30<br>16:45 |
| S122 | 2  | syrup sorbitan oil recover    | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2014/05/30<br>16:46 |
| S123 | 48 | sorbitan oil recover          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2014/05/30<br>16:46 |

## EAST Search History (Interference)

| Ref # | Hits | Search Query   | DBs                             | Default Operator | Plurals | Time Stamp          |
|-------|------|--|---------------------------------|------------------|---------|---------------------|
| L2    | 7    | stillage sorbitan ((426/601,424,623).ccls.<br>OR (554/8,9.121.204,206).ccls. OR<br>(C11B1/10 OR C11B13/00).cpc.) | US-<br>PGPUB;<br>USPAT;<br>UPAD | AND              | ON      | 2014/10/30<br>19:49 |
| S124  | 0    | ((Froderman ADJ C) (Hildebrand ADJ<br>W)).in. AND oil  | US-<br>PGPUB;<br>USPAT;         | OR               | ON      | 2014/06/01<br>02:23 |

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EAST Search History

|      |    |                   |                                 |      |    |                     |
|------|----|-------------------|---------------------------------|------|----|---------------------|
|      |    |                   | UPAD                            |      |    |                     |
| S125 | 0  | stillage sorbitan | US-<br>PGPUB;<br>USPAT;<br>UPAD | WITH | ON | 2014/06/01<br>02:24 |
| S126 | 29 | stillage sorbitan | US-<br>PGPUB;<br>USPAT;<br>UPAD | AND  | ON | 2014/06/01<br>02:24 |

10/30/2014 7:51:49 PM


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|--|--|--|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br>1793  |

| US ORIGINAL CLASSIFICATION |                                   |          |  | INTERNATIONAL CLASSIFICATION |   |   |   |                  |  |  |  |  |  |
|----------------------------|-----------------------------------|----------|--|------------------------------|---|---|---|------------------|--|--|--|--|--|
| CLASS                      |                                   | SUBCLASS |  | CLAIMED                      |   |   |   | NON-CLAIMED      |  |  |  |  |  |
| 426                        |                                   | 601      |  | C                            | 1 | 1 | B | 3 / 16 (2006.0)  |  |  |  |  |  |
| CROSS REFERENCE(S)         |                                   |          |  | C                            | 1 | 1 | B | 13 / 00 (2006.0) |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
| CLASS                      | SUBCLASS (ONE SUBCLASS PER BLOCK) |          |  |                              |   |   |   |                  |  |  |  |  |  |
| 554                        | 206                               |          |  |                              |   |   |   |                  |  |  |  |  |  |
| 426                        | 623                               |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |
|                            |                                   |          |  |                              |   |   |   |                  |  |  |  |  |  |

|   |                          |  |                            |
|---|--------------------------|--|----------------------------|
| /SUBBALAKSHMI PRAKASH/<br>Examiner, Art Unit 1793<br><br>(Assistant Examiner)           | 10/30/14<br><br>(Date)   | <b>Total Claims Allowed:</b><br><br>16 |                            |
| /HUMERA SHEIKH/<br>Supervisory Patent Examiner, Art Unit 1784<br><br>(Primary Examiner) | 11/01/2014<br><br>(Date) | O.G. Print Claim(s)<br><br>1           | O.G. Print Figure<br><br>1 |

|  |  |  |
|--|--|--|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br>1793  |

| <input type="checkbox"/> <b>Claims renumbered in the same order as presented by applicant</b> <input type="checkbox"/> <b>CPA</b> <input type="checkbox"/> <b>T.D.</b> <input type="checkbox"/> <b>R.1.47</b> |          |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
|---|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|
| Final   | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original |
|   | 1        |       | 17       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 2        | 1     | 18       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 3        | 2     | 19       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 4        | 3     | 20       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 5        | 4     | 21       |       |          |       |          |       |          |       |          |       |          |       |          |
| 6   | 6        | 5     | 22       |       |          |       |          |       |          |       |          |       |          |       |          |
| 7   | 7        | 13    | 23       |       |          |       |          |       |          |       |          |       |          |       |          |
| 8   | 8        | 14    | 24       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 9        | 15    | 25       |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 10       | 16    | 26       |       |          |       |          |       |          |       |          |       |          |       |          |
| 9   | 11       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
| 10  | 12       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
| 11  | 13       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
| 12  | 14       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 15       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
|   | 16       |       |          |       |          |       |          |       |          |       |          |       |          |       |          |

|  |                          |  |                            |
|--|--------------------------|--|----------------------------|
| /SUBBALAKSHMI PRAKASH/<br>Examiner.Art Unit 1793<br><br>(Assistant Examiner)           | 10/30/14<br><br>(Date)   | <b>Total Claims Allowed:</b><br><br>16 |                            |
| /HUMERA SHEIKH/<br>Supervisory Patent Examiner.Art Unit 1784<br><br>(Primary Examiner) | 11/01/2014<br><br>(Date) | O.G. Print Claim(s)<br><br>1           | O.G. Print Figure<br><br>1 |

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of: )  
 ) Before the Examiner  
 Christopher S. Froderman et al )  
 ) Subbalakshmi Prakash  
 Application No. 13/117,301 )  
 ) Group Art Unit 1793  
 Filed May 27, 2011 )  
 )  
 BIO-BASED OIL COMPOSITION AND )  
 METHOD FOR PRODUCING THE SAME )

|   |
|---|
| <p>Date of Filing: August 5, 2014</p> <p>I hereby certify that this correspondence is being filed electronically through the USPTO EFS-Web System on the date indicated above.</p> <p>_____<br/> <i>William F. Bahret</i><br/>         William F. Bahret, Reg. No. 31,087</p> |
|---|

**AMENDMENT AFTER THIRD ACTION**

Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

Sir:

Please enter the following amendment in response to the June 5, 2014, Office Action. Please provide any extension of time which may be necessary and charge any fees which may be due for extra claims or otherwise, except for the issue fee, to Deposit Account No. 50-2176.

**IN THE SPECIFICATION:**

**Please amend paragraph [0024] as set forth below:**

[0024] One aspect of the present invention is that it was discovered that an oil concentrator may be used to enhance oil recovery by interfering with the interaction between the naturally occurring oil sequestering components and the triglycerides so that the triglycerides are capable of interacting with each other so as to form a distinct oil phase. In illustrative embodiments, the oil concentrator comprises a surfactant compound having a hydrophilic group and a lipophilic group. The lipophilic group may be selected to have a higher affinity for the fatty acid groups of the triglycerides than the naturally present oil sequestering component. Thus, the triglycerides separate from the oil sequestering component. As used herein, this effect is [[a]] referred to as a “detergent effect.” Essentially, the detergent effect is a “washing” of the triglycerides from the starches, waxes, gums, and proteins that are included in the bio-based byproduct stream. The hydrophilic group provides solubility for the lipophilic group enabling aqueous solubility.

**IN THE CLAIMS:**

**Please cancel claims 1-5, 9, 10 and 15-17. Please amend claims 6, 11 and 12, and add new claims 24-26, as set forth below:**

1-5. (Cancelled)

6. (Currently amended) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of ~~claim 1~~ claim 18, wherein the byproduct stream comprises an aqueous liquid byproduct stream with dissolved solids.

7. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 6, wherein the byproduct stream comprises a thin stillage or syrup derived therefrom.

8. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 6, wherein adding the oil concentrator into the aqueous liquid byproduct stream includes adding an amount of oil concentrator so that the oil concentrator concentration is below a critical micellar concentration for the oil concentrator in the aqueous liquid byproduct stream.

9-10. (Cancelled)

11. (Currently amended) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of ~~claim 1~~ claim 18, the method further comprising:  
~~evaporating water from the byproduct stream prior to said applying step; and~~  
drying the byproduct stream after said oil separating step to produce a distillers dried grains product suitable for animal feed.



12. (Currently amended) An organic composition produced according to the method of claim 18, said organic composition comprising oil derived from a byproduct stream of a bio-based ethanol production process and an ~~oil concentrator, the oil concentrator comprising a surfactant compound including an~~ ethoxylated sorbitan ester and having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about ~~12 to about 18~~.

13. (Original) The organic composition of claim 12, wherein the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is whole stillage remaining from a distillation bottom.

14. (Original) The organic composition of claim 12, wherein the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is a thin stillage or syrup derived therefrom separated from the whole stillage by centrifugation.

15-17. (Cancelled)

18. (Previously presented) A method of extracting oil from a byproduct stream of a bio-based ethanol production process, comprising:

mixing an ethoxylated sorbitan ester with the byproduct stream;  
centrifuging the mixture of the ethoxylated sorbitan ester and the byproduct stream; and  
separating the oil from the mixture.

19. (Previously presented) The method of claim 18, wherein the ethoxylated sorbitan ester includes polyoxyethylene (20) sorbitan.

20. (Previously presented) The method of claim 19, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan monooleate.

21. (Previously presented) The method of claim 19, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan trioleate.

22. (Previously presented) The method of claim 19, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan tristearate.

23. (Previously presented) A method of extracting oil from a liquid stillage byproduct of a bio-based ethanol production process, comprising:

evaporating water from the liquid stillage to produce a syrup;

processing the syrup to a temperature between 100° F and 212° F and a pH between 3 and 7;

mixing a polyoxyethylene (20) sorbitan ester with the syrup;

centrifuging the mixture; and

separating the oil from the mixture.

24. (New) The method of claim 23, wherein the sorbitan ester includes polyoxyethylene (20) sorbitan monooleate.

25. (New) The method of claim 23, wherein the sorbitan ester includes polyoxyethylene (20) sorbitan trioleate.

26. (New) The method of claim 23, wherein the sorbitan ester includes polyoxyethylene (20) sorbitan tristearate.

**REMARKS**

The Examiner reopened prosecution in view of the arguments in Applicants' appeal brief, and allowed claims 18-23 and rejected claims 1-17. Applicants hereby cancel rejected claims 1-5, 9, 10 and 15-17. Claims 6, 11 and 12 are amended to depend on allowed claim 18, and claims 6-8 and 11-14 are allowable for that reason among others. Claims 1-17 are cancelled or amended as set forth above in order to expedite the allowance of the application, without acquiescence in the rejections and without prejudice to Applicants' right to submit such claims in a continuation application.

Paragraph [0024] of the specification is amended to correct a typographical error.

This application is therefore believed to be in condition for immediate allowance, and such action is respectfully requested. The Examiner is invited to call the undersigned attorney if a discussion of any remaining issues might expedite the allowance of this application.

Respectfully submitted,

/William F. Bahret/

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## Electronic Acknowledgement Receipt

|   |   |
|---|---|
| <b>EFS ID:</b>                              | 19781919  |
| <b>Application Number:</b>                  | 13117301  |
| <b>International Application Number:</b>    |   |
| <b>Confirmation Number:</b>                 | 7354  |
| <b>Title of Invention:</b>                  | BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME |
| <b>First Named Inventor/Applicant Name:</b> | Christopher S. Froderman                                    |
| <b>Customer Number:</b>                     | 32841   |
| <b>Filer:</b>                               | William F. Bahret/Joyce Eden                                |
| <b>Filer Authorized By:</b>                 | William F. Bahret   |
| <b>Attorney Docket Number:</b>              | 13044-9A  |
| <b>Receipt Date:</b>                        | 05-AUG-2014   |
| <b>Filing Date:</b>                         | 27-MAY-2011   |
| <b>Time Stamp:</b>                          | 17:02:45  |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                 |

### Payment information:

|                        |    |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

### File Listing:

| Document Number | Document Description | File Name                     | File Size(Bytes)/<br>Message Digest              | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|-------------------------------|--|------------------|------------------|
| 1               |                      | AmendmentAfterThirdAction.pdf | 27471<br>60730eb5002f36aec2e35c4ff7f1f63ec91c01b | yes              | 6                |

| Multipart Description/PDF files in .zip description   |       |     |
|---|-------|-----|
| Document Description  | Start | End |
| Amendment/Req. Reconsideration-After Non-Final Reject   | 1     | 1   |
| Specification   | 2     | 2   |
| Claims  | 3     | 5   |
| Applicant Arguments/Remarks Made in an Amendment  | 6     | 6   |
| <b>Warnings:</b>  |       |     |
| <b>Information:</b>   |       |     |
| <b>Total Files Size (in bytes):</b>   | 27471 |     |
| <p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> |       |     |

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|   |   |                                  |                                       |
|---|---|----------------------------------|---------------------------------------|
| <b>PATENT APPLICATION FEE DETERMINATION RECORD</b><br>Substitute for Form PTO-875 | Application or Docket Number<br><b>13/117,301</b> | Filing Date<br><b>05/27/2011</b> | <input type="checkbox"/> To be Mailed |
|---|---|----------------------------------|---------------------------------------|

ENTITY:  LARGE  SMALL  MICRO

**APPLICATION AS FILED – PART I**

| FOR  | NUMBER FILED  | NUMBER EXTRA | RATE (\$) | FEE (\$) |
|--|---|--------------|-----------|----------|
| <input type="checkbox"/> BASIC FEE<br>(37 CFR 1.16(a), (b), or (c))        | N/A   | N/A          | N/A       |          |
| <input type="checkbox"/> SEARCH FEE<br>(37 CFR 1.16(k), (l), or (m))       | N/A   | N/A          | N/A       |          |
| <input type="checkbox"/> EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q))  | N/A   | N/A          | N/A       |          |
| TOTAL CLAIMS<br>(37 CFR 1.16(i))   | minus 20 = *  | *            | X \$ =    |          |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h))                                     | minus 3 = *   | *            | X \$ =    |          |
| <input type="checkbox"/> APPLICATION SIZE FEE<br>(37 CFR 1.16(s))          | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). |              |           |          |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) |   |              |           |          |
| * If the difference in column 1 is less than zero, enter "0" in column 2.  |   |              | TOTAL     |          |

**APPLICATION AS AMENDED – PART II**

|  | (Column 1)   | (Column 2)                       | (Column 3) | PRESENT EXTRA                      | RATE (\$) | ADDITIONAL FEE (\$) |
|--|--|----------------------------------|------------|------------------------------------|-----------|---------------------|
| <b>AMENDMENT</b>   |  | CLAIMS REMAINING AFTER AMENDMENT |            | HIGHEST NUMBER PREVIOUSLY PAID FOR |           |                     |
|  | Total (37 CFR 1.16(o))   | *                                | Minus      | **                                 | =         | X \$ =              |
|  | Independent (37 CFR 1.16(h))                                   | *                                | Minus      | ***                                | =         | X \$ =              |
|  | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) |                                  |            |                                    |           |                     |
| <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |  |                                  |            |                                    |           |                     |
|  |  |                                  |            |                                    |           | TOTAL ADD'L FEE     |
| (Column 1) (Column 2) (Column 3)   |  |                                  |            |                                    |           |                     |
| <b>AMENDMENT</b>   | <b>08/05/2014</b>  | CLAIMS REMAINING AFTER AMENDMENT |            | HIGHEST NUMBER PREVIOUSLY PAID FOR |           |                     |
|  | Total (37 CFR 1.16(o))   | * 16                             | Minus      | ** 20                              | = 0       | X \$40 = 0          |
|  | Independent (37 CFR 1.16(h))                                   | * 3                              | Minus      | *** 3                              | = 0       | X \$210 = 0         |
|  | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) |                                  |            |                                    |           |                     |
| <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |  |                                  |            |                                    |           |                     |
|  |  |                                  |            |                                    |           | TOTAL ADD'L FEE     |
|  |  |                                  |            |                                    |           | <b>0</b>            |

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE  
/Chantae Dessau/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**  
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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR     | ATTORNEY DOCKET NO.   | CONFIRMATION NO. |
|---|-------------|--------------------------|-----------------------|------------------|
| 13/117,301  | 05/27/2011  | Christopher S. Froderman | 13044-9A              | 7354             |
| 32841   | 7590        | 06/05/2014               | EXAMINER              |                  |
| BAHRET & ASSOCIATES<br>320 NORTH MERIDIAN STREET<br>SUITE 510<br>INDIANAPOLIS, IN 46204 |             |                          | PRAKASH, SUBBALAKSHMI |                  |
|   |             |                          | ART UNIT              | PAPER NUMBER     |
|   |             |                          | 1793                  |                  |
|   |             |                          | NOTIFICATION DATE     | DELIVERY MODE    |
|   |             |                          | 06/05/2014            | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

joyce@bahretlaw.com  
bahret@bahretlaw.com  
rfrisk@bahretlaw.com





**DETAILED ACTION**

In view of the Appeal Brief filed on January 28, 2014, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/HUMERA SHEIKH/  
Supervisory Patent Examiner, Art Unit 1793

***Withdrawn Rejections***

The rejection of claims 1-17 and 19 under 35 USC 112 second paragraph are withdrawn. The previous rejections under 35 USC 103(a) are withdrawn in view of the arguments presented in the appeal brief. However, upon further consideration, a new ground of rejection is made.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**Claims 1,2, and 8-10 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Winsness et al. (US2007238891 (A1) (R7) cited by the applicants) in view of Wang et al. (*J. Agric. Food Chem.* 2009, 57, 2302–2307 (R6))**

The method in R7 differs from the instantly claimed method only in that the method in R7 does not use an oil concentrator in separating bound oil from whole and thin stillage from a bio-based ethanol process. However, R6 discloses a method of extracting oil from a byproduct stream of a bio-based ethanol production process under conditions in which there is an attraction between oil and oil sequestering components in the byproduct stream, the method comprising applying the oil concentrator (dish detergent) to the byproduct stream, the oil concentrator having a chemical composition capable of reducing the effect of oil sequestering components in the byproduct stream, mixing the oil concentrator with the byproduct stream and separating the oil from the byproduct stream, wherein separation is achieved by centrifugation as in claim 9 to separate an oil phase and aqueous phase as in claim 10. (page 2304 col.2 first full paragraph). The stream (thin stillage) is expected to have a pH in the recited range, in view of the disclosure in R7 wherein the subsequent centrifugation step is carried out under these conditions of pH. R7 discloses that the concentrate delivered to the disk

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stack centrifuge is at a pH of between about 3 and 6. One of ordinary skill in the art would therefore apply these pH conditions to ensure separation of oil by centrifugation in the subsequent step. Motivation to modify the method in R7 with the application of a surfactant as in R6, is provided by the disclosure in R6 wherein oil was more efficiently extracted from surfactant treated stillage, as compared to untreated stillage (Figure 5).

Regarding claim 8 one of ordinary skill in the art would know that applying concentration of surfactant below the CMC, would enable mobilization of oil droplets to effect oil separation. One of ordinary skill in the art looking to efficiently separate oil from a by-product stream of bioethanol process would therefore apply a method as in R6 with a reasonable expectation of success. Further the detergent composition in R6 is expected to have an HLB value of about 16-20 which is close to the disclosed range in claim 2, and the composition was successfully applied to a by-product stream from a bio-based ethanol production process motivating one of ordinary skill in the art to apply surfactants providing HLB values in the recited range, in a method as claimed.

Claims 1, 2 and 8-10 are therefore *prima facie* obvious in view of the art.

**Claims 3-7, 11-17 are rejected under 35 USC 103(a) as being unpatentable over R7 in view of R6 and further in view of Scheimann et al. (US 2007/0210007 A1 (R4)).**

Although R6 does not specifically disclose the surfactants recited in claim 3, R4 discloses the application of surfactants in a method of extracting oil from a byproduct stream of a bio-based ethanol production process thin stillage, as in claim 7 [0012] which is an aqueous liquid byproduct of a bio-based ethanol production process with

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dissolved solids as in as in claim 6 [0012] , under conditions under which there is an attraction between oil and oil sequestering components in the byproduct stream, the method comprising applying an oil concentrator having a chemical composition capable of reducing the effect the oil sequestering components in the byproduct stream, mixing the oil concentrator with the byproduct stream and separating the oil from the byproduct stream. Specifically, in the method in R1, [0012] suspended solids, fats, oils and grease from thin stillage of a dry grind ethanol process stream by the steps of [0013] (i) adding to the thin stillage process stream an effective flocculating amount of one or more anionic polymers, the anionic polymers comprising one or more anionic monomers selected from acrylic acid sodium salt, 2-acrylamido-2-methyl-1-propanesulfonic acid sodium salt and methacrylic acid sodium salt and optionally one or more acrylamide monomers to form a mixture of water and coagulated and flocculated solids; and (ii) separating the water from the flocculated solids using a solids/liquids separation device. As instant independent claim 1 does not specifically identify the "oil concentrator" and the dependent claims use the open ended transitional phrase "comprises" in identifying a surfactant compound, it is probable that the "oil concentrator " of the invention comprises a blend or emulsion as in R4. It is expected that the pH of thin stillage in R4, would be in the recited range of 3-7, as claimed.

As in claim 3, the oil concentrator in R4 comprises a surfactant [0022] having a hydrophilic group and a lipophilic group providing the oil concentrator a HLB value of about 12 to about 18 , as the anionic polymer in the invention is disclosed to be in the form of an emulsion polymer which is an invertible water-in-oil emulsion an invertible

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water-in-oil polymer emulsion comprising an anionic polymer according to this invention in the aqueous phase, a hydrocarbon oil for the oil phase, a water-in-oil emulsifying agent and, potentially, an inverting surfactant; wherein the inverting surfactants include sorbitan esters of fatty acids, ethoxylated sorbitan esters of fatty acids, and the like or mixtures thereof. Preferred emulsifying agents include sorbitan monooleate, polyoxyethylene sorbitan monostearate, and the like, as in instant claims 12 and 17, which singly or in combination are expected to provide HLB values in the ranges disclosed in claims 3-5 and 12. For example, polyoxyethylene sorbitan monostearate provides HLB of about 15 as in claims 5 and 16, and has a lipophilic group comprising a fatty acid and a hydrophilic group comprising polyethylene oxide, as in claim 15.

One of ordinary skill in the art would therefore apply surfactants as claimed in a method as in R6 with a reasonable expectation of successfully separating oil from thin stillage, derived from centrifugal separation from whole stillage as in claims 13 and 14 (see R6 cross-reference 4). One would substitute the detergent in R6 with a food grade oil concentrator as in R4, with a reasonable expectation of success.

R6 does not specifically disclose an evaporation step and a drying step as in claim 11. However, R7 discloses these steps in treating whole and thin stillage to separate bound oil, and one would apply these steps to an oil concentrator treated byproduct stream with a reasonable expectation of success.

Claims 1-17 are therefore *prima facie* obvious in view of the art.

***Allowable Subject Matter***

Claims 18-23 are free of the art.

The closest art is Scheimann et al. Scheimann discloses an emulsion polymer, which is an invertible water-in-oil polymer emulsion comprising an anionic polymer, a hydrocarbon oil, a water-in-oil emulsifying agent and potentially an inverting surfactant in separating solids and oil from an aqueous by-product stream from a bioethanol production process. The water-in-oil emulsifying agent useful for preparing the emulsion polymers of Schiemann can include ethoxylated sorbitan esters of fatty acids including polyoxyethylene sorbitan. However, Scheimann does not teach the application of ethoxylated sorbitan ester by itself as an oil concentrator in recovering bound oil from a by-product stream from a bio-based ethanol production process. In Scheimann, the ethoxylated sorbitan ester is incorporated into an emulsion polymer which also comprises an anionic polymer, a hydrocarbon oil, and potentially an inverting surfactant.

Related art published after the filing date (May 27, 2011) of the instant application, is US 2012/0245370 A1 (published September 27, 2012, provisional application filed March 21, 2011) which discloses and claims the instantly claimed surfactants in recovering bound oil from stillage.

### ***Response to Arguments***

Applicant's arguments in the Appeal Brief with respect to the rejection(s) of claims 1-17 and 19 under 35 USC 112 second paragraph and 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejections have been **withdrawn**.

However, upon further consideration, new grounds of rejection are made, as detailed in the current Office action.

***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Subbalakshmi Prakash whose telephone number is (571)270-3685. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Humera Sheikh can be reached on 571-272-0604. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUMERA SHEIKH/  
Supervisory Patent Examiner, Art Unit 1793

/Subbalakshmi Prakash/  
Examiner, Art Unit 1793

Application/Control Number: 13/117,301  
Art Unit: 1793

Page 8



|                                   |                                       |  |             |
|-----------------------------------|---------------------------------------|--|-------------|
| <b>Notice of References Cited</b> | Application/Control No.<br>13/117,301 | Applicant(s)/Patent Under<br>Reexamination<br>FRODERMAN ET AL. |             |
|                                   | Examiner<br>Subbalakshmi Prakash      | Art Unit<br>1793   | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name             | Classification |
|---|--|-----------------|------------------|----------------|
|   | A US-  |                 |                  |                |
| * | B US-2007/0238891 A1                             | 10-2007         | Winsness et al.  | 554/008        |
| * | C US-2007/0210007 A1                             | 09-2007         | Scheimann et al. | 210/728        |
| * | D US-2012/0245370 A1                             | 09-2012         | Sheppard et al.  | 554/204        |
|   | E US-  |                 |                  |                |
|   | F US-  |                 |                  |                |
|   | G US-  |                 |                  |                |
|   | H US-  |                 |                  |                |
|   | I US-  |                 |                  |                |
|   | J US-  |                 |                  |                |
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|   | L US-  |                 |                  |                |
|   | M US-  |                 |                  |                |

**FOREIGN PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | Classification |
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|   | N  |                 |         |      |                |
|   | O  |                 |         |      |                |
|   | P  |                 |         |      |                |
|   | Q  |                 |         |      |                |
|   | R  |                 |         |      |                |
|   | S  |                 |         |      |                |
|   | T  |                 |         |      |                |

**NON-PATENT DOCUMENTS**

| * | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)   |
|---|---|
| U | HUI WANG, TONG WANG, AND LAWRENCE A. JOHNSON Effect of Low-Shear Extrusion on Corn Fermentation and Oil Partition. J. Agric. Food Chem. 2009, 57, 2302–2307 |
| V |   |
| W |   |
| X |   |

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

## EAST Search History

## EAST Search History (Prior Art)

| Ref # | Hits | Search Query  | DBs  | Default Operator | Plurals | Time Stamp          |
|-------|------|---|--|------------------|---------|---------------------|
| S1    | 159  | oil byproduct corn (surfactant OR concentrat\$3 OR hydrophil\$3 OR lipophil\$3) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>12:38 |
| S3    | 17   | S1 stillage   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>12:47 |
| S4    | 20   | oil byproduct corn (surfactant OR detergent)                                    | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>12:55 |
| S6    | 41   | stillage alkali   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>13:08 |
| S7    | 4    | stillage (oil ADJ recovery)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR             | ON      | 2012/07/24<br>13:56 |
| S8    | 20   | HLB ("10" OR "12" OR "18" OR "19") oil  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR             | ON      | 2012/07/24<br>14:05 |
| S10   | 20   | (ammonium ADJ oleate) surfactant  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR             | ON      | 2012/07/24<br>14:22 |
| S14   | 63   | oil (separation OR recover\$3) (alcohol   | US-PGPUB;  | SAME             | ON      | 2012/07/24          |

## EAST Search History

|     |     |  |  |      |    |                     |
|-----|-----|--|--|------|----|---------------------|
|     |     | OR ethanol) fermentation (emulsifier OR surfactant)    | USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB              |      |    | 14:32               |
| S15 | 0   | ("8008516").URPN.                                      | USPAT  | OR   | ON | 2012/07/24<br>14:37 |
| S16 | 9   | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND oil     | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2012/07/24<br>15:05 |
| S17 | 0   | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND ethanol | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2012/07/24<br>15:08 |
| S18 | 0   | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND biofuel | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2012/07/24<br>15:09 |
| S19 | 36  | surfactant HLB (oil ADJ recovery)                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:01 |
| S20 | 0   | surfactant HLB (oil ADJ extraction)                    | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:03 |
| S21 | 21  | surfactant HLB extraction oil                          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:03 |
| S22 | 718 | hlb ADJ "12"   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:08 |
| S23 | 135 | S22 oil  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;                                | SAME | ON | 2012/07/25<br>20:09 |

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|-----|-----|---|--|------|----|---------------------|
|     |     |   | JPO;<br>DERWENT;<br>IBM_TDB  |      |    |                     |
| S24 | 1   | (corn ADJ oil) recovery HLB   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/26<br>12:38 |
| S26 | 3   | (corn ADJ oil) recovery HLB<br>demulsification                        | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:39 |
| S27 | 23  | (oil ADJ recovery) HLB<br>demulsification                             | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:40 |
| S32 | 22  | ((oil ADJ recovery) HLB).ab.  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:49 |
| S34 | 4   | oil stillage HLB  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>14:56 |
| S35 | 16  | ("4662990").URPN.   | USPAT  | OR   | ON | 2012/07/26<br>14:57 |
| S36 | 3   | S35 surfactant HLB  | USPAT  | AND  | ON | 2012/07/26<br>15:00 |
| S38 | 8   | (oil NEAR release) (waste OR<br>byproduct) surfactant HLB             | USPAT  | AND  | ON | 2012/07/26<br>15:21 |
| S39 | 19  | ("4179369").URPN.   | USPAT  | OR   | ON | 2012/07/26<br>15:25 |
| S40 | 7   | water oil (dissolved ADJ solids)<br>surfactant separation             | USPAT  | SAME | ON | 2012/07/26<br>15:39 |
| S41 | 128 | water oil (dissolved ADJ solids)<br>surfactant                        | USPAT  | SAME | ON | 2012/07/26<br>15:41 |
| S52 | 464 | ((oil OR grease) NEAR (recover\$3<br>OR extract\$3)) surfactant).clm. | USPAT  | AND  | ON | 2012/07/26<br>15:57 |
| S55 | 4   | ((oil ADJ extraction) surfactant).ab.                                 | USPAT  | AND  | ON | 2012/07/26<br>16:01 |
| S56 | 6   | ((oil ADJ extraction) surfactant).clm.                                | USPAT  | AND  | ON | 2012/07/26<br>16:01 |
| S60 | 1   | (oil (ethanol ADJ production)<br>surfactant).clm.                     | USPAT  | AND  | ON | 2012/07/26<br>16:03 |

|     |     |   |  |      |    |                     |
|-----|-----|---|--|------|----|---------------------|
| S61 | 8   | ("4797214").URPN.   | USPAT  | OR   | ON | 2012/07/26<br>16:07 |
| S62 | 165 | stillage oil surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>12:58 |
| S67 | 45  | ("2663718" "5250182" "5662810"<br>"5795477" "6433146" "20030180415"<br>"20040087808" "20050155282"<br>"20060006116" "20080110577"<br>"20080125612" "20090227004"<br>"7601858" "7608729"<br>"20090293344").pn. | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2013/02/04<br>13:33 |
| S68 | 1   | S67 surfactant  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>13:34 |
| S69 | 0   | fermentation (by ADJ product) oil<br>surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>14:09 |
| S70 | 406 | fermentation oil surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>14:10 |
| S71 | 0   | fermentation oil surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR | ON | 2013/02/04<br>14:10 |
| S72 | 132 | S70 corn  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>14:16 |
| S73 | 24  | S72 polyoxyethylene   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>14:17 |
| S74 | 0   | surfactant HLB oil (waste ADJ<br>stream)  | US-PGPUB;<br>USPAT;<br>USOCR;  | SAME | ON | 2013/02/04<br>16:01 |

## EAST Search History

|     |      |                                       |  |      |    |                     |
|-----|------|---------------------------------------|--|------|----|---------------------|
|     |      |                                       | FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB                                  |      |    |                     |
| S75 | 81   | surfactant HLB oil (waste ADJ stream) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>16:02 |
| S76 | 0    | surfactant syrup oil                  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR | ON | 2013/02/04<br>17:00 |
| S77 | 3003 | surfactant syrup oil                  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>17:00 |
| S78 | 0    | S77 stillage                          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:00 |
| S79 | 1700 | S77 corn ethanol                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:00 |
| S80 | 336  | S77 corn ethanol recovery             | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:01 |
| S81 | 0    | S77 (bio ADJ ethanol)                 | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:02 |
| S82 | 7    | surfactant (bio ADJ ethanol)          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>17:02 |
| S83 | 165  | surfactant oil stillage               | US-PGPUB;  | AND  | ON | 2013/02/04          |

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## EAST Search History

|     |     |                                      |  |      |    |                     |
|-----|-----|--------------------------------------|--|------|----|---------------------|
|     |     |                                      | USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB              |      |    | 17:03               |
| S84 | 108 | S83 @py<="2011"                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:06 |
| S85 | 14  | S84 sorbitan                         | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:11 |
| S86 | 3   | S85 HLB                              | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:23 |
| S87 | 2   | surfactant HLB (oil ADJ recovery) pH | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>17:39 |
| S88 | 8   | S85 pH                               | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:39 |
| S89 | 399 | (corn ADJ oil) hlb                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/05<br>14:58 |
| S90 | 0   | (corn ADJ oil) hlb                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR | ON | 2013/02/05<br>14:58 |
| S91 | 0   | (corn ADJ oil) hlb 12-18             | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;            | SAME | ON | 2013/02/05<br>14:59 |

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## EAST Search History

|      |       |   |  |      |    |                     |
|------|-------|---|--|------|----|---------------------|
|      |       |   | IBM_TDB  |      |    |                     |
| S92  | 0     | (by ADJ product) oil corn (surfactant OR concentrat\$3 OR hydrophli\$3 OR lipophil\$3 OR emulsi\$3 OR demulsi\$3)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:27 |
| S93  | 0     | (by ADJ product) oil corn (surfactant OR emulsifier)  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:27 |
| S94  | 18715 | oil corn (surfactant OR emulsifier)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:27 |
| S95  | 13330 | S94 ethanol   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:28 |
| S96  | 8194  | S95 polyoxyethylene   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:28 |
| S97  | 1     | S96 stillage  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:28 |
| S98  | 40    | ("20060041153"   "20080299632"   "20090259060"   "5605970"   "5662810"   "5837776"   "5958233"   "5985992"   "6265477"   "7497955"   "7566469"   "7601858"   "7608729"   "7641928").PN. | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:30 |
| S99  | 4     | S98 surfactant  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:31 |
| S100 | 4     | S98 (surfactant OR emulsifier)  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;                                | AND  | ON | 2013/02/07<br>14:33 |

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## EAST Search History

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|------|----|--|--|------|----|---------------------|
|      |    |  | JPO;<br>DERWENT;<br>IBM_TDB  |      |    |                     |
| S101 | 0  | S98 TWEEN  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:34 |
| S102 | 2  | S98 polyoxyethylene                                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:34 |
| S103 | 12 | nalco stillage   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>17:10 |
| S104 | 7  | S103 (surfactant OR emulsifier)                          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>17:10 |
| S105 | 0  | stillage oil (wetting ADJ agent)                         | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>17:25 |
| S106 | 11 | stillage oil (wetting ADJ agent)                         | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>17:25 |
| S107 | 0  | (oil ADJ concentrator) sorbitan                          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:42 |
| S108 | 11 | (oil ADJ collector) sorbitan                             | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:43 |
| S109 | 0  | (concentrated ADJ oil) sorbitan emulsion demulsification | US-PGPUB;<br>USPAT;  | AND  | ON | 2014/05/30<br>11:47 |

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EAST Search History

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|------|-----|--|--|------|----|---------------------|
|      |     |  | USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB                        |      |    |                     |
| S110 | 13  | (concentrated ADJ oil) surfactant emulsion demulsification | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:47 |
| S111 | 0   | aqueous oil surfactant emulsion demulsification stillage   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:48 |
| S112 | 65  | aqueous oil surfactant emulsion stillage                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:48 |
| S113 | 0   | (oil ADJ removaql) stillage surfactant                     | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:53 |
| S114 | 13  | (oil ADJ removal) stillage surfactant                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>11:54 |
| S115 | 692 | syrup surfactant oil                                       | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | WITH | ON | 2014/05/30<br>16:44 |
| S116 | 0   | S115 stillage  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | WITH | ON | 2014/05/30<br>16:44 |
| S117 | 0   | S115 stillage  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>16:45 |

## EAST Search History


|      |    |                               |  |      |    |                     |
|------|----|-------------------------------|--|------|----|---------------------|
| S118 | 0  | S115 bioethanol               | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2014/05/30<br>16:45 |
| S119 | 0  | syrup surfactant oil recovery | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | WITH | ON | 2014/05/30<br>16:45 |
| S120 | 0  | syrup surfactant oil recover  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | WITH | ON | 2014/05/30<br>16:45 |
| S121 | 0  | syrup surfactant oil recover  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2014/05/30<br>16:45 |
| S122 | 2  | syrup sorbitan oil recover    | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2014/05/30<br>16:46 |
| S123 | 48 | sorbitan oil recover          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2014/05/30<br>16:46 |

## EAST Search History (Interference)

| Ref # | Hits | Search Query                                       | DBs                      | Default Operator | Plurals | Time Stamp          |
|-------|------|--|--------------------------|------------------|---------|---------------------|
| L1    | 0    | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND oil | US-PGPUB;<br>USPAT; UPAD | OR               | ON      | 2014/06/01<br>02:23 |
| L2    | 0    | stillage sorbitan                                  | US-PGPUB;<br>USPAT; UPAD | WITH             | ON      | 2014/06/01<br>02:24 |
| L3    | 29   | stillage sorbitan                                  | US-PGPUB;<br>USPAT; UPAD | AND              | ON      | 2014/06/01<br>02:24 |

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|--|--|--|
| <b>Search Notes</b><br><br> | <b>Application/Control No.</b><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br>1793  |

| CPC- SEARCHED |      |          |
|---------------|------|----------|
| Symbol        | Date | Examiner |
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| CPC COMBINATION SETS - SEARCHED |      |          |
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| US CLASSIFICATION SEARCHED  |          |        |          |
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| Class                       | Subclass | Date   | Examiner |
| See Search History printout |          | 2/2013 | SP       |

| SEARCH NOTES  |               |          |
|---|---------------|----------|
| Search Notes  | Date          | Examiner |
| EAST: Search Terms: water/aqueous, oil/grease, dissolved solids, separation/extraction/recovery, surfactant/surface active agent/concentrator, byproduct/waste stream, demulsification, emulsification, stillage, corn, ethanol, HLB, inventors, wetting agent, emulsifier, polyoxyethylene, sorbitan ester, Tween, Polysorbate | 2/2013,5/2014 | SP       |
| Google Scholar  | 2/2013,5/2014 | SP       |

| INTERFERENCE SEARCH         |                         |        |          |
|-----------------------------|-------------------------|--------|----------|
| US Class/<br>CPC Symbol     | US Subclass / CPC Group | Date   | Examiner |
| See Search History printout |                         | 5/2014 | SP       |

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re patent application of: )  
 ) Before the Examiner  
Christopher S. Froderman et al )  
 ) Subbalakshmi Prakash  
Application No. 13/117,301 )  
 ) Group Art Unit 1793  
Filed May 27, 2011 )  
 )  
BIO-BASED OIL COMPOSITION AND )  
METHOD FOR PRODUCING THE SAME )

Date of Filing: January 28, 2014

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/William F. Bahret/  
William F. Bahret, Reg. No. 31,087

**APPEAL BRIEF**

This is an appeal from the final rejection of claims 1-23 in the above-identified patent application. These claims were indicated as finally rejected in an Office Action mailed February 14, 2013.

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## **I. Real Party in Interest**

The real party in interest in this appeal is Superior Oil Company, as evidenced by an Assignment from inventors Christopher S. Froderman and William C. Hildebrand to Superior Oil Company, recorded on May 27, 2011, at Reel 026354, Frame 0608, and an Assignment from inventor Robert Mark Sickels to Superior Oil Company, recorded on July 8, 2011, at Reel 026561, Frame 0409.

## **II. Related Appeals and Interferences**

There are no related appeals or interferences.

## **III. Summary of Claimed Subject Matter**

The pending claims are directed to a method used to extract oil from a byproduct stream of a bio-based ethanol production process (Specification, ¶[0001]). The method is configured such that an oil concentrator is used on the byproduct stream so that the oil can be separated from the byproduct stream (*Id.*, ¶[0009]). The pending claims are also directed to an organic composition comprising oil derived from a byproduct stream of a bio-based ethanol production process and an oil concentrator (*Id.*, ¶[0010]). Embodiments of the method enhance the efficiency of recovering oil from the byproduct stream (*Id.*, ¶[0018]). The method results in an organic composition of oil and oil concentrator (*Id.*, ¶[0010]), embodiments of which are edible (*Id.*, ¶[0034]).

None of the claims on appeal, which include pending claims 1-23, contain means plus function language.

Claim 1 is an independent claim directed to a method of extracting oil from a byproduct stream of a bio-based ethanol production process. The method includes applying an oil concentrator to the byproduct stream (*Id.*, ¶[0021], referring to FIG. 3), mixing the oil concentrator with the byproduct stream (*Id.*, ¶[0021], referring to FIG. 3), and separating the oil from the byproduct stream (*Id.*, ¶[0021], referring to FIG. 3). The method requires conditions in which there is an attraction between oil and oil sequestering components in the byproduct stream (*Id.*, ¶[0024]). The method further requires conditions that include the byproduct stream being at



a pH of between 3 and 7 (Id., ¶[0021]). The method also requires that the oil concentrator has a chemical composition capable of reducing the effect of the oil sequestering components in the byproduct stream (Id., ¶[0024]).

Claim 2 depends from claim 1 and requires that the oil concentrator comprises a surfactant compound having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18. Support for the limitations of claim 2 may be found at least at ¶[0028] of the Specification.

Claim 3 depends from claim 2 and requires that the lipophilic group is a fatty acid group and the hydrophilic group is a polyethylene oxide. Support for the limitations of claim 3 may be found at least at ¶[0029] and ¶[0030] of the Specification.

Claim 4 depends from claim 2 and requires the hydrophile-lipophile balance (HLB) is about 14 to about 16. Support for the limitations of claim 4 may be found at least at ¶[0028] of the Specification.

Claim 5 depends from claim 2 and requires the hydrophile-lipophile balance (HLB) is about 15. Support for the limitations of claim 5 may be found at least at ¶[0028] of the Specification.

Claim 6 depends from claim 1 and requires the byproduct stream comprises an aqueous liquid byproduct stream with dissolved solids. Support for the limitations of claim 6 may be found at least at ¶[0020] of the Specification, which refers to FIG. 2.

Claim 7 depends from claim 6 and requires that the byproduct stream comprises a thin stillage or syrup derived therefrom. Support for the limitations of claim 7 may be found at least at ¶[0020] of the Specification, which refers to FIG. 2.

Claim 8 depends from claim 6 and requires that adding the oil concentrator into the aqueous liquid byproduct stream includes adding an amount of oil concentrator so that the oil concentrator concentration is below a critical micellar concentration for the oil concentrator in the aqueous liquid byproduct stream. Support for the limitations of claim 8 may be found at least at ¶[0039] of the Specification.

Claim 9 depends from claim 6 and requires the method to further comprise applying centrifugal force after mixing the oil concentrator with the byproduct stream. Support for the limitations of claim 9 may be found at least at ¶[0021] of the Specification, which refers to FIG. 3.

Claim 10 depends from claim 9 and requires applying centrifugal force after mixing the oil concentrator to enable the formation of a separable oil phase and aqueous phase, wherein the oil concentrator is distributed between the oil phase and the aqueous phase. Support for the limitations of claim 10 may be found at least at ¶[0021] and ¶[0042].

Claim 11 depends from claim 1 and requires the method further comprises evaporating water from the byproduct stream prior to applying the oil concentrator and drying the byproduct stream after separating the oil away from the byproduct stream to produce a distillers dried grains product suitable for animal feed. Support for the limitations of claim 11 may be found at least at ¶[0020] which refers to FIG. 2.

Claim 12 is an independent claim directed to an organic composition that includes oil derived from a byproduct stream of a bio-based ethanol production process and an oil concentrator (Specification, ¶[0034]). The oil concentrator includes a surfactant compound (Id., ¶[0029]) including an ethoxylate sorbitan ester (Id., ¶[0030]) and having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18 (Id., ¶[0031]).

Claim 13 depends from claim 12 and requires the bio-based ethanol production process comprise a process of ethanol production from corn and the byproduct stream is whole stillage remaining from a distillation bottom. Support for the limitations of claim 12 may be found at least at ¶[0020] which refers to FIG. 2.

Claim 14 depends from claim 12 and requires the bio-based ethanol production process comprise a process of ethanol production from corn and the byproduct stream is a thin stillage or syrup derived therefrom separated from the whole stillage by centrifugation. Support for the limitations of claim 12 may be found at least at ¶[0019].

Claim 15 depends from claim 12 and requires the lipophilic group comprises a fatty acid and the hydrophilic group comprises a polyethylene oxide. Support for the limitations of claim 15 may be found at least at ¶[0029] and ¶[0030] of the Specification.

Claim 16 depends from claim 12 and requires the fatty acid and the polyether provide the oil concentrator with a hydrophile-lipophile balance (HLB) of about 14 to about 16. Support for the limitations of claim 16 may be found at least at ¶[0028] of the Specification.

Claim 17 depends from claim 12 and requires the oil concentrator is an FDA acceptable direct food additive for humans and animals, said food additive selected from the group

consisting of polyoxyethylene (20) sorbitan monostearate (Polysorbate 60), polyoxyethylene (20) sorbitan tristearate (Polysorbate 65), and polyoxyethylene (20) sorbitan monooleate (Polysorbate 80). Support for the limitations of claim 16 may be found at least at ¶[0034] of the Specification and at Table 1, which can be found prior to ¶[0036].

Claim 18 is an independent claim directed to a method of extracting oil from a byproduct stream of a bio-based ethanol production process. The method includes mixing an ethoxylated sorbitan ester (¶[0030]) with the byproduct stream (¶[0040]). The method also includes centrifuging the mixture of the ethoxylated sorbitan ester and the byproduct stream and separating the oil from the mixture (¶[0021]).

Claim 19 depends from claim 18 and requires the ethoxylated sorbitan ester includes polyoxyethylene (20) sorbitan. Support for the limitations of claim 19 may be found at least at Table 1, which can be found prior to ¶[0036] of the Specification.

Claim 20 depends from claim 19 and requires the ethoxylated sorbitan ester be polyoxyethylene (20) sorbitan monooleate. Support for the limitations of claim 20 may be found at least at Table 1, which can be found prior to ¶[0036] of the Specification.

Claim 21 depends from claim 19 and requires the ethoxylated sorbitan ester be polyoxyethylene (20) sorbitan trioleate. Support for the limitations of claim 21 may be found at least at Table 1, which can be found prior to ¶[0036] of the Specification.

Claim 22 depends from claim 19 and requires the ethoxylated sorbitan ester be polyoxyethylene (20) sorbitan tristearate. Support for the limitations of claim 22 may be found at least at Paragraph [0030] and Table 1, which can be found prior to ¶[0036] of the Specification.

Claim 23 is an independent claim directed to a method of extracting oil from a liquid stillage byproduct of a bio-based ethanol production process. The method includes evaporating water from the liquid stillage to produce a syrup (¶[0020]). The method also includes processing the syrup to a temperature between 100° F and 212° F and a pH between 3 and 7 (¶[0020]). The method includes mixing a polyoxyethylene (20) sorbitan ester (Table 1, which can be found prior to ¶[0036]) of the Specification with the syrup (¶[0020]). The method includes centrifuging the mixture and separating the oil from the mixture (¶[0020]).

#### IV. Argument

##### A. 35 U.S.C. §112, second paragraph, Rejection of claims 1 and 11

The Final Office Action of Feb. 14, 2013 rejected claim 1-17 and 19 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

35 U.S.C. §112, second paragraph of the Patent Act requires that a patent specification conclude with one or more claims “particularly pointing out and distinctly claiming subject matter which the applicant regards as his invention.” 35 U.S.C. §112, ¶ 2. The Federal Court has repeatedly cautioned that the standard for assessing whether a patent claim is sufficiently definite to satisfy the statutory requirement is as follows: If one skilled in the art would understand the bounds of the claim when read in light of the specification, then the claim satisfies 35 U.S.C. §112, second paragraph. *See Miles Labs., Inc. v. Shandon, Inc.*, 997 F.2d 870, 875, 27 USPQ2d 1123, 1126 (Fed. Cir. 1993).

An indefiniteness inquiry requires a determination of whether those skilled in the art would understand what is claimed when the claim is read in light of the specification.<sup>1</sup> MPEP 2173.02 III.A states that the Examiner must establish a clear record and that “when a rejection under 35 U.S.C. 112, second paragraph, is appropriate based on the Examiner’s determination that a claim term or phrase is indefinite, the Examiner should clearly communicate in an Office action any findings and reasons which support the rejection and avoid a mere conclusion that the claim term or phrase is indefinite.” Applicants respectfully submit that while the 35 U.S.C. §112, second paragraph, rejections appear to be based on a lack of understanding; this lack of understanding is not representative of one of ordinary skill in the art. Rather, one of ordinary skill in the art would, with even a cursory review of the Specification, understand the claims currently under appeal. Applicants respectfully request that the rejections be overturned.

The indefiniteness rejection of claim 1 appears to allege that “the conditions in which the oil component is sequestered” and the chemical composition of the concentrator that would be “capable of reducing the effect of the oil sequestering components” is unclear. First, this rejection is merely conclusory and does not provide a legally defensible basis for this conclusion. Second, the specification provides sufficient information regarding this concept so

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<sup>1</sup>See MPEP §706.03 and 707.07(g).

that one of ordinary skill in the art understands what is claimed. In particular, Applicants point to the Specification at Paragraph [0023] which states:

[I]t is common for byproduct streams to include oil sequestering components that emulsify and/or stabilize the oil within the liquid solution. For example, a syrup byproduct stream may include soluble starches, proteins, gums, and waxes that interact with the oil (primarily triglycerides) to prevent its separation from solution. The molecular structure of a triglyceride includes a glycerol backbone with three fatty acid groups bound through ester bonds. Each of the fatty acid groups of a particular triglyceride can be composed of a variety of fatty acids with different molecular weights and lipophilicity. The overall oil profile may include a relatively diverse range of triglycerides having a diverse range of fatty acids bound thereon. The result is a potentially broad distribution of lipophilicity amongst the population of triglycerides that makes up the oil profile of a given source. Furthermore, the oil profile varies according to the source species, breed, and even with variable environmental and seasonal factors under which the source grew. The sequestering components interact with the triglycerides to prevent the triglycerides from interacting with each other in a manner which would result in the formation of a distinct oil phase. Instead, the oil tends to remain dispersed in the aqueous phase stabilized by the starches, proteins, gums, and waxes.

Furthermore, ¶[0024] further describes that the oil concentrator acts through a detergent effect to interfere with the interaction between the oil sequestering components and the oil. ¶[0025] goes on to further describe the oil concentrator operating through an “interfacial capacity” to reduce the effect of the oil sequestering components. Without addressing these paragraphs of the Specification and without an explanation as to why one of ordinary skill in the art would fail to appreciate the scope of the claims, the Examiner’s rejection is merely conclusory and should be overturned. As a consequence of the above discussion, Applicants respectfully submit that it is evident from the patent specification that one of ordinary skill in the art, informed by the specification, would easily have been able to determine the appropriate dimensions of the disputed term.

The Examiner further alleges that separately reciting a step of applying an oil concentrator to a byproduct stream and mixing the oil concentrator with the byproduct stream makes the claim unclear. Applicants submit that these steps would not only be clear to one of ordinary skill in the art, but also to any ordinary person. Applicants submit that a step of applying and a step of mixing are routinely separated within instructions so as to enhance clarity (*e.g.*, add water to flour and then mix the water and the flour). The supposition that having these two distinct steps within a single method renders the claim unclear is akin to the statement that standard cookbooks are unclear.

Applicants point to the Specification at Paragraph [0021], which refers to FIG. 3, which states, “As shown in FIG. 3, according to one embodiment of the present invention, an oil concentrator may be applied to a syrup that has been heated (e.g. between 100° F and 212° F) and pH adjusted (e.g. between a pH of 3 and 7). The composition can then be mixed in a baffled tank or other mixing unit for a time sufficient for the oil concentrator to act on the sequestered oil.” FIG. 3 also shows one process step that reads “apply oil concentrator” and another process step that reads “mix.” Applicants argue that one skilled in the art would readily understand what is claimed in light of the specification. Further, the Examiner has provided no objective evidence that one skilled in the art would not readily understand what is claimed; instead, the Examiner makes only conclusory statements without a reasoned basis or supporting facts. Applicants submit the claims have met the threshold requirements of clarity and precision according to MPEP 2173.02:

The examiner’s focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. 112, second paragraph, is whether the claim meets the threshold requirements of clarity and precision, not whether more suitable language or modes of expression are available. When the examiner is satisfied that patentable subject matter is disclosed, and it is apparent to the examiner that the claims are directed to such patentable subject matter, he or she should allow claims which define the patentable subject matter with a reasonable degree of particularity and distinctness.<sup>2</sup>

Regarding claim 11, the Examiner erroneously alleges “evaporating water from the byproduct stream prior to said applying step” is indefinite because one of ordinary skill in the art would not be reasonably apprised of the sequence of the method steps in the claim. The Specification clearly sets forth the order of steps claimed both in the written description and the Drawings. In particular, FIG. 2 is a schematic showing a method of extracting oil from the whole stillage byproduct stream from FIG. 1 (See Paragraph [0020]). FIG. 2 shows an “evaporate” step as a process step that converts the liquid stillage into syrup with the byproduct of water. The process step “concentrate and separate oil” is shown performed on the “syrup.” It is respectfully submitted that the claim very clearly recites the sequence: “evaporating water from the byproduct stream prior to said applying step.” The Examiner’s rejection is not legally sustainable and should be overturned.

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<sup>2</sup>MPEP 2173.02. Section II.

B. 35 U.S.C. §112, second paragraph, Rejection of claims 12-17

Regarding claims 12-17, the Examiner alleges that the term “organic composition” renders the claims indefinite because it is allegedly unclear what the term “organic” means. Applicants submit that one of ordinary skill in the art would apply a normal definition from the field of chemistry and understand that organic is an adjective meaning “of, relating to, or belonging to the class of chemical compounds that are formed from carbon.”<sup>3</sup>

C. 35 U.S.C. §103 Rejections

The Final Office Action of Feb. 14, 2013 rejected all claims under 35 U.S.C. §103, as being unpatentable over a combination or selection of Cantrell et al. (US2006/0041152 A1 (R1)) in view of Darling et al. (US 2,606,916 (R2)); and further in view of known principles and methods in the art of using surfactants for oil recovery from various matrices, for example, as disclosed in Cooper, et al. (*The Canadian Journal of Chemical Engineering*, Vol. 58, 1980; 576-579 (R3)), Scheimann et al. (US 2007/0210007 AI (R4)) and Bonanno (US 4,702,798 (R5)) included as extrinsic evidence.

**1. The Cited Art**

R1: Cantrell et al. (US2006/0041152) discloses a method of recovering oil from a concentrated byproduct, such as evaporated thin stillage formed during a dry milling process used for producing ethanol. The method involves forming a concentrate through evaporating and centrifuging and, in particular, a disk stack centrifuge.<sup>4</sup>

R2: Darling et al. (US 2,606,916) discloses a process for the selective separation of the oil and proteins contained in cereal products. The objective stated was to pre-treat certain cereal products (dry milled corn, soy bean flour, cottonseed, comminuted peanuts)<sup>5</sup> which contain oil, proteins, and starch, so that the latter two materials may be more effectively subsequently separated.<sup>6</sup> The pre-treatment involved adding ammonium hydroxide to suspended cereals.<sup>7</sup>

R3: Cooper, et al. *The Canadian Journal of Chemical Engineering*, Vol. 58, 1980; 576-579 discloses the relevance of HLB to De-emulsification of a mixture of heavy oil, water and

<sup>3</sup>The American Heritage Dictionary of the English Language, Fourth Edition copyright ©2000 by Houghton Mifflin Company. Updated in 2009. (accessed through <http://www.thefreedictionary.com/organic>)

<sup>4</sup>R1 at Abstract and ¶[0013].

<sup>5</sup>R2 at Column 1, Line 15.

<sup>6</sup>R2 at Column 1, Line 38.

<sup>7</sup>R2 at Column 3, Line 21.

clay.<sup>8</sup> The stated purpose of the research was to find a range of HLB values which would be characteristic of a surfactant with good potential for coalescing heavy oil-water-clay emulsions.<sup>9</sup>

R4: Scheimann et al. (US 2007/0210007) discloses a method dewatering thin stillage process streams generated in the processing of grain to ethanol comprising adding to the process streams an effective flocculating amount of an anionic copolymer comprising acrylic acid sodium salt, methacrylic acid sodium salt or 2-acrylamido-2-methyl-1-propanesulfonic acid sodium salt to form a mixture of water and flocculated solids; and separating the water from the flocculated solids using a dewatering device.<sup>10</sup>

R5: Bonanno (US 4,702,798) discloses a process for dehydrating solids in aqueous solids mixtures and recovering the solids for further use.<sup>11</sup> The process describes the use of surface active agents as an aid to causing a suspension or condition of miscibility, in a multiple phase system of oil, water and solids for the efficient concentration and drying of products such as food, food wastes, chemicals, pharmaceutical wastes and sewage in a fluidizing oil.<sup>12</sup>

## 2. Burden of Proving Obviousness under 35 U.S.C. §103

In rejecting claims under 35 U.S.C. §103, the Examiner bears the initial burden of presenting a *prima facie* case of obviousness.<sup>13</sup> A *prima facie* case of obviousness is established when the teachings of the prior art itself would appear to have suggested the claimed subject matter to one of ordinary skill in the art.<sup>14</sup> Any rejection under 35 U.S.C. §103 must be supported by an explicit analysis of obviousness.<sup>15</sup> The analysis of obviousness must be resolved on the basis of the scope and content of the prior art.<sup>16</sup> It must also include an analysis of the differences between the prior art and the claims at issue. If the Examiner misconstrues the scope and content of the prior art, the differences between prior art and the claims will be improperly reasoned and the rejection will be improper.

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<sup>8</sup>R3 at Title.

<sup>9</sup>R3 at 576, Column 1, last line.

<sup>10</sup>R4 at Abstract.

<sup>11</sup>R5 at Column 1, Line 9.

<sup>12</sup>R5 at Column 1, Line 66 - Column 2, Line 4.

<sup>13</sup>*In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993).

<sup>14</sup>*In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993).

<sup>15</sup>*KSR Int'l. Co. v. Teleflex, Inc. et al.*, 127 S.Ct. 1727,1741 (U.S. 2007).

<sup>16</sup>*Graham v. John Deere, Co.*, 383 U.S. 1, 148 USPQ 459 (1966).



“All words in a claim must be considered in judging the patentability of that claim against the prior art.”<sup>17</sup> “If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious.”<sup>17</sup> To show obviousness, an Examiner must show that the improvement is only “the predictable use of prior art elements according to their established functions.”<sup>18</sup> “A statement that modifications of the prior art to meet the claimed invention would have been ‘well within the ordinary skill of the art’ at the time the claimed invention was made’ because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references.”<sup>19</sup>

Rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.<sup>20</sup> “If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.”<sup>21</sup> A conclusory statement to the contrary is insufficient to rebut such an indicia of nonobviousness.<sup>22</sup> Further, “the proposed modification cannot render the prior art unsatisfactory for its intended purpose.”<sup>23</sup> Obviousness must not be distorted by using hindsight bias or ex post reasoning.<sup>24</sup> Secondary considerations may also be provided to show that an asserted combination would not render claimed subject matter predictable or obvious.<sup>25</sup> These secondary considerations include failure of others, unexpected results and the prior art teaching away from the invention.<sup>26</sup>

### 3. 35 U.S.C. §103 Rejection of Claim 1.

The Examiner has combined R1 and R2 without considering the references as a whole, and as a result has combined the references despite their teaching away from such combination. Specifically, (1) the modifications proposed by the Examiner to reach the claimed invention are

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<sup>17</sup>MPEP §2143.03

<sup>18</sup>*Id.*

<sup>19</sup>MPEP §2143.01.

<sup>20</sup>*KSR* at 1741.

<sup>21</sup>*Id.*

<sup>22</sup>MPEP §2143.01.

<sup>23</sup>*Id.*

<sup>24</sup>*KSR* at 1742 citing *Graham* at 36.

<sup>25</sup>*Graham* at 17-18.

<sup>26</sup>*Id.*

explicitly taught against within the references, (2) the combination of references would be inoperable because the references teach conditions which are disparate and incompatible, and (3) the references facially disparage approaches like those presented in the other. As such, the combination of references is in error.

Regarding claim 1, Applicants point out that that one aspect of the claim is “applying an oil concentrator to the byproduct stream of the bio-based ethanol production process with the byproduct stream at a pH between 3 and 7, the oil concentrator having a chemical composition capable of reducing the effect of the oil sequestering components in the byproduct stream.” With respect to R1, the Examiner correctly identifies that R1 does not describe the use of an oil concentrator. To teach an oil concentrator, the Examiner relies on R2. The Examiner has recognized that R1 concerns the same problem to be solved as the present invention; however, the solution proposed by R1 (1) is distinguished from the present claim, (2) teaches away from elements of the present claim, (3) disparages the claimed approach, and (4) evidences the failure of others having attempted to solve the same problem.

R1 discloses a method of recovering oil from a concentrated byproduct, such as evaporated thin stillage formed during a dry milling process used for producing ethanol. The method disclosed in R1 involves forming a concentrate through evaporating and centrifuging (*e.g.* a disk stack centrifuge).<sup>27</sup> R1 focuses on purely mechanical means (centrifugation) to separate the oil from the byproduct stream. To enhance recovery, R1 teaches the concentration of the syrup (*e.g.* through evaporation). Importantly, R1 specifically states that, despite the commercial significance of recovering the oil, efforts to efficiently and economically separate oil from the byproduct stream have all failed.<sup>28</sup>

R1 discloses a method inferior to the presently claimed approach despite each of the references relied on by the Examiner being “known principles and methods in the art.” Despite the known principles and methods in the art, R1 states that there are no adequate means available for recovering this oil. “Efforts to recover the valuable oil from this byproduct have not been successful in terms of efficiency or economy.”<sup>29</sup> R1 is completely devoid of any teaching or disclosure related to an oil concentrator despite the Examiner’s hindsight conclusion that applying a concentrator would have been obvious. Instead of suggesting an oil concentrator, R1

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<sup>27</sup>R1 at Abstract and ¶[0013].

<sup>28</sup>R1 at [0006].

<sup>29</sup>R1 ¶[0006].

specifically teaches against the formation of emulsions in that forming an emulsion has a negative impact on the yield of the oil recovered (*e.g.*, undesirable emulsion phase).<sup>30</sup> While similar with respect to the problem to be solved, R1 is completely devoid of any teaching or suggestion that an oil concentrator be applied.

Prior to citing additional art, the Examiner takes a position of obviousness without a basis in any fact or reference by stating that “the use of surfactants to enhance oil recovery from various matrices is well known in the chemical arts.”<sup>31</sup> After this unsupported statement, R2 is essentially added to teach recovering oil from agricultural biomass. The Examiner construes R2 to disclose a method for the liberation and recovery of oil from materials containing starch, proteins, and oil such as in a matrix derived from dry milling of corn; wherein ammonium oleate is the surfactant or concentrator.<sup>32</sup>

The rejection is improper, for one thing, because the Examiner misconstrues the scope of R2. R2, as a whole, is understood to teach that oil recovery from cereal products can be enhanced by subjecting the cereal to a basic solution of ammonia (*e.g.* ammonium hydroxide). R2 describes the invention most succinctly saying the “actual operation” is combining “92 gallons of water and one liter of concentrated ammonium hydroxide” and “235 pounds”<sup>33</sup> of a “material” described as the “typical by-product of the making of hominy grits.”<sup>34</sup> The “material” is a solid by-product stream as indicated by its passage through a mesh to define its particle size.<sup>35</sup> After a second liter of ammonium hydroxide was added, the pH of this solution was defined at 9.75 to 9.85.<sup>36</sup> Without the addition of any other compounds, R2 discloses that an oil-in-water emulsion was formed.<sup>37</sup> Separation of the oil was accomplished through centrifugation.<sup>38</sup> “The oil-in-water emulsion thus obtained was then acidified by means of hydrochloric acid, which broke the emulsion so that the oil gradually rose to the top and formed a separate layer on the liquor.”<sup>39</sup> The Examiner relies on the statement “[i]t was found advantageous to use a small amount of ammonium oleate in the original solution of ammonium

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<sup>30</sup>R1 ¶[0006].

<sup>31</sup>Final Office Action, Page 5, second complete paragraph.

<sup>32</sup>Final Office Action, Page 5, referring to R2 (column 2 lines 37-43).

<sup>33</sup>R2 at Column 3, line 21ff.

<sup>34</sup>R2 at Column 2, line 55.

<sup>35</sup>R2 at Column 3, lines 5-20.

<sup>36</sup>R2 at Column 3, line 36.

<sup>37</sup>R2 at Column 3, line 41.

<sup>38</sup>R2 at Column 3, line 44ff.

<sup>39</sup>R2 at Column 3, line 62.

hydroxide as this enhanced the yield, and also made emulsification of the oil more rapid and complete”<sup>40</sup> to teach applying an oil concentrator as claimed. To summarize the teachings of R2, R2 teaches (1) that adding a base to a cereal suspended in water enhances the formation of an oil-in-water emulsion (2) which can be separated away from the solids by centrifugation, and (3) that the separated emulsion can be “broken” by acidification.

The Examiner relies on R2 for disclosing ammonium oleate despite this being an optional component, but ignores R2’s disclosure of adding a base despite this being the most important aspect of the disclosure. Instead of an oil concentrator, R2 teaches adding a base to enhance formation of an emulsion. While R2 discloses that adding a “small amount of ammonium oleate”<sup>41</sup> forms a more complete emulsion, R2 states that this is not necessary<sup>42</sup> and that making the solution basic is the primary mode by which the objective of forming the emulsion is met. Considering R2 as a whole, one of ordinary skill in the art would understand that R2 requires the emulsion step to be done at a basic pH. Present claims 1 and 23 require the pH be between 3 and 7 (*i.e.* not basic). The mechanism for recovering oil taught by R2 (adding base) is specifically outside the scope of the present claims.

The combination of R1 and R2 is improper because the references teach away from the proposed combination. R1 teaches against the formation of emulsions in that forming an emulsion has a negative impact on the yield of the oil recovered (*e.g.*, undesirable emulsion phase).<sup>43</sup> The objective of R2 is to form an emulsion and to separate the emulsion from the solid cereals. One of ordinary skill in the art would not combine the teaching of avoiding the formation of an emulsion and the purposeful formation of an emulsion because the objectives are opposites. R2 discloses the inclusion of an emulsifying agent.<sup>44</sup> The emulsifying agent, by its functional name, achieves that which is taught against in R1 (*i.e.*, R1 teaches against forming an emulsion).<sup>45</sup> R2 then states that the emulsifying agent “should be of the type that can subsequently be rendered ineffective.” R2 goes on to describe that very little emulsifying agent is needed and that actually the amount in the “biomass” may be sufficient so that applying

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<sup>40</sup> R2 at Column 3, line 69 to 73.

<sup>41</sup> R2 at Column 3, line 69.

<sup>42</sup> R2 at Column 4, line 4.

<sup>43</sup> R1 ¶[0006].

<sup>44</sup> R2 Column 2, line 30.

<sup>45</sup> R1 ¶[0006].

additional emulsifying agent is not necessary.<sup>46</sup> According to this approach, extracting oil from the “biomass” requires only the application of a base. To that end, R2 extensively describes the importance of the type of base.<sup>47</sup> Thus, while R1 teaches the importance of avoiding emulsions and present claims 1 and 23 require “a pH between 3 and 7,” the Examiner adds a reference which teaches adding a base to reach a pH of 9.75 to 10.58<sup>48</sup> to form an emulsion. This is a clear error. Additionally, the claimed method does not include rendering the oil concentrators ineffective, which is a required attribute of the emulsifying agents of R2. Instead, the claimed oil concentrators are effective to separate the oil from the byproduct stream.

A further indication of the impropriety of combining R1 and R2 is that one would not apply the solution described in R2 with a reasonable expectation of success against the problem disclosed in R1. As described above, R2 relates generally to the use of alkaline components (e.g., ammonium hydroxide) for separating oil from dry milled flours. One of ordinary skill in the art understands that dry-milled flours and the byproduct stream of a bio-based ethanol production process are extraordinarily different in composition and attributes. As such, one would not apply solutions found suitable to one to the other with a reasonable expectation of success.

R2 states that care should be taken to avoid solubilization of the dispersion of the proteins and gelation of the starches.<sup>49</sup> The starting material of R2 is dry flour with intact starches. This flour is a solid which is only being suspended in liquid. R2 describes a method of removing the oil which focuses on keeping the flour from being solubilized or dispersed in the liquid. The reagents employed are uniquely applied to maintain the fidelity of the starch in the starting material, with the starch recovered “in the form of unchanged starch granules” (col. 1, lines 46-47).

In complete contrast to the “object” of R2 is the objective stated in R1. The starting material in R1 is a starch depleted liquid stillage (the starch has been largely converted into ethanol). Thus, the central “object” of R2 is primarily absent from R1. In contrast to R2, the waste stream of R1 includes solubilized proteins as the entire dry-milled product has been subjected to fermentation and distillation. The wetted flour described in R2 and the stillage

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<sup>46</sup>R2 Column 3, line 69, through Column 4, line 24.

<sup>47</sup>R2 Columns 2-3.

<sup>48</sup>R2 Column 4, lines 31-34.

<sup>49</sup>R2 Columns 1-2.

described in R1 are uniquely different materials from which to separate oil. A solution found appropriate for R2 is not an obvious solution for the material in R1, or vice versa. Instead, R2 explicitly describes avoiding conditions which would result in the formation of materials like those described in R1 (*e.g.*, solubilized proteins). Presently appealed claim 1 recites reducing the effect of the oil sequestering components within the method. Oil sequestering components are disclosed as soluble starches, proteins, gums, and waxes that interact with the oil (primarily triglycerides) to prevent its separation from solution.<sup>50</sup> R2 teaches that forming these in solution should be avoided, undoubtedly because they would confound oil recovery, while the present claims specifically address recovery from these oil sequestering components.

One of ordinary skill in the art would not look to R2 for teachings with any expectation of success for at least these reasons. This argument is supported explicitly by the disclosure in R1 which states that no viable solution to the problem described therein had been developed, despite the disclosure of R2 being public for fifty years. For at least these reasons, the rejection of Claim 1 is improper and should be reversed.

#### **4. 35 U.S.C. §103 Rejection of Claim 2.**

Claim 2 includes all the limitations of Claim 1 and additionally requires “the oil concentrator comprises a surfactant compound having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18.” In addition to the arguments set forth in Section IV.C.3. of this Brief with respect to the failure of R1 and R2 to teach or suggest each element of Claim 1, the addition of “known principles and methods in the art of using surfactants for oil recovery”<sup>51</sup> fails to teach or suggest each element of Claim 2. The Examiner does not rely on the specific teaching of any of the references R3, R4 or R5, but instead relies on them superficially as evidence of “known principles and methods in the art of using surfactants for oil recovery.” Applicants submit that the rejection is improper because the combination of R1, R2, and “known principles and methods” fails to teach each element of claim 2. In particular, “known principles and methods” fails to teach that “the oil concentrator comprises a surfactant compound having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18.”

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<sup>50</sup>Specification, ¶[0023].

<sup>51</sup>Final Office Action at page 4, final paragraph.

One statement that the Examiner contends is a known principle and method in the art of using surfactants for oil recovery is that “[i]n selecting a suitable surfactant system for the purpose, one would use standard methods in the art such as determining HLB criteria for optimal emulsion formation and subsequent demulsification; and optimal surfactant concentrations to ensure that the surfactant concentration is below a critical micellar concentration (CMC) for the surfactant in the liquid byproduct stream...”<sup>52</sup> “One would therefore logically select a surfactant or surfactant composition with HLB value in the range specified in claims 2...”<sup>53</sup> Applicants submit that neither R1 nor R2 teaches or discloses any reference to HLB nor a specific range of appropriate HLB values. The extrinsic evidence provided by the Examiner does not provide a teaching of a particular range or an appropriate approach for establishing an appropriate HLB range relevant to the present application.

Applicants submit that the Examiner is relying on these references as extrinsic evidence only because there is no reasonable nexus between these references and either the pending claims or references R1 and R2. In particular, R3 discloses the relevance of HLB to de-emulsification of a mixture of heavy oil, water and clay.<sup>54</sup> Applicants submit that the problem to be solved, the various chemicals, the scale, the industry, and the teachings associated therewith are so removed from the present specification as to be lacking in any significant teaching that is relevant to the present invention. The stated purpose of the research was to find a range of HLB values which would be characteristic of a surfactant with good potential for coalescing heavy oil-water-clay emulsions.<sup>55</sup>

Without acquiescing to the Examiner’s contention that R3 evidences that “standard methods in the art such as determining HLB criteria for optimal emulsion formation and subsequent demulsification” exist, Applicants submit that the teachings of R3 do not teach “the oil concentrator comprises a surfactant compound having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18.” The combination of R1 and R2 fail to teach the oil concentrator comprises a surfactant compound having a hydrophilic group and a lipophilic group providing the oil concentrator a

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<sup>52</sup>Final Office Action at page 6, first full paragraph.

<sup>53</sup>Final Office Action at page 6, second full paragraph.

<sup>54</sup>R3 at Title.

<sup>55</sup>R3 at 576, Column 1, last line.

hydrophile-lipophile balance (HLB) of about 12 to about 18” and none of R3, R4 or R5 remedy this failure.

R3 is evidenced in light of R1 and R2 to teach that HLB can be “optimized.” As a reference in relation to R1 and R2, R3 is highly divergent in field/content/disclosure. R3 essentially teaches compositions useful for the removal of clay from oil. R3 is not relied on for, nor does it make up for, the deficiencies described with respect to R1 and R2. The Examiner alleges that R3 teaches compounds having an HLB of 2 to 12. Indeed, R3 teaches HLB values in that range and substantially outside that range, *e.g.*, 30 (see figures). Depending on the desired outcome and the class of surfactant, relationships between the efficiency of the surfactant and the HLB could be deduced. However, R3 explicitly describes and shows (Fig. 1 and Fig. 2) that the relationship between HLB and performance is not predictable nor deduced without significant experimentation. For example, the efficacy of clay removal has two distinct maxima at distinct HLB values (*e.g.*, Fig. 2, maxima at HLB = 7 and 27). Adding references to teach a claimed HLB value within the context of the claimed method can only be based on hindsight reasoning. Applicants respectfully submit that it would have been impossible for the Examiner or a person of ordinary skill in the art to accurately predict the claimed HLB values without access to the present disclosure. Instead, the present disclosure presents a known problem, *e.g.*, extracting oil from a byproduct stream, according to a new perspective, *e.g.*, the concept of the “oil sequestering components,” and applies ingenuity and extensive experimentation to deduce an approach to solving that problem. The blanket assertion by the Examiner that “the use of surfactants to enhance oil recovery from various matrices is well known in the chemical arts” is an unsustainable legal position that lies upon a multitude of clear factual and legal errors.

R4 and R5 were not relied on nor do they remedy the deficiencies noted herein with respect to R1, R2 and R3.

### **5. 35 U.S.C. §103 Rejection of Claim 3.**

Claim 3 includes all the limitations of Claim 2 and additionally requires “the lipophilic group is a fatty acid group and the hydrophilic group is a polyethylene oxide.” In addition to the arguments set forth in Sections IV.C.3-4. of this Brief with respect to the failure of R1 and R2 to teach or suggest each element of Claim 1, the addition of “known principles and methods in the



art of using surfactants for oil recovery”<sup>56</sup> fails to teach each element of Claim 3. “Known principles and methods” fail to teach “the lipophilic group is a fatty acid group and the hydrophilic group is a polyethylene oxide.” By citing R3, R4, and R5 as extrinsic evidence, these references are not appropriately used to teach particular elements of the pending claims, but are instead limited to modifying those teachings of R1 and R2.

The Examiner specifically states that “R4 for example, suggests a surfactant which is chemically a polyethylene oxide with terminal fatty acid units, as in instant claims 3 and 15, for use in food systems, such as corn stillage to separate oil and suspended solids from an aqueous phase, which is expected to have a pH value as instantly claimed.” While the Examiner has relied on R4, a recitation by column and line number is not present within any office action. While R4 discloses adding surfactants, the surfactants disclosed are referred to as a “flocculating amount of one or more anionic polymers, the anionic polymers comprising one or more anionic monomers selected from acrylic acid sodium salt, 2-acrylamido-2-methyl-1-propanesulfonic acid sodium salt and methacrylic acid sodium salt and optionally one or more acrylamide monomers to form a mixture of water and coagulated and flocculated solids.”<sup>57</sup> The logical nexus between the flocculating anionic polymers and the present claims or any of the cited references has not been articulated by the Examiner and cannot be discerned on the present record with its superficial citation of R4. Again, the burden is on the Examiner in the first instance to present a *prima facie* case of obviousness, and that case must have articulated reasoning with rational underpinning as described above.

The blanket assertion by the Examiner that “the use of surfactants to enhance oil recovery from various matrices is well known in the chemical arts” is an unsustainable legal position that lies upon a multitude of clear factual and legal errors.

#### **6. 35 U.S.C. §103 Rejection of Claim 4.**

Claim 4 includes all the limitations of Claim 2 and additionally requires “the hydrophile-lipophile balance (HLB) is about 14 to about 16.” In addition to the arguments set forth in Sections IV.C.3-4. of this Brief with respect to the failure of R1 and R2 to teach or suggest each element of Claim 1, the addition of “known principles and methods in the art of using surfactants

<sup>56</sup> Final Office Action at page 4, final paragraph.

<sup>57</sup> R4 at ¶[0013]

for oil recovery”<sup>58</sup> fails to teach each element of Claim 4. “Known principles and methods” fail to teach “the hydrophile-lipophile balance (HLB) is about 15.”

The blanket assertion by the Examiner that “the use of surfactants to enhance oil recovery from various matrices is well known in the chemical arts” is an unsustainable legal position that lies upon a multitude of clear factual and legal errors. R4 and R5 were not relied on nor do they remedy the deficiencies noted herein with respect to R1, R2 and R3.

#### **7. 35 U.S.C. §103 Rejection of Claim 5.**

Claim 5 includes all the limitations of Claim 2 and additionally requires “the hydrophile-lipophile balance (HLB) is about 15.” In addition to the arguments set forth in Sections IV.C.3-4. of this Brief with respect to the failure of R1 and R2 to teach or suggest each element of Claim 1, the addition of “known principles and methods in the art of using surfactants for oil recovery”<sup>59</sup> fails to teach each element of Claim 3. “Known principles and methods” fail to teach “the hydrophile-lipophile balance (HLB) is about 15.”

The blanket assertion by the Examiner that “the use of surfactants to enhance oil recovery from various matrices is well known in the chemical arts” is an unsustainable legal position that lies upon a multitude of clear factual and legal errors. R4 and R5 were not relied on nor do they remedy the deficiencies noted herein with respect to R1, R2 and R3.

#### **8. 35 U.S.C. §103 Rejection of Claim 6.**

Claim 6 includes all the limitations of Claim 1 and additionally requires the byproduct stream comprises an aqueous liquid byproduct stream with dissolved solids. The Examiner relies on R1 to teach the additional requirement of claimed in Claim 6. However, R1 specifically describes evaporating the thin stillage prior to centrifugation. Accordingly, the combination of R1 and R2 fails to teach each element of Claim 6. R3, R4, and R5 were not relied on nor do they remedy the deficiencies noted herein with respect to R1 and R2.

#### **9. 35 U.S.C. §103 Rejection of Claim 7.**

Claim 7 includes all the limitations of Claim 6 and additionally requires the byproduct stream comprises a thin stillage or syrup derived therefrom. The Examiner relies on R1 to teach

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<sup>58</sup> Final Office Action at page 4, final paragraph.

<sup>59</sup> Final Office Action at page 4, final paragraph.

the additional requirement of claimed in Claim 7. However, R1 specifically describes evaporating the thin stillage prior to centrifugation. Accordingly, the combination of R1 and R2 fails to teach each element of Claim 7. R3, R4, and R5 were not relied on nor do they remedy the deficiencies noted herein with respect to R1 and R2.

#### **10. 35 U.S.C. §103 Rejection of Claim 8.**

Claim 8 includes all the limitations of Claim 6 and additionally requires adding an amount of oil concentrator so that the oil concentrator concentration is below a critical micellar concentration for the oil concentrator in the aqueous liquid byproduct stream. In addition to the arguments set forth in Sections IV.C.3-4. of this Brief with respect to the failure of R1 and R2 to teach or suggest each element of Claim 1, the addition of “known principles and methods in the art of using surfactants for oil recovery”<sup>60</sup> fails to teach each element of Claim 3. “Known principles and methods” fail to teach “the hydrophile-lipophile balance (HLB) is about 15.”

The blanket assertion by the Examiner that “one would use standard methods in the art such as determining HLB criteria for optimal emulsion formation and subsequent demulsification; and optimal surfactant concentrations to ensure that the surfactant concentration is below a critical micellar concentration (CMC) for the surfactant in the liquid byproduct stream,” is an unsustainable legal position that lies upon a multitude of clear factual and legal errors. The rejection so lacks clarity that it is not presently discernable upon which reference the Examiner relies to teach that the surfactant concentration be below a critical micellar concentration.

#### **11. 35 U.S.C. §103 Rejection of Claim 9.**

Claim 9 includes all the limitations of Claim 1 and additionally requires a further step of applying centrifugal force after mixing the oil concentrator with the byproduct stream. The arguments set forth in Sections IV.C.3-4. of this Brief describe the error in combining R1 and R2. Additionally, both R1 and R2 lack a step of applying an oil concentrator and thus do not inform on any step that may occur subsequently. R3, R4, and R5 were not relied on nor do they remedy the deficiencies noted herein with respect to R1 and R2.

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<sup>60</sup> Final Office Action at page 4, final paragraph.

**12. 35 U.S.C. §103 Rejection of Claim 10.**

Claim 10 includes all the limitations of Claim 9 and additionally requires applying centrifugal force after mixing the oil concentrator enables the formation of a separable oil phase and aqueous phase, wherein the oil concentrator is distributed between the oil phase and the aqueous phase. The arguments set forth in Sections IV.C.3-4. of this Brief describe the error in combining R1 and R2. Additionally, both R1 and R2 lack a step of applying an oil concentrator and thus do not inform on any step that may occur subsequently. R3, R4, and R5 were not relied on nor do they remedy the deficiencies noted herein with respect to R1 and R2.

**13. 35 U.S.C. §103 Rejection of Claim 11.**

Claim 11 includes all the limitations of Claim 1 and additionally requires evaporating water from the byproduct stream prior to said applying step and drying the byproduct stream after said oil separating step to produce a distillers dried grains product suitable for animal feed. The arguments set forth in Sections IV.C.3-4. of this Brief describe the error in combining R1 and R2. The Examiner relies on R1 to teach that the distillers dried grains product suitable for animal feed. However, the method of claim 11 produces a superior animal feed as described in paragraphs [0007] and [0008]. That is, the animal feed, not having been subjected to high temperatures and pressures has not been degraded. R1 specifically describes using elevated temperatures and pressures to evaporate the water prior to centrifugally concentrating the oil.

**14. 35 U.S.C. §103 Rejection of Claim 12.**

Applicants submit that while claim 12 was cited as rejected on Page 4 of the Office Action as part of a list (*i.e.* “Claims 1-17 are rejected under 35 U.S.C. 103(a)”), there is no explicit analysis as to why this claim was rejected. Applicants point out that claim 12 requires an organic composition comprising oil derived from a byproduct stream of a bio-based ethanol production process and an oil concentrator. As pointed out in Sections IV.C.3-4. of this Brief, R1 and R2 are not combinable and do not teach an oil concentrator. Applicants further submit that the references do not teach a surfactant compound including an ethoxylated sorbitan ester and having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18.

Applicants point out that the Examiner does not combine R4 with any of the other references to make a rejection, but instead relies on as extrinsic evidence of what is known in the art. However, the Examiner also states, “R4 discloses sorbitan esters of fatty acids, ethoxylated sorbitan esters of fatty acids” in the first paragraph of page 7. This reference appears to be relied on to teach that specifically claimed surfactant compounds were known in the art. Again, it appears that the Examiner has taken this approach because the relied upon teaching from Paragraphs [0026]-[0027] are taken completely out of context. R4 relates to using flocculating anionic polymers to byproduct streams. The portions of R4 the Examiner relies on relates to the use of surfactants to manufacture these anionic polymers. Not anywhere in the disclosure does R4 suggest that these surfactants be used on the byproduct streams.

**15. 35 U.S.C. §103 Rejection of Claim 13.**

Claim 13 includes all the limitations of Claim 12 and additionally requires the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is whole stillage remaining from a distillation bottom. As with Claim 12, Claim 13 has not been addressed by the Examiner with an explicit analysis of obviousness.

**16. 35 U.S.C. §103 Rejection of Claim 14.**

Claim 14 includes all the limitations of Claim 12 and additionally requires the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is a thin stillage or syrup derived therefrom separated from the whole stillage by centrifugation. As with Claim 12, Claim 14 has not been addressed by the Examiner with an explicit analysis of obviousness.

**17. 35 U.S.C. §103 Rejection of Claim 15.**

Claim 15 includes all the limitations of Claim 12 and additionally requires the lipophilic group comprises a fatty acid and the hydrophilic group comprises a polyethylene oxide. As with Claim 12, Claim 15 has not been addressed by the Examiner with an explicit analysis of obviousness.

**18. 35 U.S.C. §103 Rejection of Claim 16.**

Claim 16 includes all the limitations of Claim 15 and additionally requires the fatty acid and the polyether provide the oil concentrator with a hydrophile-lipophile balance (HLB) of about 14 to about 16. As with Claim 12, Claim 16 has not been addressed by the Examiner with an explicit analysis of obviousness.

**19. 35 U.S.C. §103 Rejection of Claim 17.**

Claim 17 includes all the limitations of Claim 12 and additionally requires the oil concentrator be an FDA acceptable direct food additive for humans and animals, said food additive selected from the group consisting of polyoxyethylene (20) sorbitan monostearate (Polysorbate 60), polyoxyethylene (20) sorbitan tristearate (Polysorbate 65), and polyoxyethylene (20) sorbitan monooleate (Polysorbate 80). As with Claim 12, Claim 17 has not been addressed by the Examiner with an explicit analysis of obviousness.

**20. 35 U.S.C. §103 Rejection of Claim 18.**

Applicants point out that claim 18 recites a method of extracting oil from a byproduct stream of a bio-based ethanol production process comprising mixing an ethoxylated sorbitan ester with the byproduct stream; centrifuging the mixture of the ethoxylated sorbitan ester and the byproduct stream; and separating the oil from the mixture.

As pointed out in Sections IV.C.3-4. of this Brief, the combination of R1 and R2 is improper. Applicants further submit that the combination of R1 and R2 is completely devoid of any teaching or disclosure of an ethoxylated sorbitan ester.

Applicants point out that the Examiner does not combine R4 with any of the other references to make a rejection, but instead relies on as extrinsic evidence of what is known in the art. However, the Examiner also states, “R4 discloses sorbitan esters of fatty acids, ethoxylated sorbitan esters of fatty acids” in the first paragraph of page 7. This reference appears to be relied on to teach that specifically claimed surfactant compounds were known in the art. Again, it appears that the Examiner has taken this approach because the relied upon teaching from Paragraphs [0026]-[0027] are taken completely out of context. R4 relates to using flocculating anionic polymers to byproduct streams. The portions of R4 the Examiner relies on relates to the use of surfactants to manufacture these anionic polymers. Not anywhere in the disclosure does

R4 suggest that these surfactants be used on the byproduct streams. R5 is mentioned as teaching surfactants, but there is no clear basis provided by the Examiner for relying on this reference. The rejection, with respect to R5, clearly does not reach the level of explicit analysis of obviousness.

**21. 35 U.S.C. §103 Rejection of Claim 19.**

Claim 19 includes all the limitations of Claim 18 and additionally requires the ethoxylated sorbitan ester includes polyoxyethylene (20) sorbitan. In addition to the combination of references not teaching every element of Claim 19, the arguments set forth in the preceding sections are applicable to Claim 19.

**22. 35 U.S.C. §103 Rejection of Claim 20.**

Claim 20 includes all the limitations of Claim 19 and additionally requires the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan monooleate. In addition to the combination of references not teaching every element of Claim 20, the arguments set forth in the preceding sections are applicable to Claim 20.

**23. 35 U.S.C. §103 Rejection of Claim 21.**

Claim 21 includes all the limitations of Claim 19 and additionally requires the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan trioleate. In addition to the combination of references not teaching every element of Claim 21, the arguments set forth in the preceding sections are applicable to Claim 21.

**24. 35 U.S.C. §103 Rejection of Claim 22.**

Claim 22 includes all the limitations of Claim 19 and additionally requires the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan tristearate. In addition to the combination of references not teaching every element of Claim 22, the arguments set forth in the preceding sections are applicable to Claim 22.

**25. 35 U.S.C. §103 Rejection of Claim 23.**

The Applicants point out that claim 23 recites a method of extracting oil from a liquid stillage byproduct of a bio-based ethanol production process, comprising evaporating water from

the liquid stillage to produce a syrup; processing the syrup to a temperature between 100° F and 212° F and a pH between 3 and 7; mixing a polyoxyethylene (20) sorbitan ester with the syrup; centrifuging the mixture; and separating the oil from the mixture.

The Examiner states that “[t]he invention as a whole is therefore prima facie obvious in view of the art” on page 9 of the Office Action; however, the rejection lacks any clarity around how each element of the claim is disclosed or suggested by the prior art. The lack of explicit analysis clearly does not meet the Examiner’s burden of establishing a prima facie case of obviousness.



**V. Conclusion**

For the foregoing reasons, Applicants respectfully submit that the rejection of claims 1-23 should be reversed.

Respectfully submitted,

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## VI. Claims Appendix

Claims 1-23 are on appeal:

1. A method of extracting oil from a byproduct stream of a bio-based ethanol production process under conditions in which there is an attraction between oil and oil sequestering components in the byproduct stream, the method comprising:

applying an oil concentrator to the byproduct stream of the bio-based ethanol production process with the byproduct stream at a pH between 3 and 7, the oil concentrator having a chemical composition capable of reducing the effect of the oil sequestering components in the byproduct stream;

mixing the oil concentrator with the byproduct stream; and

separating the oil from the byproduct stream.

2. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 1, wherein the oil concentrator comprises a surfactant compound having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18.

3. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 2, wherein the lipophilic group is a fatty acid group and the hydrophilic group is a polyethylene oxide.

4. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 2, wherein the hydrophile-lipophile balance (HLB) is about 14 to about 16.

5. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 2, wherein the hydrophile-lipophile balance (HLB) is about 15.

6. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 1, wherein the byproduct stream comprises an aqueous liquid byproduct stream with dissolved solids.

7. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 6, wherein the byproduct stream comprises a thin stillage or syrup derived therefrom.

8. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 6, wherein adding the oil concentrator into the aqueous liquid byproduct stream includes adding an amount of oil concentrator so that the oil concentrator concentration is below a critical micellar concentration for the oil concentrator in the aqueous liquid byproduct stream.

9. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 1, the method further comprising:  
applying centrifugal force after mixing the oil concentrator with the byproduct stream.

10. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 9, wherein applying centrifugal force after mixing the oil concentrator enables the formation of a separable oil phase and aqueous phase, wherein the oil concentrator is distributed between the oil phase and the aqueous phase.

11. The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 1, the method further comprising:  
evaporating water from the byproduct stream prior to said applying step; and  
drying the byproduct stream after said oil separating step to produce a distillers dried grains product suitable for animal feed.

12. An organic composition comprising oil derived from a byproduct stream of a bio-based ethanol production process and an oil concentrator, the oil concentrator comprising a surfactant compound including an ethoxylated sorbitan ester and having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18.

13. The organic composition of claim 12, wherein the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is whole stillage remaining from a distillation bottom.

14. The organic composition of claim 12, wherein the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is a thin stillage or syrup derived therefrom separated from the whole stillage by centrifugation.

15. The organic composition of claim 12, wherein the lipophilic group comprises a fatty acid and the hydrophilic group comprises a polyethylene oxide.

16. The organic composition of claim 15, wherein the fatty acid and the polyether provide the oil concentrator with a hydrophile-lipophile balance (HLB) of about 14 to about 16.

17. The organic composition of claim 12, wherein the oil concentrator is an FDA acceptable direct food additive for humans and animals, said food additive selected from the group consisting of polyoxyethylene (20) sorbitan monostearate (Polysorbate 60), polyoxyethylene (20) sorbitan tristearate (Polysorbate 65), and polyoxyethylene (20) sorbitan monooleate (Polysorbate 80).

18. A method of extracting oil from a byproduct stream of a bio-based ethanol production process, comprising:  
mixing an ethoxylated sorbitan ester with the byproduct stream;  
centrifuging the mixture of the ethoxylated sorbitan ester and the byproduct stream; and  
separating the oil from the mixture.

19. (Previously presented) The method of claim 18, wherein the ethoxylated sorbitan ester includes polyoxyethylene (20) sorbitan.

20. The method of claim 19, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan monooleate.

21. The method of claim 19, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan trioleate.

22. The method of claim 19, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan tristearate.

23. A method of extracting oil from a liquid stillage byproduct of a bio-based ethanol production process, comprising:

evaporating water from the liquid stillage to produce a syrup;

processing the syrup to a temperature between 100° F and 212° F and a pH between 3 and 7;

mixing a polyoxyethylene (20) sorbitan ester with the syrup;

centrifuging the mixture; and

separating the oil from the mixture.

**VII. Evidence Appendix**

None

**VIII. Related Proceedings Appendix**

None

| Electronic Patent Application Fee Transmittal  |   |          |        |                      |
|--|---|----------|--------|----------------------|
| <b>Application Number:</b>                     | 13117301  |          |        |                      |
| <b>Filing Date:</b>                            | 27-May-2011   |          |        |                      |
| <b>Title of Invention:</b>                     | BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME |          |        |                      |
| <b>First Named Inventor/Applicant Name:</b>    | Christopher S. Froderman                                    |          |        |                      |
| <b>Filer:</b>                                  | William F. Bahret/Joyce Eden                                |          |        |                      |
| <b>Attorney Docket Number:</b>                 | 13044-9A  |          |        |                      |
| Filed as Small Entity                          |   |          |        |                      |
| <b>Utility under 35 USC 111(a) Filing Fees</b> |   |          |        |                      |
| Description                                    | Fee Code  | Quantity | Amount | Sub-Total in USD(\$) |
| <b>Basic Filing:</b>                           |   |          |        |                      |
| <b>Pages:</b>                                  |   |          |        |                      |
| <b>Claims:</b>                                 |   |          |        |                      |
| <b>Miscellaneous-Filing:</b>                   |   |          |        |                      |
| <b>Petition:</b>                               |   |          |        |                      |
| <b>Patent-Appeals-and-Interference:</b>        |   |          |        |                      |
| <b>Post-Allowance-and-Post-Issuance:</b>       |   |          |        |                      |
| <b>Extension-of-Time:</b>                      |   |          |        |                      |
| Extension - 4 months with \$0 paid             | 2254  | 1        | 1100   | 1100                 |



| Description              | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--------------------------|----------|----------|--------|----------------------|
| <b>Miscellaneous:</b>    |          |          |        |                      |
| <b>Total in USD (\$)</b> |          |          |        | <b>1100</b>          |

| <b>Electronic Acknowledgement Receipt</b>   |   |
|---|---|
| <b>EFS ID:</b>                              | 18051035  |
| <b>Application Number:</b>                  | 13117301  |
| <b>International Application Number:</b>    |   |
| <b>Confirmation Number:</b>                 | 7354  |
| <b>Title of Invention:</b>                  | BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME |
| <b>First Named Inventor/Applicant Name:</b> | Christopher S. Froderman                                    |
| <b>Customer Number:</b>                     | 32841   |
| <b>Filer:</b>                               | William F. Bahret/Joyce Eden                                |
| <b>Filer Authorized By:</b>                 | William F. Bahret   |
| <b>Attorney Docket Number:</b>              | 13044-9A  |
| <b>Receipt Date:</b>                        | 28-JAN-2014   |
| <b>Filing Date:</b>                         | 27-MAY-2011   |
| <b>Time Stamp:</b>                          | 18:03:14  |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                 |

**Payment information:**

|  |                   |
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| Submitted with Payment   | yes               |
| Payment Type   | Credit Card       |
| Payment was successfully received in RAM   | \$1100            |
| RAM confirmation Number  | 4553              |
| Deposit Account  | 502176            |
| Authorized User  | BAHRET, WILLIAM F |
| <p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p> |                   |

| <b>File Listing:</b>  |                             |                  |   |                         |                         |
|---|-----------------------------|------------------|---|-------------------------|-------------------------|
| <b>Document Number</b>  | <b>Document Description</b> | <b>File Name</b> | <b>File Size(Bytes)/<br/>Message Digest</b>                       | <b>Multi Part /.zip</b> | <b>Pages (if appl.)</b> |
| 1   | Appeal Brief Filed          | Appeal_Brief.pdf | 156971<br><small>65bd0239fa8d6aba4984b24f45e5c2889ee4d412</small> | no                      | 35                      |
| <b>Warnings:</b>  |                             |                  |   |                         |                         |
| <b>Information:</b>   |                             |                  |   |                         |                         |
| 2   | Fee Worksheet (SB06)        | fee-info.pdf     | 30205<br><small>fb6d5a642a1f1d6ae86c131e6daed8eac5718a0</small>   | no                      | 2                       |
| <b>Warnings:</b>  |                             |                  |   |                         |                         |
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| <b>Total Files Size (in bytes):</b>   |                             |                  | 187176  |                         |                         |
| <p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> <b>If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> <b>If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> <b>If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</b></p> |                             |                  |   |                         |                         |



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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR     | ATTORNEY DOCKET NO.   | CONFIRMATION NO. |
|---|-------------|--------------------------|-----------------------|------------------|
| 13/117,301  | 05/27/2011  | Christopher S. Froderman | 13044-9A              | 7354             |
| 32841   | 7590        | 08/28/2013               | EXAMINER              |                  |
| BAHRET & ASSOCIATES<br>320 NORTH MERIDIAN STREET<br>SUITE 510<br>INDIANAPOLIS, IN 46204 |             |                          | PRAKASH, SUBBALAKSHMI |                  |
|   |             |                          | ART UNIT              | PAPER NUMBER     |
|   |             |                          | 1793                  |                  |
|   |             |                          | MAIL DATE             | DELIVERY MODE    |
|   |             |                          | 08/28/2013            | PAPER            |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|  |                        |                     |
|--|------------------------|---------------------|
| <b>Notice of Panel Decision<br/>from Pre-Appeal Brief<br/>Review</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|  | 13/117,301             | FRODERMAN ET AL.    |
|  | <b>Examiner</b>        | <b>Art Unit</b>     |
|  | Subbalakshmi Prakash   | 1793                |

This is in response to the Pre-Appeal Brief Request for Review filed .

1.  **Improper Request** – The Request is improper and a conference will not be held for the following reason(s):

- The Notice of Appeal has not been filed concurrent with the Pre-Appeal Brief Request.
- The request does not include reasons why a review is appropriate.
- A proposed amendment is included with the Pre-Appeal Brief request.
- Other: .

The time period for filing a response continues to run from the receipt date of the Notice of Appeal or from the mail date of the last Office communication, if no Notice of Appeal has been received.

2.  **Proceed to Board of Patent Appeals and Interferences** – A Pre-Appeal Brief conference has been held. The application remains under appeal because there is at least one actual issue for appeal. Applicant is required to submit an appeal brief in accordance with 37 CFR 41.37. The time period for filing an appeal brief will be reset to be one month from mailing this decision, or the balance of the two-month time period running from the receipt of the notice of appeal, whichever is greater. Further, the time period for filing of the appeal brief is extendible under 37 CFR 1.136 based upon the mail date of this decision or the receipt date of the notice of appeal, as applicable.

The panel has determined the status of the claim(s) is as follows:

Claim(s) allowed: \_\_\_\_\_.  
 Claim(s) objected to: \_\_\_\_\_.  
 Claim(s) rejected: 1-23.  
 Claim(s) withdrawn from consideration: \_\_\_\_\_.

3.  **Allowable application** – A conference has been held. The rejection is withdrawn and a Notice of Allowance will be mailed. Prosecution on the merits remains closed. No further action is required by applicant at this time.

4.  **Reopen Prosecution** – A conference has been held. The rejection is withdrawn and a new Office action will be mailed. No further action is required by applicant at this time.

All participants:

(1) Subbalakshmi Prakash.

(3) Christopher Fiorilla.

(2) Humera Sheikh.

(4) \_\_\_\_\_.

/Subbalakshmi Prakash/  
Examiner, Art Unit 1793

/Humera N. Sheikh/  
Supervisory Patent Examiner, Art  
Unit 1793

/Christopher A. Fiorilla/  
Chris Fiorilla  
Supervisory Patent Examiner, Art  
Unit 1700

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of: )  
 ) Before the Examiner  
 Christopher S. Froderman et al )  
 ) Subbalakshmi Prakash  
 Application No. 13/117,301 )  
 ) Group Art Unit 1793  
 Filed May 27, 2011 )  
 )  
 BIO-BASED OIL COMPOSITION AND )  
 METHOD FOR PRODUCING THE SAME )

|  |
|--|
| Date of Filing: July 15, 2013<br><br>I hereby certify that this correspondence is being filed electronically through the USPTO EFS-Web System on the date indicated above.<br><br>_____<br>/William F. Bahret/<br>William F. Bahret, Reg. No. 31,087 |
|--|

**ARGUMENT IN SUPPORT OF REQUEST FOR REVIEW**

Applicants respectfully submit that there are clear errors in the final rejection set forth in the Office Action mailed February 14, 2013, and respectfully request review of the rejections prior to filing of an appeal brief. Applicants submit that the following are clearly improper:

- I. The rejection of claims 1 and 11 under 35 U.S.C. §112, second paragraph;
- II. The rejection of claims 1-17 under 35 U.S.C. §103(a) over R1 – R5; and
- III. The rejection of claims 18-22, 23 under 35 U.S.C. §103(a) over R1, R2, R4, and R5.

**Claim Rejections – 35 U.S.C. §112**

The indefiniteness rejection of claim 1 essentially alleges that oil sequestering is unclear and further that separately reciting a step of applying an oil concentrator to a byproduct stream and mixing the oil concentrator with the byproduct stream makes the claim unclear. As to the latter point, this is clear error as these steps would not only be clear to one of ordinary skill in the art, but also to any ordinary person. Applicants submit that a step of applying and a step of mixing are routinely separated within instructions so as to enhance clarity (*e.g.*, add water to flour and then mix the water and the flour). The supposition that having these two distinct steps within a single method renders the claim unclear is akin to the statement that standard cookbooks are unclear. The Examiner also alleges that “oil sequestering components” is unclear. However, the nature of these components is described in extensive detail in paragraph [0023] and following so that one of ordinary skill in the art would fully appreciate and be

enlightened by the present disclosure. It is a clear error for the Examiner to reject the present claims due to a failure to appreciate this topic despite its conspicuous and clear description.

Regarding claim 11, it is respectfully submitted that the claim very clearly recites the sequence: “evaporating water from the byproduct stream prior to said applying step.”

### **Claim Rejections – 35 U.S.C. §103**

The Examiner alleges that the present invention is obvious in light of the combination of R1 and R2, adding R3 to teach the optimization of HLB, R4 to teach that some surfactants have been used in food systems, and R5 to teach that surfactants have been used to aid evaporation. In a first clear error, the Examiner has combined R1 and R2 without considering the references as a whole, and as a result has combined the references despite their clear teaching away from such combination. The modifications proposed by the Examiner to reach the claimed invention are explicitly taught against within the references. The combination of references would be inoperable, the references teach conditions which are disparate and incompatible, the solutions presented relate to such distinct problems that one of ordinary skill in the art would not draw from one for the application to the other, and the references facially disparage approaches like those presented in the other. As such, the combination of references is clear error.

Teaching Away: R1 discloses a solution to the same problem as disclosed in the present application, that is, extracting oil from a by-product stream. As would be expected with an overlap in the problem to be solved, the scope and content of R1 is fairly well described within the background of the present application. While similar with respect to the problem to be solved, R1 is completely devoid of any teaching or suggestion that an oil concentrator be applied. Rather, it teaches against such an approach and instead describes the negative impact of an emulsion forming on the yield of the oil (*e.g.*, undesirable emulsion phase - paragraph [0006]). Prior to citing additional art, the Examiner establishes a position of obviousness without a basis in any fact or reference by stating, “the use of surfactants to enhance oil recovery from various matrices is well known in the chemical arts.” After this unsupported statement, R2 is essentially added to teach recovering oil from agricultural biomass.

The Examiner's reliance on R2 is a clear error because it teaches away from the claimed invention and against the combination with R1. In particular, in column 2, line 30, R2 mentions

the inclusion of an emulsifying agent. The emulsifying agent, by its functional name, achieves exactly that which is taught against in R1 paragraph [0006], i.e., R1 teaches against forming an emulsion. R2 then states that the emulsifying agent “should be of the type that can subsequently be rendered ineffective.” R2 goes on to describe (column 3, line 69, through column 4, line 24) that very little emulsifying agent is needed and that actually the amount in the “biomass” may be sufficient so that applying additional emulsifying agent is not necessary. According to this approach, extracting oil from the “biomass” requires only the application of an alkali (*i.e.*, a base). To that end, R2 extensively describes the importance of the type of base (see cols. 2-3). Thus, while R1 teaches the avoidance of emulsions and present claims 1 and 23 require “a pH between 3 and 7,” the Examiner adds a reference which teaches adding a base to form an emulsion. This is a clear error. Additionally, the claimed method does not include rendering the oil concentrators ineffective, which is a required attribute of the emulsifying agents of R2. Instead, the claimed oil concentrators are not rendered ineffective to separate the oil from the byproduct stream.

As described above, R2 relates generally to the use of alkaline components (e.g., ammonium hydroxide) for separating oil from dry milled flours. One of ordinary skill in the art understands that dry-milled flours and the byproduct stream of a bio-based ethanol production process are extraordinarily different in composition and attributes. As such, one would not apply solutions found suitable to one to the other with a reasonable expectation of success. Instead, R2 states that care should be taken to avoid solubilization of the dispersion of the proteins and gelation of the starches (cols. 1-2). The starting material of R2 is dry flour with intact starches. This flour is a solid which is only being suspended in liquid. R2 describes a method of removing the oil which focuses on keeping the flour from being solubilized or dispersed in the liquid. The reagents employed are uniquely applied to maintain the fidelity of the starch in the starting material, with the starch recovered “in the form of unchanged starch granules” (col. 1, lines 46-47). In complete contrast to this “object” of the invention of R2, is R1. The starting material in R1 is a starch depleted (the starch has been largely converted into ethanol) liquid stillage. Thus, the central “object” of R2 is primarily absent from R1. In contrast to R2, the waste-stream of R1 includes solubilized proteins as the entire dry-milled product has been subjected to fermentation and distillation. As such, the wetted flour described in R2 and the stillage described in R1 are uniquely different materials from which to separate oil. As such, a solution found appropriate



for R2 is not an obvious solution for the material in R1, or vice versa. Instead, R2 explicitly describes avoiding conditions which would result in the formation of materials like those described in R1 as normal (*e.g.*, solubilized proteins). Furthermore, the conditions in R2 were designed explicitly for the preservation of the native starches while the starting materials in R1 are necessarily starch depleted. One of ordinary skill in the art would not look to R2 for teachings with any expectation of success for at least these reasons. This argument is supported explicitly by the disclosure in R1 which states that no viable solution to the problem described therein had been developed, despite the disclosure of R2 being public for fifty years.

R3 is added to R1 and R2 to teach that HLB can be “optimized.” As a reference in relation to R1 and R2, R3 is highly divergent in field/content/disclosure. R3 essentially teaches compositions useful for the removal of clay from oil. R3 is not relied on for, nor does it make up for, the deficiencies described with respect to R1 and R2. The Examiner alleges that R3 teaches compounds having an HLB of 2 to 12. Indeed, R3 teaches HLB values in that range and substantially outside that range, *e.g.*, 30 (see figures). Depending on the desired outcome and the class of surfactant, relationships between the efficiency of the surfactant and the HLB could be deduced. However, R3 explicitly describes and shows (Fig. 1 and Fig. 2) that the relationship between HLB and performance is not predictable nor deduced without significant experimentation. For example, the efficacy of clay removal has two distinct maxima at distinct HLB values (*e.g.*, Fig. 2, maxima at HLB = 7 and 27). Adding references to teach a claimed HLB value within the context of the claimed method can only rely on hindsight reasoning. Applicants respectfully submit that it would have been impossible for the Examiner or a person of ordinary skill in the art to accurately predict the claimed HLB values without access to the present disclosure. Instead, the present disclosure presents a known problem, *e.g.*, extracting oil from a byproduct stream, according to a new perspective, *e.g.*, the concept of the “oil sequestering components,” and applies ingenuity and extensive experimentation to deduce an approach to solving that problem. The blanket assertion by the Examiner that “the use of surfactants to enhance oil recovery from various matrices is well known in the chemical arts” is an unsustainable legal position that lies upon a multitude of clear factual and legal errors. R4 and R5 were not relied on nor do they remedy the deficiencies noted herein with respect to R1, R2 and R3.

### **Conclusion**

In view of the foregoing remarks and in consideration of the clear errors identified, Applicants request that the rejections be withdrawn and that the application be found allowable.

The Examiner is invited to call the undersigned attorney if a discussion of any issues relating to this amendment could expedite the allowance of this application.

Respectfully submitted,

/William F. Bahret/

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| Electronic Patent Application Fee Transmittal  |   |          |        |                      |
|--|---|----------|--------|----------------------|
| <b>Application Number:</b>                     | 13117301  |          |        |                      |
| <b>Filing Date:</b>                            | 27-May-2011   |          |        |                      |
| <b>Title of Invention:</b>                     | BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME |          |        |                      |
| <b>First Named Inventor/Applicant Name:</b>    | Christopher S. Froderman                                    |          |        |                      |
| <b>Filer:</b>                                  | William F. Bahret/Joyce Eden                                |          |        |                      |
| <b>Attorney Docket Number:</b>                 | 13044-9A  |          |        |                      |
| Filed as Small Entity                          |   |          |        |                      |
| <b>Utility under 35 USC 111(a) Filing Fees</b> |   |          |        |                      |
| Description                                    | Fee Code  | Quantity | Amount | Sub-Total in USD(\$) |
| <b>Basic Filing:</b>                           |   |          |        |                      |
| <b>Pages:</b>                                  |   |          |        |                      |
| <b>Claims:</b>                                 |   |          |        |                      |
| <b>Miscellaneous-Filing:</b>                   |   |          |        |                      |
| <b>Petition:</b>                               |   |          |        |                      |
| <b>Patent-Appeals-and-Interference:</b>        |   |          |        |                      |
| Notice of Appeal                               | 2401  | 1        | 400    | 400                  |
| <b>Post-Allowance-and-Post-Issuance:</b>       |   |          |        |                      |
| <b>Extension-of-Time:</b>                      |   |          |        |                      |

| Description                        | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|------------------------------------|----------|----------|--------|----------------------|
| Extension - 2 months with \$0 paid | 2252     | 1        | 300    | 300                  |
| <b>Miscellaneous:</b>              |          |          |        |                      |
| <b>Total in USD (\$)</b>           |          |          |        | <b>700</b>           |

## Electronic Acknowledgement Receipt

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|---|---|
| <b>EFS ID:</b>                              | 16318063  |
| <b>Application Number:</b>                  | 13117301  |
| <b>International Application Number:</b>    |   |
| <b>Confirmation Number:</b>                 | 7354  |
| <b>Title of Invention:</b>                  | BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME |
| <b>First Named Inventor/Applicant Name:</b> | Christopher S. Froderman                                    |
| <b>Customer Number:</b>                     | 32841   |
| <b>Filer:</b>                               | William F. Bahret/Joyce Eden                                |
| <b>Filer Authorized By:</b>                 | William F. Bahret   |
| <b>Attorney Docket Number:</b>              | 13044-9A  |
| <b>Receipt Date:</b>                        | 15-JUL-2013   |
| <b>Filing Date:</b>                         | 27-MAY-2011   |
| <b>Time Stamp:</b>                          | 17:22:15  |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                 |

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| Payment Type  | Credit Card       |
| Payment was successfully received in RAM  | \$700             |
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| Deposit Account   | 502176            |
| Authorized User   | BAHRET, WILLIAM F |
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| <b>File Listing:</b>   |   |  |  |                         |                         |
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| <b>Document Number</b>   | <b>Document Description</b>               | <b>File Name</b>                       | <b>File Size(Bytes)/ Message Digest</b>            | <b>Multi Part /.zip</b> | <b>Pages (if appl.)</b> |
| 1  | Notice of Appeal Filed                    | Notice_of_Appeal.pdf                   | 217021<br>5b32d4b6486a957df5f30ee406d89a8207d547   | no                      | 2                       |
| <b>Warnings:</b>   |   |  |  |                         |                         |
| <b>Information:</b>  |   |  |  |                         |                         |
| 2  | Miscellaneous Incoming Letter             | PreAppeal_Brief_Request_for_Review.pdf | 233906<br>e28beb78f215381f65d22bb9b0e235d7edd973a3 | no                      | 2                       |
| <b>Warnings:</b>   |   |  |  |                         |                         |
| <b>Information:</b>  |   |  |  |                         |                         |
| 3  | Amendment/Argument after Notice of Appeal | PABR.pdf                               | 35111<br>1d0c4736601fd888e5df4c37ead0f1bc4b7115f6  | no                      | 5                       |
| <b>Warnings:</b>   |   |  |  |                         |                         |
| <b>Information:</b>  |   |  |  |                         |                         |
| 4  | Fee Worksheet (SB06)                      | fee-info.pdf                           | 31978<br>b00f617b6a825619961c0fb243194c5487c5050   | no                      | 2                       |
| <b>Warnings:</b>   |   |  |  |                         |                         |
| <b>Information:</b>  |   |  |  |                         |                         |
| <b>Total Files Size (in bytes):</b>  |   |  | 518016   |                         |                         |
| <p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> |   |  |  |                         |                         |

|  |  |   |
|--|--|---|
| <b>NOTICE OF APPEAL FROM THE EXAMINER TO<br/>THE PATENT TRIAL AND APPEAL BOARD</b>   |  | Docket Number (Optional)<br><br>13044-9A            |
| I hereby certify that this correspondence is being facsimile transmitted to the USPTO EFS-Web transmitted to the USPTO, or or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)]<br><br>on _____<br><br>Signature _____<br>Typed or printed name _____ | In re Application of<br><b>Christopher S. Froderman et al.</b>   |   |
|  | Application Number<br>13/117,301   | Filed<br>05/27/2011                                 |
|  | For <b>BIO-BASED OIL COMPOSITION ANDMETHOD FOR PRODUCING THE SAME</b>  |   |
|  |  | Art Unit<br>1793                                    |
|  |  | Examiner<br>Subbalakshmi Prakash                    |
| Applicant hereby <b>appeals</b> to the Patent Trial and Appeal Board from the last decision of the examiner.   |  |   |
| The fee for this Notice of Appeal is (37 CFR 41.20(b)(1))  |  | \$ <u>800.00</u>                                    |
| <input checked="" type="checkbox"/>  | Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is:          | \$ <u>400.00</u>                                    |
| <input type="checkbox"/>   | A check in the amount of the fee is enclosed.  |   |
| <input checked="" type="checkbox"/>  | Payment by credit card. Form PTO-2038 is attached.   |   |
| <input type="checkbox"/>   | The Director has already been authorized to charge fees in this application to a Deposit Account.  |   |
| <input checked="" type="checkbox"/>  | The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. <u>502176</u> . |   |
| <input type="checkbox"/>   | A petition for an extension of time under 37 CFR 1.136(a) (PTO/SB/22) is enclosed.   |   |
| <b>WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</b>  |  |   |
| I am the   |  |   |
| <input type="checkbox"/>   | applicant/inventor.  | _____<br>/William F. Bahret/<br>Signature           |
| <input type="checkbox"/>   | assignee of record of the entire interest.<br>See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.<br>(Form PTO/SB/96)               | _____<br>William F. Bahret<br>Typed or printed name |
| <input checked="" type="checkbox"/>  | attorney or agent of record. <u>31087</u><br>Registration number _____   | _____<br>317-423-2300<br>Telephone number           |
| <input type="checkbox"/>   | attorney or agent acting under 37 CFR 1.34.<br>Registration number if acting under 37 CFR 1.34. _____  | _____<br>July 15, 2013<br>Date                      |
| NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.   |  |   |
| <input checked="" type="checkbox"/>  | *Total of <u>1</u> forms are submitted.  |   |

This collection of information is required by 37 CFR 41.31. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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|   |   |                                      |
|---|---|--------------------------------------|
| <b>PRE-APPEAL BRIEF REQUEST FOR REVIEW</b>  |   | Docket Number (Optional)<br>13044-9A |
| I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)]<br><br>on _____<br><br>Signature _____<br><br>Typed or printed name _____ | Application Number<br>13/177,301                        | Filed<br>05/27/2011                  |
|   | First Named Inventor<br>Christopher S. Froderman et al. |                                      |
|   | Art Unit<br>1793  | Examiner<br>Subbalakshmi Prakash     |

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).  
 Note: No more than five (5) pages may be provided.

I am the

|   |                           |
|---|---------------------------|
| <input type="checkbox"/> applicant/inventor.  | _____ /William F. Bahret/ |
|   | Signature                 |
| <input type="checkbox"/> assignee of record of the entire interest.<br>See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.<br>(Form PTO/SB/96) | _____ William F. Bahret   |
|   | Typed or printed name     |
| <input checked="" type="checkbox"/> attorney or agent of record. 31087<br>Registration number _____   | _____ 317-423-2300        |
|   | Telephone number          |
| <input type="checkbox"/> attorney or agent acting under 37 CFR 1.34.<br>Registration number if acting under 37 CFR 1.34 _____                           | _____ July 15, 2013       |
|   | Date                      |

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below\*.

\*Total of 1 forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR     | ATTORNEY DOCKET NO.   | CONFIRMATION NO. |
|---|-------------|--------------------------|-----------------------|------------------|
| 13/117,301  | 05/27/2011  | Christopher S. Froderman | 13044-9A              | 7354             |
| 32841   | 7590        | 02/14/2013               | EXAMINER              |                  |
| BAHRET & ASSOCIATES<br>320 NORTH MERIDIAN STREET<br>SUITE 510<br>INDIANAPOLIS, IN 46204 |             |                          | PRAKASH, SUBBALAKSHMI |                  |
|   |             |                          | ART UNIT              | PAPER NUMBER     |
|   |             |                          | 1793                  |                  |
|   |             |                          | NOTIFICATION DATE     | DELIVERY MODE    |
|   |             |                          | 02/14/2013            | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

joyce@bahretlaw.com  
bahret@bahretlaw.com  
rfrisk@bahretlaw.com

|                              |   |   |  |
|------------------------------|---|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>13/117,301    | <b>Applicant(s)</b><br>FRODERMAN ET AL. |  |
|                              | <b>Examiner</b><br>Subbalakshmi Prakash | <b>Art Unit</b><br>1793                 |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 03 December 2012.
- 2a)  This action is **FINAL**.                      2b)  This action is non-final.
- 3)  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 5)  Claim(s) 1-23 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6)  Claim(s) \_\_\_\_ is/are allowed.
- 7)  Claim(s) 1-23 is/are rejected.
- 8)  Claim(s) \_\_\_\_ is/are objected to.
- 9)  Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

- 10)  The specification is objected to by the Examiner.
- 11)  The drawing(s) filed on \_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \*    c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 12/3/2012
- 3)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_ .
- 4)  Other: \_\_\_\_ .

**DETAILED ACTION**

***Status of the Application***

Receipt is acknowledged of the Amendment and response filed 12/3/2012.

Claims 1-23 are pending in this action. Claims 1, 9, 11,12 and 17 were amended and new claims 18-23 were added by the applicants.

Claims 1-23 are rejected.

***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 12/3/2012 was filed after the mailing date of the first Office action, but before the close of prosecution. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Withdrawn Rejections***

Applicants' amendment of claims 1, 11 and 17 traverses the previously made rejection under 35 USC 112 second paragraph. The rejection is therefore withdrawn.

***Claim Rejections - 35 USC § 112***

The following is a quotation of 35 U.S.C. 112(b):

(B) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 1-17 and 19 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point**

**out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.**

Claim 1 recites “under conditions in which there is an attraction between oil and oil sequestering components in the byproduct stream”, a step of “applying an oil concentrator to the byproduct stream”, “the oil concentrator having a chemical composition capable of reducing the effect of the oil sequestering components in the byproduct stream”; and “mixing the oil concentrator with the byproduct stream”. One of ordinary skill in the art would not be reasonably apprised of the scope of the invention, as the conditions in which the oil component is sequestered, and the chemical composition of the concentrator that would be “capable of reducing the effect of the oil sequestering components” is unclear. Further, the claim recites an “applying” step and a “mixing” step for the same material. The method steps are therefore not clear and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Claims dependent on claim 1 are therefore indefinite. Appropriate correction is required.

Claim 11 recites “evaporating water from the byproduct stream prior to said applying step”. One of ordinary skill in the art would not be reasonably apprised of the sequence of the method steps in the claim. Appropriate clarification is required.

Claim 8 recites “wherein adding the oil concentrator into the aqueous liquid byproduct stream includes adding an amount of oil concentrator so that the oil concentrator is below a critical micelle concentration for the oil concentrator in the aqueous byproduct stream.” One of ordinary skill in the art would not be reasonably

apprised of the scope of the invention as the method of adding the oil concentrator is unclear. Appropriate clarification is required.

Claim 16 recites "polyether" in the composition of claim 15. There is insufficient antecedent basis for "polyether" in the claim.

Claims 12-17 recite "organic composition". It is unclear what "organic" means. One of ordinary skill in the art would not be reasonably apprised of the scope of the invention because the oil concentrator in claim 12 is recited as "comprising a surfactant compound including an ethoxylated sorbitan ester". One of ordinary skill in the art would not be reasonably apprised of the scope of the term "organic" in this recitation. Appropriate clarification is required.

Claim 19 recites "includes polyoxyethylene (20) sorbitan" in describing an ethoxylated sorbitan ester. The identity of this compound is indefinite. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cantrell et al. (US2006/0041152 A1 (R1)) in view of Darling et al. (US 2,606,916 (R2)); and further in view of known principles and methods in the art of using surfactants for oil recovery from various matrices, for example, as disclosed in Cooper, et al. (The Canadian Journal of Chemical Engineering, Vol. 58, 1980; 576-**

**579 (R3)), Scheimann et al. (US 2007/0210007 AI (R4)) and Bonanno (US 4,702,798 (R5)) included herein as extrinsic evidence.**

R1 describes a method of extracting oil from a byproduct stream of a bio-based ethanol production process, and separating the oil from the byproduct stream, as in instant claim 1 (see abstract); wherein the byproduct stream comprises an aqueous liquid byproduct stream as in claim 6; which comprises a thin stillage or syrup derived therefrom, as in claim 7 (paragraph [0010]); wherein the oil is separated from the stream by centrifugation as in claim 9 (paragraph [0013]); a stable flowable product for animal feed is produced as in claim 11 (paragraph [0025]); a byproduct stream of whole stillage or thin stillage is fed as in claims 13 and 14 (paragraphs [0010]-[0014]); these feed streams being produced during the process of ethanol production from corn, as instantly claimed (paragraph [0009]).

R1 does not specifically describe the use of a surfactant or oil concentrator in the process to recover oil from byproduct streams of ethanol production from corn. However, the use of surfactants to enhance oil recovery from various matrices is well known in the chemical arts. With reference to agricultural biomass, R2, for example, discloses a method for the liberation and recovery of oil from materials containing starch, proteins, and oil such as in a matrix derived from dry milling of corn; wherein ammonium oleate is the surfactant or concentrator (column 2 lines 37-43). R2 additionally discloses that it has been found to be advantageous to have present certain emulsifying agents that tend to produce oil-in-water emulsion, although they should be of a type that can be subsequently rendered ineffective so that the emulsion produced



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may be readily broken and resolved into separate layers of oil and aqueous substrate (column 2 lines 30-35).

One of ordinary skill in the art looking to improve a method as in R1 would consider adding a suitable surfactant to enhance oil recovery in a centrifugation step as in instant claim 10; based on the disclosure in R2 (column 3 lines 69-73).

In selecting a suitable surfactant system for the purpose, one would use standard methods in the art such as determining HLB criteria for optimal emulsion formation and subsequent demulsification; and optimal surfactant concentrations to ensure that the surfactant concentration is below a critical micellar concentration (CMC) for the surfactant in the liquid byproduct stream, as in claim 8.

One would therefore logically select a surfactant or surfactant composition with HLB value in the range specified in claims 2 and 12; to enable forming an oil-in-water emulsion that is easily broken to separate the phases. Additionally, methods to optimize HLB values of surfactants for various applications are well established in the art, (e.g. see R3, page 576, column 1); and R4 for example, suggests a surfactant which is chemically a polyethylene oxide with terminal fatty acid units, as in instant claims 3 and 15, for use in food systems, such as corn stillage to separate oil and suspended solids from an aqueous phase, which is expected to have a pH value as instantly claimed. R3 suggests surfactants with HLB of 15.3, as in instant claim 5; and a surfactant with HLB of about 13- 14, as in instant claim 4 and 16, (page 577, column 2) for de-emulsification of a complex oil bearing matrix to help separate oil and water phases. One of ordinary skill in the art would substitute surfactants approved for food use (either single

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surfactants or mixtures) to achieve the recited HLB values, with a reasonable expectation of success. For example, surfactants as instantly claimed are used in removing natural oils from aqueous solids to facilitate the drying process (R5, column 5 lines 1-25). Other examples are available in the art; and the disclosed surfactants are routinely used in the broader chemical arts to enhance oil recovery from mixed aqueous streams, and in the food art to extract oils from oleaginous materials. Furthermore, in selecting a suitable surfactant in extracting products from by-product streams for potential food or feed applications, as in claim 17, one would select surfactants that are commonly used in the food art. In this context, R4 discloses sorbitan esters of fatty acids, ethoxylated sorbitan esters of fatty acids, and the like or mixtures thereof, preferred emulsifying agents include sorbitan monooleate, polyoxyethylene sorbitan monostearate, and the like, (paragraph [0026]) in removing suspended matter and oils from thin stillage obtained in a dry milling process for food and feed grade ethanol. One of ordinary skill in the art would be aware that these surfactants/emulsifiers are routinely used in the food art for diverse applications; and would optimize surfactants for oil recovery from stillage of a bio-ethanol process with a reasonable expectation of success; and use centrifugal separation as in claims 9 and 10 to separate the oil phase from the aqueous phase as in R1.

One would therefore modify the method in R1 without undue experimentation and with a reasonable expectation of the success; based on the successful use of a surfactant in liberating and recovering oil from materials containing starch, proteins and oil; in R2, the successful separation of oil and water phases by centrifugation in the oil

recovery method from stillage produced during ethanol production from corn, in R1; and the known use of surfactants in improving the separation of oils and suspended matter from thin stillage in the art, as for example, in R4. The resultant separated oil phase would comprise the natural oil and added surfactant as in claims 12-17.

**Claims 18-22 are rejected under 35 USC 103(a) as being unpatentable over R1 in view of R2, R4 and R5.**

R1 discloses a method of separating oil stillage byproduct stream of a bio-ethanol production process; and R2 discloses using a surfactant in such a process. R4 and R5 suggest ethoxylated sorbitan esters to enable separation of oil from aqueous phase in stillage; and one of ordinary skill in the art would select the surfactant or surfactant mixtures by using known methods in the art, as explained in the preceding paragraphs.

**Claim 23 is rejected under 35 USC 103(a) as being unpatentable over R1 in view of known methods in the art as for example disclosed in R2, R4 and R5.**

R1 discloses the instantly claimed method including the recited temperature and pH conditions (paragraph [0010]); Although R1 does not disclose the use of a surfactant in oil recovery, as described in the preceding paragraphs, the use of surfactants in oil recovery from various matrices is well established in the chemical art, and food grade surfactants such as polyoxyethylene (20) sorbitan ester are known to improve separation of oil from aqueous phase in separating oil and solids from food matrices including stillage. One of ordinary skill in the art would therefore include a surfactant

addition step in the method of R1 with a reasonable expectation of successfully separating the residual oil from stillage.

The invention as a whole is therefore *prima facie* obvious in view of the art.

### ***Response to Arguments***

Applicant's arguments to support reconsideration of the rejection of claims 1-17 as amended, and the allowance of newly added claims 18-23 have been fully considered and are partially persuasive.

### ***Claim Rejections - 35 USC § 112***

Claims 1, 11, and 17 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants' amendment of claims 1 and 11 to clarify the method steps, and amendment of claim 17 to list FDA approved surfactants, traverses the previously made rejection. The rejection is therefore **withdrawn**. However, the claims as amended present new grounds for rejection as explained on pages 2-4 in this Office action.

### ***Claim Rejections - 35 USC § 103***

Claims 1-17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Cantrell et al. (US2006/0041152 A1 (R1)) in view of Darling et al. (US 2,606,916 (R2)); and further in view of known principles and methods in the art of using surfactants for oil recovery from various matrices, for example, as disclosed in Cooper, et al. (The Canadian Journal of Chemical Engineering, Vol. 58, 1980; 576-579 (R3)).

Applicants remarked that “[C]laim 1 as amended recites applying an oil concentrator to a byproduct stream of the bio- based ethanol production process with the byproduct stream at a pH between 3 and 7. R2 (Darling et al.) teaches the use of an alkaline solution, e.g., ammonium hydroxide, at pH 9.75 or more. The process depends on the ammonium hydroxide for the formation of the ammonium oleate which the Examiner cites as a surfactant or concentrator. An alkaline solution as in R2 would be incompatible with the method described in R1 (Cantrell et al.), in which the pH is 6 or less. It is respectfully submitted that R2 would not motivate one of ordinary skill in the art to add a surfactant to improve the method of R1.”

Applicants further argued that in “[C]laims 3 and 15 The Examiner cites R3 for suggesting a polyethylene oxide with fatty alcohol units "as in instant claims 3 and 15." However, claims 3 and 15 recite a fatty acid, not a fatty alcohol. These are very different chemical compounds, in different chemical classifications. The cited combination of prior art teachings does not include all the claim limitations. Claims 3 and 15 are respectfully submitted to be allowable for this reason in addition to those stated herein with respect to claims 1 and 12 from which they respectively depend. Claim 12 Claim 12 is hereby amended to recite an ethoxylated sorbitan ester as the surfactant compound in the claimed composition. There is no suggestion in the cited references to include such a compound in an organic composition of the type claimed;” and that “[T]he Examiner appears to refer to Applicants' own disclosure - claim 11 - as part of the basis for the rejection of claim 17. Applicants respectfully question what the underlying factual basis is - outside the present application - for the assertion that one would logically use

an FDA accepted direct food additive in the composition of claim 12 in view of the projected application of the product of a method in a different claim set. It is noted that the Examiner did not refer to any of the cited prior art for evidence of such a logical use. And it is not clear what basis there is outside this application for the assumption that a composition containing oil and an oil concentrator as recited in claim 12 is intended for use in food. It is respectfully submitted that the composition of claim 17 would not have been obvious in view of the prior art to a person of ordinary skill in the art, particularly as the claim is now narrowed.”

However, the use of the recited surfactants is well established in the food art and is not restricted to the instant disclosure. Further these surfactants have been used in oil removal/recovery from food processing by-product streams, as described on pages 4-9 in this Office action. The example from the art (R3) was provided earlier as an example from the general art, in view of the indefinite recitation in independent claim 1. Other examples are available in the art, and the current rejection specifically addresses the subject matter in the claims as amended.

Regarding the newly added claims applicants argued that “[C]laim 18 is similar in scope to original claim 1 but is more specific as to the additive used to facilitate separation of oil from the bio-based byproduct stream, reciting an ethoxylated sorbitan ester. There is no suggestion in the cited references to use such a compound in a method of the type claimed. Claims 19-22 depend from claim 18 and more specifically define the ethoxylated sorbitan ester”, and that “[N]ew claim 23 is particularly directed toward extracting oil from liquid stillage, which is separated from whole stillage by

centrifugation, for example, and then introduced to an evaporator to create a syrup, as described in the present application and in R1.”

However, polyoxyethylene sorbitan esters have been successfully used in extracting oil from waste streams and in bioremediation in the broader art, and methods to arrive at optimal surfactant compositions to achieve optimal oil recovery are known in the art. One of ordinary skill in the art would therefore modify the method in R1 by including a surfactant addition step, more specifically, a food grade surfactant addition step wherein the food grade surfactant is selected based on experimentation by using known methods in the art, with a reasonable expectation of success.

In response to applicant’s argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007).

In this case, the use of surfactants to enhance oil recovery from various matrices is well known in the chemical arts. Further, surfactants have been successfully used in the art to effectively separate oils and suspended solids from a thin stillage stream produced during dry mill ethanol production for food and feed applications. Furthermore, one of ordinary skill in the art would consider using surfactants that are commonly used in food

applications and with well characterized properties, and would optimize mixtures to achieve the effective HLB values at the normal pH of the by-product stream which is usually in the range of 3-7. In this context, the art discloses the successful use of mixtures of the instantly claimed surfactants in efficiently separating suspended solids and oil from thin stillage, which has a pH in this range. One would therefore modify the method in R1 with a reasonable expectation of success. Therefore, the claimed use of surfactants in recovering oil from a by-product stream in bio-ethanol production, remains obvious over known methods in the art; and the rejection is not based on the applicants' disclosure.

For these reasons, applicants' arguments were not persuasive.

#### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Subbalakshmi Prakash whose telephone number is (571)270-3685. The examiner can normally be reached on Monday-Thursday 8.30am-5.00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Humera Sheikh can be reached on 571-272-0604. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Humera N. Sheikh/  
Supervisory Patent Examiner, Art Unit 1793

/Subbalakshmi Prakash/  
Examiner, Art Unit 1793

Application/Control Number: 13/117,301  
Art Unit: 1793

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|                                   |                                       |   |             |
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| <b>Notice of References Cited</b> | Application/Control No.<br>13/117,301 | Applicant(s)/Patent Under Reexamination<br>FRODERMAN ET AL. |             |
|                                   | Examiner<br>Subbalakshmi Prakash      | Art Unit<br>1793  | Page 1 of 1 |

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| M | US-  |                 |                        |                |

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| X |  |                 |         |  |                |

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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|--|---|----|-----------------------------|---------------------------------|----------|
| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b> |   |    | <b>Application Number</b>   | 13/117,301                      |          |
|  |   |    | <b>Filing Date</b>          | May 27, 2011                    |          |
|  |   |    | <b>First Named Inventor</b> | Christopher S. Froderman et al. |          |
|  |   |    | <b>Art Unit</b>             | 1789                            |          |
|  |   |    | <b>Examiner Name</b>        | Subbalakshmi Prakash            |          |
| <b>Sheet</b>   | 1 | of | 2                           | <b>Attorney Docket Number</b>   | 13044-9A |

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| Examiner Initials <sup>5</sup> | Cite No. <sup>1</sup> | Document Number<br>Number-Kind Code <sup>2</sup> | Publication Date<br>MM-DD-YYYY | Name of Patentee or<br>Applicant of Cited Document | Pages, Columns, Lines, Where Relevant<br>Passages or Relevant Figures Appear |
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|                                 |                       | Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> |  |                                |  |   |                |
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| Examiner Signature | /Subbalakshmi Prakash/ (02/04/2013) | Date Considered |  |
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<sup>4</sup> EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant  
<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kind Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible.  
<sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.P./

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|--|---|----|---|-------------------------------|---------------------------------|
| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b> |   |    |   | <b>Application Number</b>     | 13/117,301                      |
|  |   |    |   | <b>Filing Date</b>            | May 27, 2011                    |
|  |   |    |   | <b>First Named Inventor</b>   | Christopher S. Froderman et al. |
|  |   |    |   | <b>Art Unit</b>               | 1789                            |
|  |   |    |   | <b>Examiner Name</b>          | Subbalakshmi Prakash            |
| <b>Sheet</b>   | 2 | of | 2 | <b>Attorney Docket Number</b> | 13044-9A                        |

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| <b>Examiner<br/>Signature</b> | /Subbalakshmi Prakash/ (02/04/2013) | <b>Date<br/>Considered</b> |  |
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\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional).

<sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

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## EAST Search History

## EAST Search History (Prior Art)

| Ref # | Hits | Search Query  | DBs  | Default Operator | Plurals | Time Stamp          |
|-------|------|---|--|------------------|---------|---------------------|
| S1    | 159  | oil byproduct corn (surfactant OR concentrat\$3 OR hydrophil\$3 OR lipophil\$3) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>12:38 |
| S3    | 17   | S1 stillage   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>12:47 |
| S4    | 20   | oil byproduct corn (surfactant OR detergent)                                    | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>12:55 |
| S6    | 41   | stillage alkali   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME             | ON      | 2012/07/24<br>13:08 |
| S7    | 4    | stillage (oil ADJ recovery)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR             | ON      | 2012/07/24<br>13:56 |
| S8    | 20   | HLB ("10" OR "12" OR "18" OR "19") oil  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR             | ON      | 2012/07/24<br>14:05 |
| S10   | 20   | (ammonium ADJ oleate) surfactant  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR             | ON      | 2012/07/24<br>14:22 |
| S14   | 63   | oil (separation OR recover\$3) (alcohol   | US-PGPUB;  | SAME             | ON      | 2012/07/24          |

## EAST Search History

|     |     |  |  |      |    |                     |
|-----|-----|--|--|------|----|---------------------|
|     |     | OR ethanol) fermentation (emulsifier OR surfactant)    | USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB              |      |    | 14:32               |
| S15 | 0   | ("8008516").URPN.                                      | USPAT  | OR   | ON | 2012/07/24<br>14:37 |
| S16 | 9   | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND oil     | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2012/07/24<br>15:05 |
| S17 | 0   | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND ethanol | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2012/07/24<br>15:08 |
| S18 | 0   | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND biofuel | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2012/07/24<br>15:09 |
| S19 | 36  | surfactant HLB (oil ADJ recovery)                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:01 |
| S20 | 0   | surfactant HLB (oil ADJ extraction)                    | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:03 |
| S21 | 21  | surfactant HLB extraction oil                          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:03 |
| S22 | 718 | hlb ADJ "12"   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:08 |
| S23 | 135 | S22 oil  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;                                | SAME | ON | 2012/07/25<br>20:09 |

|     |     |   |  |      |    |                     |
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|     |     |   | JPO;<br>DERWENT;<br>IBM_TDB  |      |    |                     |
| S24 | 1   | (corn ADJ oil) recovery HLB   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/26<br>12:38 |
| S26 | 3   | (corn ADJ oil) recovery HLB<br>demulsification                        | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:39 |
| S27 | 23  | (oil ADJ recovery) HLB<br>demulsification                             | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:40 |
| S32 | 22  | ((oil ADJ recovery) HLB).ab.  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:49 |
| S34 | 4   | oil stillage HLB  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>14:56 |
| S35 | 16  | ("4662990").URPN.   | USPAT  | OR   | ON | 2012/07/26<br>14:57 |
| S36 | 3   | S35 surfactant HLB  | USPAT  | AND  | ON | 2012/07/26<br>15:00 |
| S38 | 8   | (oil NEAR release) (waste OR<br>byproduct) surfactant HLB             | USPAT  | AND  | ON | 2012/07/26<br>15:21 |
| S39 | 19  | ("4179369").URPN.   | USPAT  | OR   | ON | 2012/07/26<br>15:25 |
| S40 | 7   | water oil (dissolved ADJ solids)<br>surfactant separation             | USPAT  | SAME | ON | 2012/07/26<br>15:39 |
| S41 | 128 | water oil (dissolved ADJ solids)<br>surfactant                        | USPAT  | SAME | ON | 2012/07/26<br>15:41 |
| S52 | 464 | ((oil OR grease) NEAR (recover\$3<br>OR extract\$3)) surfactant).clm. | USPAT  | AND  | ON | 2012/07/26<br>15:57 |
| S55 | 4   | ((oil ADJ extraction) surfactant).ab.                                 | USPAT  | AND  | ON | 2012/07/26<br>16:01 |
| S56 | 6   | ((oil ADJ extraction) surfactant).clm.                                | USPAT  | AND  | ON | 2012/07/26<br>16:01 |
| S60 | 1   | (oil (ethanol ADJ production)<br>surfactant).clm.                     | USPAT  | AND  | ON | 2012/07/26<br>16:03 |



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|-----|-----|---|--|------|----|---------------------|
| S61 | 8   | ("4797214").URPN.   | USPAT  | OR   | ON | 2012/07/26<br>16:07 |
| S62 | 165 | stillage oil surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>12:58 |
| S67 | 45  | ("2663718" "5250182" "5662810"<br>"5795477" "6433146" "20030180415"<br>"20040087808" "20050155282"<br>"20060006116" "20080110577"<br>"20080125612" "20090227004"<br>"7601858" "7608729"<br>"20090293344").pn. | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | OR   | ON | 2013/02/04<br>13:33 |
| S68 | 1   | S67 surfactant  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>13:34 |
| S69 | 0   | fermentation (by ADJ product) oil<br>surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>14:09 |
| S70 | 406 | fermentation oil surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>14:10 |
| S71 | 0   | fermentation oil surfactant   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR | ON | 2013/02/04<br>14:10 |
| S72 | 132 | S70 corn  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>14:16 |
| S73 | 24  | S72 polyoxyethylene   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>14:17 |
| S74 | 0   | surfactant HLB oil (waste ADJ<br>stream)  | US-PGPUB;<br>USPAT;<br>USOCR;  | SAME | ON | 2013/02/04<br>16:01 |

## EAST Search History

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|     |      |                                       | FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB                                  |      |    |                     |
| S75 | 81   | surfactant HLB oil (waste ADJ stream) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>16:02 |
| S76 | 0    | surfactant syrup oil                  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR | ON | 2013/02/04<br>17:00 |
| S77 | 3003 | surfactant syrup oil                  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>17:00 |
| S78 | 0    | S77 stillage                          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:00 |
| S79 | 1700 | S77 corn ethanol                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:00 |
| S80 | 336  | S77 corn ethanol recovery             | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:01 |
| S81 | 0    | S77 (bio ADJ ethanol)                 | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:02 |
| S82 | 7    | surfactant (bio ADJ ethanol)          | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>17:02 |
| S83 | 165  | surfactant oil stillage               | US-PGPUB;  | AND  | ON | 2013/02/04          |

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## EAST Search History

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|     |     |                                      | USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB              |      |    | 17:03               |
| S84 | 108 | S83 @py<="2011"                      | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:06 |
| S85 | 14  | S84 sorbitan                         | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:11 |
| S86 | 3   | S85 HLB                              | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:23 |
| S87 | 2   | surfactant HLB (oil ADJ recovery) pH | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/04<br>17:39 |
| S88 | 8   | S85 pH                               | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/04<br>17:39 |
| S89 | 399 | (corn ADJ oil) hlb                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/05<br>14:58 |
| S90 | 0   | (corn ADJ oil) hlb                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | NEAR | ON | 2013/02/05<br>14:58 |
| S91 | 0   | (corn ADJ oil) hlb 12-18             | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;            | SAME | ON | 2013/02/05<br>14:59 |

## EAST Search History

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|------|-------|---|--|------|----|---------------------|
|      |       |   | IBM_TDB  |      |    |                     |
| S92  | 0     | (by ADJ product) oil corn (surfactant OR concentrat\$3 OR hydrophli\$3 OR lipophil\$3 OR emulsi\$3 OR demulsi\$3)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:27 |
| S93  | 0     | (by ADJ product) oil corn (surfactant OR emulsifier)  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:27 |
| S94  | 18715 | oil corn (surfactant OR emulsifier)   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>14:27 |
| S95  | 13330 | S94 ethanol   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:28 |
| S96  | 8194  | S95 polyoxyethylene   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:28 |
| S97  | 1     | S96 stillage  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:28 |
| S98  | 40    | ("20060041153"   "20080299632"   "20090259060"   "5605970"   "5662810"   "5837776"   "5958233"   "5985992"   "6265477"   "7497955"   "7566469"   "7601858"   "7608729"   "7641928").PN. | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:30 |
| S99  | 4     | S98 surfactant  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:31 |
| S100 | 4     | S98 (surfactant OR emulsifier)  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;                                | AND  | ON | 2013/02/07<br>14:33 |

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EAST Search History


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|      |    |                                  | JPO;<br>DERWENT;<br>IBM_TDB  |      |    |                     |
| S101 | 0  | S98 TWEEN                        | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:34 |
| S102 | 2  | S98 polyoxyethylene              | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>14:34 |
| S103 | 12 | nalco stillage                   | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>17:10 |
| S104 | 7  | S103 (surfactant OR emulsifier)  | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>17:10 |
| S105 | 0  | stillage oil (wetting ADJ agent) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | SAME | ON | 2013/02/07<br>17:25 |
| S106 | 11 | stillage oil (wetting ADJ agent) | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS; EPO;<br>JPO;<br>DERWENT;<br>IBM_TDB | AND  | ON | 2013/02/07<br>17:25 |

**EAST Search History (Interference)**

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| <b>Search Notes</b><br><br> | <b>Application/Control No.</b><br><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br><br>1793  |

| CPC- SEARCHED |      |          |
|---------------|------|----------|
| Symbol        | Date | Examiner |
|               |      |          |

| CPC COMBINATION SETS - SEARCHED |      |          |
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| Symbol                          | Date | Examiner |
|                                 |      |          |

| US CLASSIFICATION SEARCHED  |          |        |          |
|-----------------------------|----------|--------|----------|
| Class                       | Subclass | Date   | Examiner |
| See Search History printout |          | 2/2013 | SP       |

| SEARCH NOTES  |        |          |
|---|--------|----------|
| Search Notes  | Date   | Examiner |
| EAST: Search Terms: water/aqueous, oil/grease, dissolved solids, separation/extraction/recovery, surfactant/surface active agent/concentrator, byproduct/waste stream, demulsification, emulsification, stillage, corn, ethanol, HLB, inventors, wetting agent, emulsifier, polyoxyethylene, sorbitan ester, Tween, Polysorbate | 2/2013 | SP       |
| Google Scholar  | 2/2013 | SP       |

| INTERFERENCE SEARCH     |                         |      |          |
|-------------------------|-------------------------|------|----------|
| US Class/<br>CPC Symbol | US Subclass / CPC Group | Date | Examiner |
|                         |                         |      |          |

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of: )  
 ) Before the Examiner  
 Christopher S. Froderman et al )  
 ) Subbalakshmi Prakash  
 Application No. 13/117,301 )  
 ) Group Art Unit 1789  
 Filed May 27, 2011 )  
 )  
 BIO-BASED OIL COMPOSITION AND )  
 METHOD FOR PRODUCING THE SAME )

|  |
|--|
| <p>Date of Filing: December 3, 2012</p> <p>I hereby certify that this correspondence is being filed electronically through the USPTO EFS-Web System on the date indicated above.</p> <p>_____<br/>         /William F. Bahret/<br/>         William F. Bahret, Reg. No. 31,087</p> |
|--|

**AMENDMENT AFTER FIRST ACTION**

Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

Sir:

Please enter the following amendment in response to the August 2, 2012, Office Action. Please provide any extension of time which may be necessary and charge any fees which may be due for extra claims or otherwise, except for the issue fee, to Deposit Account No. 50-2176.

**IN THE CLAIMS:**

**Please amend claims 1, 9, 11, 12 and 17 and add claims 18-23 as set forth below:**

1. (Currently amended) A method of extracting oil from a byproduct stream of a bio-based ethanol production process under conditions in which there is an attraction between oil and oil sequestering components in the byproduct stream, the method comprising:

applying an oil concentrator to the byproduct stream of the bio-based ethanol production process[[.]] with the byproduct stream at a pH between 3 and 7, the oil concentrator having a chemical composition capable of reducing the effect of the oil sequestering components in the byproduct stream;

mixing the oil concentrator with the byproduct stream; ~~so that the oil concentrator reduces interactions between the oil and oil sequestering components of the byproduct stream,~~  
and

separating the oil from the byproduct stream.

2. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 1, wherein the oil concentrator comprises a surfactant compound having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18.

3. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 2, wherein the lipophilic group is a fatty acid group and the hydrophilic group is a polyethylene oxide.

4. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 2, wherein the hydrophile-lipophile balance (HLB) is about 14 to about 16.



5. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 2, wherein the hydrophile-lipophile balance (HLB) is about 15.

6. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 1, wherein the byproduct stream comprises an aqueous liquid byproduct stream with dissolved solids.

7. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 6, wherein the byproduct stream comprises a thin stillage or syrup derived therefrom.

8. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 6, wherein adding the oil concentrator into the aqueous liquid byproduct stream includes adding an amount of oil concentrator so that the oil concentrator concentration is below a critical micellar concentration for the oil concentrator in the aqueous liquid byproduct stream.

9. (Currently amended) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 1, the method further comprising:

applying centrifugal force after mixing the oil concentrator with the byproduct stream.

10. (Original) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 9, wherein applying centrifugal force after mixing the oil concentrator enables the formation of a separable oil phase and aqueous phase, wherein the oil concentrator is distributed between the oil phase and the aqueous phase.

11. (Currently amended) The method of extracting oil from the byproduct stream of the bio-based ethanol production process of claim 1, the method further comprising: ~~evaporating and drying the byproduct stream to produce a distillers dried grains product suitable for animal feed.~~ evaporating water from the byproduct stream prior to said applying step; and drying the byproduct stream after said oil separating step to produce a distillers dried grains product suitable for animal feed.

12. (Currently amended) An organic composition comprising oil derived from a byproduct stream of a bio-based ethanol production process and an oil concentrator, the oil concentrator comprising a surfactant compound including an ethoxylated sorbitan ester and having a hydrophilic group and a lipophilic group providing the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18.

13. (Original) The organic composition of claim 12, wherein the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is whole stillage remaining from a distillation bottom.

14. (Original) The organic composition of claim 12, wherein the bio-based ethanol production process comprises a process of ethanol production from corn and the byproduct stream is a thin stillage or syrup derived therefrom separated from the whole stillage by centrifugation.

15. (Original) The organic composition of claim 12, wherein the lipophilic group comprises a fatty acid and the hydrophilic group comprises a polyethylene oxide.

16. (Original) The organic composition of claim 15, wherein the fatty acid and the polyether provide the oil concentrator with a hydrophile-lipophile balance (HLB) of about 14 to about 16.

17. (Currently amended) The organic composition of claim 12, wherein the oil concentrator is an FDA acceptable direct food additive for humans and animals, said food additive selected from the group consisting of polyoxyethylene (20) sorbitan monostearate (Polysorbate 60), polyoxyethylene (20) sorbitan tristearate (Polysorbate 65), and polyoxyethylene (20) sorbitan monooleate (Polysorbate 80).

18. (New) A method of extracting oil from a byproduct stream of a bio-based ethanol production process, comprising:

mixing an ethoxylated sorbitan ester with the byproduct stream;  
centrifuging the mixture of the ethoxylated sorbitan ester and the byproduct stream; and  
separating the oil from the mixture.

19. (New) The method of claim 18, wherein the ethoxylated sorbitan ester includes polyoxyethylene (20) sorbitan.

20. (New) The method of claim 19, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan monooleate.

21. (New) The method of claim 19, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan trioleate.

22. (New) The method of claim 19, wherein the ethoxylated sorbitan ester is polyoxyethylene (20) sorbitan tristearate.

23. (New) A method of extracting oil from a liquid stillage byproduct of a bio-based ethanol production process, comprising:

evaporating water from the liquid stillage to produce a syrup;  
processing the syrup to a temperature between 100° F and 212° F and a pH between 3 and 7;  
mixing a polyoxyethylene (20) sorbitan ester with the syrup;  
centrifuging the mixture; and  
separating the oil from the mixture.

## REMARKS

In the first Office Action, the Examiner rejected claims 1, 11 and 17 under 35 U.S.C. §112, second paragraph, as being indefinite, and rejected claims 1-17 under 35 U.S.C. §103(a) over Cantrell et al. (US 2006/0041152) (R1) in view of Darling et al. (US 2,606,916) (R2) and Cooper et al. (*The Canadian Journal of Chemical Engineering*, Vol. 58, 1980; 576-579) (R3).

### Claim Rejections – 35 U.S.C. §112

Claim 1 is hereby amended to clarify the steps of the method. The preamble is amended to add foundation for the action of the oil concentrator, with reference to the process conditions under which it is designed to be used, and the oil concentrator is defined as having a chemical composition capable of reducing the effect of the oil sequestering components in the byproduct stream. The applying, mixing and separating steps of the method are believed to be sufficiently clear and definite to satisfy 35 U.S.C. §112, second paragraph.

Claim 11 is also amended to clarify the steps of the method.

Amended claim 17 more particularly points out and distinctly claims a group of FDA acceptable direct food additives for humans and animals. The additives recited are specific examples of the ethoxylated sorbitan esters recited in amended claim 12, and are specified in FDA Part 172, which is incorporated by reference in the present application (paragraph [0034]).

### Claim Rejections – 35 U.S.C. §103

#### Claim 1

Claim 1 as amended recites applying an oil concentrator to a byproduct stream of the bio-based ethanol production process with the byproduct stream at a pH between 3 and 7.

R2 (Darling et al.) teaches the use of an alkaline solution, e.g., ammonium hydroxide, at pH 9.75 or more. The process depends on the ammonium hydroxide for the formation of the ammonium oleate which the Examiner cites as a surfactant or concentrator. An alkaline solution as in R2 would be incompatible with the method described in R1 (Cantrell et al.), in which the pH is 6 or less. It is respectfully submitted that R2 would not motivate one of ordinary skill in the art to add a surfactant to improve the method of R1.

Claims 3 and 15

The Examiner cites R3 for suggesting a polyethylene oxide with fatty alcohol units “as in instant claims 3 and 15.” However, claims 3 and 15 recite a fatty acid, not a fatty alcohol. These are very different chemical compounds, in different chemical classifications. The cited combination of prior art teachings does not include all the claim limitations. Claims 3 and 15 are respectfully submitted to be allowable for this reason in addition to those stated herein with respect to claims 1 and 12 from which they respectively depend.

Claim 12

Claim 12 is hereby amended to recite an ethoxylated sorbitan ester as the surfactant compound in the claimed composition. There is no suggestion in the cited references to include such a compound in an organic composition of the type claimed.

Claim 17

The Examiner appears to refer to Applicants’ own disclosure – claim 11 – as part of the basis for the rejection of claim 17. Applicants respectfully question what the underlying factual basis is – outside the present application – for the assertion that one would logically use an FDA accepted direct food additive in the composition of claim 12 in view of the projected application of the product of a method in a different claim set. It is noted that the Examiner did not refer to any of the cited prior art for evidence of such a logical use. And it is not clear what basis there is outside this application for the assumption that a composition containing oil and an oil concentrator as recited in claim 12 is intended for use in food.

It is respectfully submitted that the composition of claim 17 would not have been obvious in view of the prior art to a person of ordinary skill in the art, particularly as the claim is now narrowed to particular Polysorbates as the FDA acceptable direct food additive.

### New claims

Claim 18 is similar in scope to original claim 1 but is more specific as to the additive used to facilitate separation of oil from the bio-based byproduct stream, reciting an ethoxylated sorbitan ester. There is no suggestion in the cited references to use such a compound in a method of the type claimed.

Claims 19-22 depend from claim 18 and more specifically define the ethoxylated sorbitan ester. Support for these claims may be found in the specification, e.g., in paragraphs [0034] and [0037] and Table 1). It is respectfully submitted that the invention recited in these claims is not *prima facie* obvious in view of the prior art.

New claim 23 is particularly directed toward extracting oil from liquid stillage, which is separated from whole stillage by centrifugation, for example, and then introduced to an evaporator to create a syrup, as described in the present application and in R1. The claim recites evaporating the liquid stillage to produce the syrup, processing the syrup to a defined temperature and pH, mixing a particular additive – a polyoxyethylene (20) sorbitan ester – with the syrup, centrifuging the mixture, and separating the oil from the mixture. It is respectfully submitted that the cited references and the prior art as whole would not have motivated a person of ordinary skill in the art to make such a modification to the method described in R1, and that the claimed invention would not have been obvious at the time it was made.

### Conclusion

In view of the foregoing remarks and amending changes, claims 1-23 in the present application are believed to be in condition for immediate allowance, and such action is respectfully requested.

The Examiner is invited to call the undersigned attorney if a discussion of any issues relating to this amendment could expedite the allowance of this application.

Respectfully submitted,

/William F. Bahret/

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of: )  
 ) Before the Examiner  
 Christopher S. Froderman et al )  
 ) Subbalakshmi Prakash  
 Application No. 13/117,301 )  
 ) Group Art Unit 1789  
 Filed May 27, 2011 )  
 )  
 BIO-BASED OIL COMPOSITION AND )  
 METHOD FOR PRODUCING THE SAME )

|  |
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| <p>Date of Filing: December 3, 2012</p> <p>I hereby certify that this correspondence is being filed electronically through the USPTO EFS-Web System on the date indicated above.</p> <p>_____<br/>         /William F. Bahret/<br/>         William F. Bahret, Reg. No. 31,087</p> |
|--|

**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

Sir:

Submitted herewith on the attached form, entitled Information Disclosure Statement by Applicant, is a list of documents of which Applicants are aware which they believe may be material to the examination of this application, and in respect of which there may be a duty to disclose in accordance with 37 C.F.R. §1.56. Pursuant to 37 C.F.R. §1.98(a)(2), copies of the cited U.S. patents are not submitted herewith. Copies of the other cited references are enclosed.

The fee of \$180.00 is enclosed herewith. If any additional fee is due, the Patent and Trademark Office is authorized to charge any such fee except for an issue fee to Deposit Account No. 50-2176.

Respectfully submitted,

\_\_\_\_\_  
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|  |   |    |                             |                                 |          |
|--|---|----|-----------------------------|---------------------------------|----------|
| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b> |   |    | <b>Application Number</b>   | 13/117,301                      |          |
|  |   |    | <b>Filing Date</b>          | May 27, 2011                    |          |
|  |   |    | <b>First Named Inventor</b> | Christopher S. Froderman et al. |          |
|  |   |    | <b>Art Unit</b>             | 1789                            |          |
|  |   |    | <b>Examiner Name</b>        | Subbalakshmi Prakash            |          |
| <b>Sheet</b>   | 1 | of | 2                           | <b>Attorney Docket Number</b>   | 13044-9A |

| <b>U.S. PATENT DOCUMENTS</b>   |                       |  |                                |  |  |
|--------------------------------|-----------------------|--|--------------------------------|--|--|
| Examiner Initials <sup>2</sup> | Cite No. <sup>1</sup> | Document Number<br>Number-Kind Code <sup>2</sup> | Publication Date<br>MM-DD-YYYY | Name of Patentee or<br>Applicant of Cited Document | Pages, Columns, Lines, Where Relevant<br>Passages or Relevant Figures Appear |
|                                |                       | US-2,663,718                                     | 12-22-1953                     | Strezynski   |  |
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|                                |                       | US-  |                                |  |  |
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|                                |                       | US-  |                                |  |  |
|                                |                       | US-  |                                |  |  |

| <b>FOREIGN PATENT DOCUMENTS</b> |                       |  |                                |  |   |                |
|---------------------------------|-----------------------|--|--------------------------------|--|---|----------------|
| Examiner Initials               | Cite No. <sup>1</sup> | Foreign Patent Document  |                                | Name of Patentee or<br>Applicant of Cited Document | Pages, Columns, Lines,<br>Where Relevant Passages or<br>Relevant Figures Appear | T <sup>6</sup> |
|                                 |                       | Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> | Publication Date<br>MM-DD-YYYY |  |   |                |
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| Examiner Signature |  | Date Considered |  |
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<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kind Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.



|  |   |    |   |                               |                                 |
|--|---|----|---|-------------------------------|---------------------------------|
| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b> |   |    |   | <b>Application Number</b>     | 13/117,301                      |
|  |   |    |   | <b>Filing Date</b>            | May 27, 2011                    |
|  |   |    |   | <b>First Named Inventor</b>   | Christopher S. Froderman et al. |
|  |   |    |   | <b>Art Unit</b>               | 1789                            |
|  |   |    |   | <b>Examiner Name</b>          | Subbalakshmi Prakash            |
| <b>Sheet</b>   | 2 | of | 2 | <b>Attorney Docket Number</b> | 13044-9A                        |

| <b>OTHER DOCUMENTS – NON-PATENT LITERATURE DOCUMENTS</b> |                          |  |                |
|--|--------------------------|--|----------------|
| Examiner<br>Initials*                                    | Cite<br>No. <sup>1</sup> | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published   | T <sup>2</sup> |
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|-------------------------------|--|----------------------------|--|
| <b>Examiner<br/>Signature</b> |  | <b>Date<br/>Considered</b> |  |
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\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional).

<sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

| Electronic Patent Application Fee Transmittal  |   |          |        |                      |
|--|---|----------|--------|----------------------|
| <b>Application Number:</b>                     | 13117301  |          |        |                      |
| <b>Filing Date:</b>                            | 27-May-2011   |          |        |                      |
| <b>Title of Invention:</b>                     | BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME |          |        |                      |
| <b>First Named Inventor/Applicant Name:</b>    | Christopher S. Froderman                                    |          |        |                      |
| <b>Filer:</b>                                  | William F. Bahret/Joyce Eden                                |          |        |                      |
| <b>Attorney Docket Number:</b>                 | 13044-9A  |          |        |                      |
| Filed as Small Entity                          |   |          |        |                      |
| <b>Utility under 35 USC 111(a) Filing Fees</b> |   |          |        |                      |
| Description                                    | Fee Code  | Quantity | Amount | Sub-Total in USD(\$) |
| <b>Basic Filing:</b>                           |   |          |        |                      |
| <b>Pages:</b>                                  |   |          |        |                      |
| <b>Claims:</b>                                 |   |          |        |                      |
| Independent claims in excess of 3              | 2201  | 1        | 125    | 125                  |
| <b>Miscellaneous-Filing:</b>                   |   |          |        |                      |
| <b>Petition:</b>                               |   |          |        |                      |
| <b>Patent-Appeals-and-Interference:</b>        |   |          |        |                      |
| <b>Post-Allowance-and-Post-Issuance:</b>       |   |          |        |                      |
| <b>Extension-of-Time:</b>                      |   |          |        |                      |

| Description                             | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|---|----------|----------|--------|----------------------|
| Extension - 1 month with \$0 paid       | 2251     | 1        | 75     | 75                   |
| <b>Miscellaneous:</b>                   |          |          |        |                      |
| Submission- Information Disclosure Stmt | 1806     | 1        | 180    | 180                  |
| <b>Total in USD (\$)</b>                |          |          |        | <b>380</b>           |

## Electronic Acknowledgement Receipt

|   |   |
|---|---|
| <b>EFS ID:</b>                              | 14363113  |
| <b>Application Number:</b>                  | 13117301  |
| <b>International Application Number:</b>    |   |
| <b>Confirmation Number:</b>                 | 7354  |
| <b>Title of Invention:</b>                  | BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME |
| <b>First Named Inventor/Applicant Name:</b> | Christopher S. Froderman                                    |
| <b>Customer Number:</b>                     | 32841   |
| <b>Filer:</b>                               | William F. Bahret/Joyce Eden                                |
| <b>Filer Authorized By:</b>                 | William F. Bahret   |
| <b>Attorney Docket Number:</b>              | 13044-9A  |
| <b>Receipt Date:</b>                        | 03-DEC-2012   |
| <b>Filing Date:</b>                         | 27-MAY-2011   |
| <b>Time Stamp:</b>                          | 12:22:57  |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                 |

### Payment information:

|  |                   |
|--|-------------------|
| Submitted with Payment   | yes               |
| Payment Type   | Credit Card       |
| Payment was successfully received in RAM   | \$380             |
| RAM confirmation Number  | 12963             |
| Deposit Account  | 502176            |
| Authorized User  | BAHRET, WILLIAM F |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:<br>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) |                   |

| <b>File Listing:</b>                                       |  |   |   |                         |                         |  |
|--|--|---|---|-------------------------|-------------------------|--|
| <b>Document Number</b>                                     | <b>Document Description</b>                        | <b>File Name</b>                                      | <b>File Size(Bytes)/<br/>Message Digest</b>         | <b>Multi Part /.zip</b> | <b>Pages (if appl.)</b> |  |
| 1  |  | AmendmentAfter1stAction.pdf                           | 41277<br>663c3a73da49057588db3e8f985b73ba794e62de   | yes                     | 8                       |  |
| <b>Multipart Description/PDF files in .zip description</b> |  |   |   |                         |                         |  |
|  |  | <b>Document Description</b>                           | <b>Start</b>  | <b>End</b>              |                         |  |
|  |  | Amendment/Req. Reconsideration-After Non-Final Reject | 1   | 1                       |                         |  |
|  |  | Claims  | 2   | 5                       |                         |  |
|  |  | Applicant Arguments/Remarks Made in an Amendment      | 6   | 8                       |                         |  |
| <b>Warnings:</b>   |  |   |   |                         |                         |  |
| <b>Information:</b>  |  |   |   |                         |                         |  |
| 2  | Transmittal Letter                                 | IDS_Transmittal.pdf                                   | 14415<br>7516b094ed031408cf45eae6f349e6ba88ea346    | no                      | 1                       |  |
| <b>Warnings:</b>   |  |   |   |                         |                         |  |
| <b>Information:</b>  |  |   |   |                         |                         |  |
| 3  | Information Disclosure Statement (IDS) Form (SB08) | IDS.pdf   | 34156<br>3e77820f9aa8c50b606424aac337c01c083b0943   | no                      | 2                       |  |
| <b>Warnings:</b>   |  |   |   |                         |                         |  |
| <b>Information:</b>  |  |   |   |                         |                         |  |
| This is not an USPTO supplied IDS fillable form            |  |   |   |                         |                         |  |
| 4  | Non Patent Literature                              | 1_Singh_Extracton_of_oil_.pdf                         | 31511<br>878349e7f61bd7386199ead663ff636f15c8d54    | no                      | 3                       |  |
| <b>Warnings:</b>   |  |   |   |                         |                         |  |
| <b>Information:</b>  |  |   |   |                         |                         |  |
| 5  | Non Patent Literature                              | 3_Becher_Emulsions_Theory_and_Practice.PDF            | 3348839<br>0a77915e15855ac1c567bd4880336ef99cabfd0  | no                      | 30                      |  |
| <b>Warnings:</b>   |  |   |   |                         |                         |  |
| <b>Information:</b>  |  |   |   |                         |                         |  |
| 6  | Non Patent Literature                              | 2_76_Book_HLB_ICI.pdf                                 | 3137849<br>5b2f4883da5486612b74dc6356f5200f86b20a2b | no                      | 22                      |  |
| <b>Warnings:</b>   |  |   |   |                         |                         |  |
| <b>Information:</b>  |  |   |   |                         |                         |  |

|                                     |                       |  |   |         |   |
|-------------------------------------|-----------------------|--|---|---------|---|
| 7                                   | Non Patent Literature | 4_Watkins_Two_Fuels.pdf                | 1723784<br>1bfca42ba9bb361d084ffd1b5f6efd9e76c8aec3 | no      | 4 |
| <b>Warnings:</b>                    |                       |  |   |         |   |
| <b>Information:</b>                 |                       |  |   |         |   |
| 8                                   | Non Patent Literature | 5_Lumisorb_PSTS_20K_Polysorbate_65.pdf | 162637<br>9e7a6559b2f31fb5ce1e8ea786d39b6066563daa  | no      | 2 |
| <b>Warnings:</b>                    |                       |  |   |         |   |
| <b>Information:</b>                 |                       |  |   |         |   |
| 9                                   | Non Patent Literature | 7_GreenSift_Corn_Oil.PDF               | 184792<br>12a152c44ba8a4e3e7b30d723504fb4ace748438  | no      | 2 |
| <b>Warnings:</b>                    |                       |  |   |         |   |
| <b>Information:</b>                 |                       |  |   |         |   |
| 10                                  | Non Patent Literature | 8_FDA_Part_172.pdf                     | 110887<br>ca3fc0c6c471153eeb8e2bbb1a32f198addfbbe3  | no      | 5 |
| <b>Warnings:</b>                    |                       |  |   |         |   |
| <b>Information:</b>                 |                       |  |   |         |   |
| 11                                  | Non Patent Literature | 6_Lumisorb_PSMO_20K_Polysorbate_80.pdf | 154622<br>e810cf34fd094d8e76d2ea6db6c9d6034978d5e   | no      | 2 |
| <b>Warnings:</b>                    |                       |  |   |         |   |
| <b>Information:</b>                 |                       |  |   |         |   |
| 12                                  | Fee Worksheet (SB06)  | fee-info.pdf                           | 34046<br>735a2b3f6674d490fc3b817a51c004342c849157   | no      | 2 |
| <b>Warnings:</b>                    |                       |  |   |         |   |
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**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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|   |   |                                  |           |   |   |  |                                       |                     |                 |                     |  |
|---|---|----------------------------------|-----------|---|---|--|---------------------------------------|---------------------|-----------------|---------------------|--|
| <b>PATENT APPLICATION FEE DETERMINATION RECORD</b><br>Substitute for Form PTO-875   |   |                                  |           |   | Application or Docket Number<br><b>13/117,301</b> | Filing Date<br><b>05/27/2011</b>             | <input type="checkbox"/> To be Mailed |                     |                 |                     |  |
| <b>APPLICATION AS FILED – PART I</b>  |   |                                  |           |   | <b>OTHER THAN</b>                                 |  |                                       |                     |                 |                     |  |
| (Column 1)  |   | (Column 2)                       |           | <b>SMALL ENTITY</b> <input checked="" type="checkbox"/> |   | OR   |                                       | <b>SMALL ENTITY</b> |                 |                     |  |
| FOR   | NUMBER FILED  | NUMBER EXTRA                     | RATE (\$) | FEE (\$)  | OR  | RATE (\$)                                    | FEE (\$)                              |                     |                 |                     |  |
| <input type="checkbox"/> BASIC FEE<br><small>(37 CFR 1.16(a), (b), or (c))</small>  | N/A   | N/A                              | N/A       |   |   | N/A  |                                       |                     |                 |                     |  |
| <input type="checkbox"/> SEARCH FEE<br><small>(37 CFR 1.16(k), (l), or (m))</small>   | N/A   | N/A                              | N/A       |   |   | N/A  |                                       |                     |                 |                     |  |
| <input type="checkbox"/> EXAMINATION FEE<br><small>(37 CFR 1.16(o), (p), or (q))</small>  | N/A   | N/A                              | N/A       |   |   | N/A  |                                       |                     |                 |                     |  |
| TOTAL CLAIMS<br><small>(37 CFR 1.16(j))</small>   | minus 20 =  | *                                | X \$ =    |   |   | X \$ =                                       |                                       |                     |                 |                     |  |
| INDEPENDENT CLAIMS<br><small>(37 CFR 1.16(h))</small>   | minus 3 =   | *                                | X \$ =    |   |   | X \$ =                                       |                                       |                     |                 |                     |  |
| <input type="checkbox"/> APPLICATION SIZE FEE<br><small>(37 CFR 1.16(s))</small>  | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). |                                  |           |   |   |  |                                       |                     |                 |                     |  |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>                                       |   |                                  |           |   |   |  |                                       |                     |                 |                     |  |
| * If the difference in column 1 is less than zero, enter "0" in column 2.   |   |                                  | TOTAL     |   |   | TOTAL  |                                       |                     |                 |                     |  |
| <b>APPLICATION AS AMENDED – PART II</b>   |   |                                  |           |   | <b>OTHER THAN</b>                                 |  |                                       |                     |                 |                     |  |
| (Column 1)  |   | (Column 2)                       |           | (Column 3)  |   | <b>SMALL ENTITY</b>                          |                                       | OR                  |                 | <b>SMALL ENTITY</b> |  |
| <b>AMENDMENT</b>  | <b>12/03/2012</b>   | CLAIMS REMAINING AFTER AMENDMENT |           | HIGHEST NUMBER PREVIOUSLY PAID FOR                      | PRESENT EXTRA                                     | RATE (\$)                                    | ADDITIONAL FEE (\$)                   | OR                  | RATE (\$)       | ADDITIONAL FEE (\$) |  |
|   | Total <small>(37 CFR 1.16(i))</small>   | * 23                             | Minus     | ** 20   | = 3   | X \$31 =                                     | 93                                    |                     | X \$ =          |                     |  |
|   | Independent <small>(37 CFR 1.16(h))</small>   | * 4                              | Minus     | ***3  | = 1   | X \$125 =                                    | 125                                   |                     | X \$ =          |                     |  |
|   | <input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>   |                                  |           |   |   |  |                                       |                     |                 |                     |  |
| <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>                         |   |                                  |           |   |   |  |                                       |                     |                 |                     |  |
|   |   |                                  |           |   |   | TOTAL ADD'L FEE                              | <b>218</b>                            | OR                  | TOTAL ADD'L FEE |                     |  |
| (Column 1)  |   | (Column 2)                       |           | (Column 3)  |   | <b>SMALL ENTITY</b>                          |                                       | OR                  |                 | <b>SMALL ENTITY</b> |  |
| <b>AMENDMENT</b>  |   | CLAIMS REMAINING AFTER AMENDMENT |           | HIGHEST NUMBER PREVIOUSLY PAID FOR                      | PRESENT EXTRA                                     | RATE (\$)                                    | ADDITIONAL FEE (\$)                   | OR                  | RATE (\$)       | ADDITIONAL FEE (\$) |  |
|   | Total <small>(37 CFR 1.16(i))</small>   | *                                | Minus     | **  | =   | X \$ =                                       |                                       |                     | X \$ =          |                     |  |
|   | Independent <small>(37 CFR 1.16(h))</small>   | *                                | Minus     | ***   | =   | X \$ =                                       |                                       |                     | X \$ =          |                     |  |
|   | <input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>   |                                  |           |   |   |  |                                       |                     |                 |                     |  |
| <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>                         |   |                                  |           |   |   |  |                                       |                     |                 |                     |  |
|   |   |                                  |           |   |   | TOTAL ADD'L FEE                              |                                       | OR                  | TOTAL ADD'L FEE |                     |  |
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.   |   |                                  |           |   |   | Legal Instrument Examiner:<br>/PAMELA YOUNG/ |                                       |                     |                 |                     |  |
| ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".                                       |   |                                  |           |   |   |  |                                       |                     |                 |                     |  |
| *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  |   |                                  |           |   |   |  |                                       |                     |                 |                     |  |
| The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1. |   |                                  |           |   |   |  |                                       |                     |                 |                     |  |

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**  
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR     | ATTORNEY DOCKET NO.   | CONFIRMATION NO. |
|---|-------------|--------------------------|-----------------------|------------------|
| 13/117,301  | 05/27/2011  | Christopher S. Froderman | 13044-9A              | 7354             |
| 32841   | 7590        | 08/02/2012               | EXAMINER              |                  |
| BAHRET & ASSOCIATES<br>320 NORTH MERIDIAN STREET<br>SUITE 510<br>INDIANAPOLIS, IN 46204 |             |                          | PRAKASH, SUBBALAKSHMI |                  |
|   |             |                          | ART UNIT              | PAPER NUMBER     |
|   |             |                          | 1789                  |                  |
|   |             |                          | NOTIFICATION DATE     | DELIVERY MODE    |
|   |             |                          | 08/02/2012            | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

joyce@bahretlaw.com  
bahret@bahretlaw.com  
rfrisk@bahretlaw.com

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 13/117,301             | FRODERMAN ET AL.    |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | SUBBALAKSHMI PRAKASH   | 1789                |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 27 May 2011.
- 2a)  This action is **FINAL**.
- 2b)  This action is non-final.
- 3)  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 5)  Claim(s) 1-17 is/are pending in the application.
- 5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6)  Claim(s) \_\_\_\_ is/are allowed.
- 7)  Claim(s) 1-17 is/are rejected.
- 8)  Claim(s) \_\_\_\_ is/are objected to.
- 9)  Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 10)  The specification is objected to by the Examiner.
- 11)  The drawing(s) filed on \_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 13)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \*    c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5)  Notice of Informal Patent Application
- 6)  Other: \_\_\_\_.

## DETAILED ACTION

### *Status of the Application*

Claims 1-17 are pending in this action. Claims 1-17 are rejected.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 1, 11, and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claim 1 recites a step of “applying an oil concentrator to the byproduct stream of a bio-based ethanol production process “ and a step of “mixing the oil concentrator with the byproduct stream so that the oil concentrator reduces interactions between the oil and oil sequestering components of the byproduct stream.”

One of ordinary skill in the art would not be able to discern the sequential steps in the method of the invention based on this recitation. The recital of “applying an oil concentrator” is indefinite as it does not describe what the application step entails. The recital of “so that oil concentrator reduces interactions” is indefinite because no process conditions are specified. The claim should be rewritten in a proper format as a method claim. Appropriate correction is required.

Claim 11 recites “ [T]he method of extracting oil from the bio-based ethanol production process of claim 9, the method further comprising evaporating and drying the byproduct stream to produce a distillers dried grains product suitable for animal feed”.

One of ordinary skill in the art would not be able to discern the sequential method steps claimed, from this recitation. Appropriate correction is required.

Claim 17 recites "FDA acceptable direct food additive for humans and animals" without providing a list of relevant additives that are applicable to the method of the invention. This broad recitation renders the claim indefinite. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cantrell et al. (US2006/0041152 A1 (R1)) in view of Darling et al. (US 2,606,916 (R2)); and further in view of known principles and methods in the art of using surfactants for oil recovery from various matrices, for example, as disclosed in Cooper, et al. (*The Canadian Journal of Chemical Engineering*, Vol. 58, 1980; 576-579), included herein as extrinsic evidence.**

R1 describes a method of extracting oil from a byproduct stream of a bio-based ethanol production process, and separating the oil from the byproduct stream, as in instant claim 1 (see abstract); wherein the byproduct stream comprises an aqueous liquid byproduct stream as in claim 6; which comprises a thin stillage or syrup derived therefrom, as in claim 7 (paragraph [0010]); wherein the oil is separated from the stream by centrifugation as in claim 9 (paragraph [0013]); a stable flowable product for animal feed is produced as in claim 11 (paragraph [0025]); a byproduct stream of whole stillage or thin stillage is fed as in claims 13 and 14 (paragraphs [0010]-[0014]); these feed streams being produced during the process of ethanol production from corn, as instantly claimed (paragraph [0009]).

R1 does not specifically describe the use of a surfactant or oil concentrator in the process to recover oil from byproduct streams of ethanol production from corn.

However, the use of surfactants to enhance oil recovery from various matrices is well

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known in the chemical arts. With reference to agricultural biomass, R2, for example, discloses a method for the liberation and recovery of oil from materials containing starch, proteins, and oil such as in a matrix derived from dry milling of corn; wherein ammonium oleate is the surfactant or concentrator (column 2 lines 37-43). R2 additionally discloses that it has been found to be advantageous to have present certain emulsifying agents that tend to produce oil-in-water emulsion, although they should be of a type that can be subsequently rendered ineffective so that the emulsion produced may be readily broken and resolved into separate layers of oil and aqueous substrate (column 2 lines 30-35).

One of ordinary skill in the art looking to improve a method as in R1 would consider adding a suitable surfactant to enhance oil recovery in a centrifugation step as in instant claim 10; based on the disclosure in R2 (column 3 lines 69-73).

In selecting a suitable surfactant system for the purpose, one would use standard methods in the art such as determining HLB criteria for optimal emulsion formation and subsequent demulsification; and optimal surfactant concentrations to ensure that the surfactant concentration is below a critical micellar concentration (CMC) for the surfactant in the liquid byproduct stream, as in claim 8.

One would therefore logically select a surfactant or surfactant composition with HLB value in the range specified in claims 2 and 12; to enable forming an oil-in-water emulsion that is easily broken to separate the phases. Additionally, methods to optimize HLB values of surfactants for various applications are well established in the art, (e.g. see R3, page 576, column 1); and R3 for example, suggests a surfactant which is

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chemically a polyethylene oxide with terminal fatty alcohol units, as in instant claims 3 and 15; with HLB of 15.3, as in instant claim 5; and a surfactant with HLB of about 13-14, as in instant claim 4 and 16, (page 577, column 2) for de-emulsification of a complex oil bearing matrix to help separate oil and water phases. Other examples are available in the art.

One would therefore modify the method in R1 without undue experimentation and with a reasonable expectation of the success; based on the successful use of a surfactant in liberating and recovering oil from materials containing starch, proteins and oil; in R2 and the successful separation of oil and water phases by centrifugation in the oil recovery method from stillage produced during ethanol production from corn, in R1.

Regarding claim 17, one of ordinary skill in the art would logically use an FDA accepted direct food surfactant additive in view of the projected application of the oil - removed dried byproduct stream as animal feed, as in claim 11.

The invention as a whole is therefore *prima facie* obvious in view of the art.

### ***Conclusion***

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Subbalakshmi Prakash whose telephone number is (571)270-3685. The examiner can normally be reached on Monday-Thursday 8.30am-5.00pm.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Humera Sheikh can be reached on 571-272-0604. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Humera N. Sheikh/  
Supervisory Patent Examiner, Art Unit 1789

/Subbalakshmi Prakash/  
Patent Examiner, Art Unit 1789

|                                   |                                       |  |             |
|-----------------------------------|---------------------------------------|--|-------------|
| <b>Notice of References Cited</b> | Application/Control No.<br>13/117,301 | Applicant(s)/Patent Under<br>Reexamination<br>FRODERMAN ET AL. |             |
|                                   | Examiner<br>SUBBALAKSHMI PRAKASH      | Art Unit<br>1789   | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name                   | Classification |
|---|--|-----------------|------------------------|----------------|
| * | A US-2006/0041152 A1                             | 02-2006         | Cantrell et al.        | 554/008        |
| * | B US-2,606,916                                   | 08-1952         | DARLING ELTON R et al. | 554/10         |
|   | C US-  |                 |                        |                |
|   | D US-  |                 |                        |                |
|   | E US-  |                 |                        |                |
|   | F US-  |                 |                        |                |
|   | G US-  |                 |                        |                |
|   | H US-  |                 |                        |                |
|   | I US-  |                 |                        |                |
|   | J US-  |                 |                        |                |
|   | K US-  |                 |                        |                |
|   | L US-  |                 |                        |                |
|   | M US-  |                 |                        |                |


**FOREIGN PATENT DOCUMENTS**

| * | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | Classification |
|---|--|-----------------|---------|------|----------------|
|   | N  |                 |         |      |                |
|   | O  |                 |         |      |                |
|   | P  |                 |         |      |                |
|   | Q  |                 |         |      |                |
|   | R  |                 |         |      |                |
|   | S  |                 |         |      |                |
|   | T  |                 |         |      |                |

**NON-PATENT DOCUMENTS**

| * | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)  |
|---|--|
| U | David G. Cooper, J.E. Zajic, Edward J. Cannel and Joan W. Wood. The Relevance of "HLB" to De-Emulsification of a Mixture of Heavy Oil, Water and Clay. The Canadian Journal of Chemical Engineering Vol 58, October 1980; pages 576-579. |
| V |  |
| W |  |
| X |  |

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

|  |  |  |
|--|--|--|
| <b>Search Notes</b><br><br> | <b>Application/Control No.</b><br>13117301 | <b>Applicant(s)/Patent Under Reexamination</b><br>FRODERMAN ET AL. |
|  | <b>Examiner</b><br>SUBBALAKSHMI PRAKASH    | <b>Art Unit</b><br>1789  |

| SEARCHED                    |          |        |          |
|-----------------------------|----------|--------|----------|
| Class                       | Subclass | Date   | Examiner |
| See Search History printout |          | 7/2012 | SP       |

| SEARCH NOTES  |        |          |
|---|--------|----------|
| Search Notes  | Date   | Examiner |
| EAST: Search Terms: water/aqueous, oil/grease, dissolved solids, separation/extraction/recovery, surfactant/surface active agent/concentrator, byproduct/waste stream, demulsification, emulsification, stillage, corn, ethanol, HLB, inventors | 7/2012 | SP       |
| Google Scholar  | 7/2012 | SP       |

| INTERFERENCE SEARCH |          |      |          |
|---------------------|----------|------|----------|
| Class               | Subclass | Date | Examiner |
|                     |          |      |          |

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## EAST Search History

## EAST Search History (Prior Art)

| Ref # | Hits | Search Query  | DBs  | Default Operator | Plurals | Time Stamp       |
|-------|------|---|--|------------------|---------|------------------|
| S1    | 159  | oil byproduct corn (surfactant OR concentrat\$3 OR hydrophil\$3 OR lipophil\$3)             | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | SAME             | ON      | 2012/07/24 12:38 |
| S3    | 17   | S1 stillage   | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | SAME             | ON      | 2012/07/24 12:47 |
| S4    | 20   | oil byproduct corn (surfactant OR detergent)  | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | SAME             | ON      | 2012/07/24 12:55 |
| S6    | 41   | stillage alkali   | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | SAME             | ON      | 2012/07/24 13:08 |
| S7    | 4    | stillage (oil ADJ recovery)   | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | NEAR             | ON      | 2012/07/24 13:56 |
| S8    | 20   | HLB ("10" OR "12" OR "18" OR "19") oil  | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | NEAR             | ON      | 2012/07/24 14:05 |
| S10   | 20   | (ammonium ADJ oleate) surfactant  | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | NEAR             | ON      | 2012/07/24 14:22 |
| S14   | 63   | oil (separation OR recover\$3) (alcohol OR ethanol) fermentation (emulsifier OR surfactant) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | SAME             | ON      | 2012/07/24 14:32 |
| S15   | 0    | ("8008516").URPN.   | USPAT  | OR               | ON      | 2012/07/24 14:37 |
| S16   | 9    | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND oil  | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR               | ON      | 2012/07/24 15:05 |
| S17   | 0    | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND ethanol                                      | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR               | ON      | 2012/07/24 15:08 |
| S18   | 0    | ((Froderman ADJ C) (Hildebrand ADJ W)).in. AND biofuel                                      | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR               | ON      | 2012/07/24 15:09 |
| S19   | 36   | surfactant HLB (oil ADJ recovery)   | US-PGPUB; USPAT; USOCR; FPRS; EPO;                       | SAME             | ON      | 2012/07/25 20:01 |

|     |     |  |   |      |    |                     |
|-----|-----|--|---|------|----|---------------------|
|     |     |  | JPO; DERWENT;<br>IBM_TDB  |      |    |                     |
| S20 | 0   | surfactant HLB (oil ADJ extraction)                                | US-PGPUB; USPAT;<br>USOCR; FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:03 |
| S21 | 21  | surfactant HLB extraction oil                                      | US-PGPUB; USPAT;<br>USOCR; FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:03 |
| S22 | 718 | hlb ADJ "12"   | US-PGPUB; USPAT;<br>USOCR; FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:08 |
| S23 | 135 | S22 oil  | US-PGPUB; USPAT;<br>USOCR; FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/25<br>20:09 |
| S24 | 1   | (corn ADJ oil) recovery HLB  | US-PGPUB; USPAT;<br>USOCR; FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB | SAME | ON | 2012/07/26<br>12:38 |
| S26 | 3   | (corn ADJ oil) recovery HLB demulsification                        | US-PGPUB; USPAT;<br>USOCR; FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:39 |
| S27 | 23  | (oil ADJ recovery) HLB demulsification                             | US-PGPUB; USPAT;<br>USOCR; FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:40 |
| S32 | 22  | ((oil ADJ recovery) HLB).ab.                                       | US-PGPUB; USPAT;<br>USOCR; FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>12:49 |
| S34 | 4   | oil stillage HLB   | US-PGPUB; USPAT;<br>USOCR; FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB | AND  | ON | 2012/07/26<br>14:56 |
| S35 | 16  | ("4662990").URPN.  | USPAT   | OR   | ON | 2012/07/26<br>14:57 |
| S36 | 3   | S35 surfactant HLB   | USPAT   | AND  | ON | 2012/07/26<br>15:00 |
| S38 | 8   | (oil NEAR release) (waste OR byproduct) surfactant HLB             | USPAT   | AND  | ON | 2012/07/26<br>15:21 |
| S39 | 19  | ("4179369").URPN.  | USPAT   | OR   | ON | 2012/07/26<br>15:25 |
| S40 | 7   | water oil (dissolved ADJ solids) surfactant separation             | USPAT   | SAME | ON | 2012/07/26<br>15:39 |
| S41 | 128 | water oil (dissolved ADJ solids) surfactant                        | USPAT   | SAME | ON | 2012/07/26<br>15:41 |
| S52 | 464 | ((oil OR grease) NEAR (recover\$3 OR extract\$3)) surfactant).clm. | USPAT   | AND  | ON | 2012/07/26<br>15:57 |
| S55 | 4   | ((oil ADJ extraction) surfactant).ab.                              | USPAT   | AND  | ON | 2012/07/26<br>16:01 |
| S56 | 6   | ((oil ADJ extraction) surfactant).clm.                             | USPAT   | AND  | ON | 2012/07/26<br>16:01 |

EAST Search History

|     |   |  |       |     |    |                     |
|-----|---|--|-------|-----|----|---------------------|
| S60 | 1 | (oil (ethanol ADJ production) surfactant).clm. | USPAT | AND | ON | 2012/07/26<br>16:03 |
| S61 | 8 | ("4797214").URPN.                              | USPAT | OR  | ON | 2012/07/26<br>16:07 |

**7/ 26/ 2012 6:47:15 PM**

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| <b>PATENT APPLICATION FEE DETERMINATION RECORD</b><br>Substitute for Form PTO-875   |   |              |                                    |               | Application or Docket Number<br>13/117,301 |              |                    |                         |                         |                    |  |
|---|---|--------------|------------------------------------|---------------|--|--------------|--------------------|-------------------------|-------------------------|--------------------|--|
| <b>APPLICATION AS FILED - PART I</b>  |   |              |                                    |               |  |              |                    |                         |                         |                    |  |
| (Column 1)  |   | (Column 2)   |                                    |               | SMALL ENTITY                               |              | OR                 | OTHER THAN SMALL ENTITY |                         |                    |  |
| FOR   | NUMBER FILED  | NUMBER EXTRA |                                    |               | RATE(\$)                                   | FEE(\$)      |                    | RATE(\$)                | FEE(\$)                 |                    |  |
| BASIC FEE<br><small>(37 CFR 1.16(a), (b), or (c))</small>   | N/A   | N/A          |                                    |               | N/A  | 82           |                    | N/A                     |                         |                    |  |
| SEARCH FEE<br><small>(37 CFR 1.16(k), (l), or (m))</small>  | N/A   | N/A          |                                    |               | N/A  | 270          |                    | N/A                     |                         |                    |  |
| EXAMINATION FEE<br><small>(37 CFR 1.16(o), (p), or (q))</small>   | N/A   | N/A          |                                    |               | N/A  | 110          |                    | N/A                     |                         |                    |  |
| TOTAL CLAIMS<br><small>(37 CFR 1.16(j))</small>   | 17  | minus 20 = * |                                    |               | x 26 =                                     | 0.00         | OR                 |                         |                         |                    |  |
| INDEPENDENT CLAIMS<br><small>(37 CFR 1.16(h))</small>   | 2   | minus 3 = *  |                                    |               | x 110 =                                    | 0.00         |                    |                         |                         |                    |  |
| APPLICATION SIZE FEE<br><small>(37 CFR 1.16(s))</small>   | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). |              |                                    |               |  | 0.00         |                    |                         |                         |                    |  |
| MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>  |   |              |                                    |               |  | 0.00         |                    |                         |                         |                    |  |
| * If the difference in column 1 is less than zero, enter "0" in column 2.   |   |              |                                    |               | TOTAL                                      | 462          |                    | TOTAL                   |                         |                    |  |
| <b>APPLICATION AS AMENDED - PART II</b>   |   |              |                                    |               |  |              |                    |                         |                         |                    |  |
| (Column 1)  |   | (Column 2)   |                                    | (Column 3)    |  | SMALL ENTITY |                    | OR                      | OTHER THAN SMALL ENTITY |                    |  |
| AMENDMENT A   | CLAIMS REMAINING AFTER AMENDMENT  |              | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |  | RATE(\$)     | ADDITIONAL FEE(\$) |                         | RATE(\$)                | ADDITIONAL FEE(\$) |  |
|   | Total<br><small>(37 CFR 1.16(i))</small>  | *            | Minus                              | **            | =  | x            | =                  | OR                      | x                       | =                  |  |
|   | Independent<br><small>(37 CFR 1.16(h))</small>  | *            | Minus                              | ***           | =  | x            | =                  | OR                      | x                       | =                  |  |
|   | Application Size Fee <small>(37 CFR 1.16(s))</small>  |              |                                    |               |  |              |                    |                         | OR                      |                    |  |
|   | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>  |              |                                    |               |  |              |                    |                         | OR                      |                    |  |
|   |   |              |                                    |               | TOTAL ADD'L FEE                            |              |                    | OR                      | TOTAL ADD'L FEE         |                    |  |
| (Column 1)  |   | (Column 2)   |                                    | (Column 3)    |  | SMALL ENTITY |                    | OR                      | OTHER THAN SMALL ENTITY |                    |  |
| AMENDMENT B   | CLAIMS REMAINING AFTER AMENDMENT  |              | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |  | RATE(\$)     | ADDITIONAL FEE(\$) |                         | RATE(\$)                | ADDITIONAL FEE(\$) |  |
|   | Total<br><small>(37 CFR 1.16(i))</small>  | *            | Minus                              | **            | =  | x            | =                  | OR                      | x                       | =                  |  |
|   | Independent<br><small>(37 CFR 1.16(h))</small>  | *            | Minus                              | ***           | =  | x            | =                  | OR                      | x                       | =                  |  |
|   | Application Size Fee <small>(37 CFR 1.16(s))</small>  |              |                                    |               |  |              |                    |                         | OR                      |                    |  |
|   | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>  |              |                                    |               |  |              |                    |                         | OR                      |                    |  |
|   |   |              |                                    |               | TOTAL ADD'L FEE                            |              |                    | OR                      | TOTAL ADD'L FEE         |                    |  |
| <p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.</p> |   |              |                                    |               |  |              |                    |                         |                         |                    |  |



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Table with 6 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/117,301, 05/27/2011, 1778, 462, 13044-9A, 17, 2

CONFIRMATION NO. 7354

FILING RECEIPT

32841
BAHRET & ASSOCIATES
320 NORTH MERIDIAN STREET
SUITE 510
INDIANAPOLIS, IN 46204



Date Mailed: 06/15/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Applicant(s)

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Power of Attorney:

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R Frisk--32221

Domestic Priority data as claimed by applicant

Foreign Applications (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 06/08/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 13/117,301

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

\*\* SMALL ENTITY \*\*



**Title**

BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME

**Preliminary Class**

210

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page 2 of 3

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**BIO-BASED OIL COMPOSITION  
AND METHOD FOR PRODUCING THE SAME**

**BACKGROUND OF THE INVENTION**

[0001] This invention relates to a plant oil product and methods of producing the product from a bio-based ethanol byproduct stream, and more particularly to a corn oil product and methods of recovering the corn oil product from a dry milling process for obtaining ethanol from corn.

[0002] The global production of ethanol from biologically based (bio-based) sources has recently expanded significantly. While the production of ethanol from petroleum sources remains, the ethanol supply is now primarily produced from renewable sources. The dry grind ethanol production process, using corn, is presently the primary source of ethanol in the United States. While the fermentation of sugars to produce alcohol is one of humanity's earliest and arguably most important discoveries, its implementation to mass producing ethanol for fuel has occurred relatively recently. The ethanol produced from corn is considered renewable because the growth of corn does not destroy the resources that it needs to produce compounds (*e.g.* starches and sugars) which can be treated enzymatically then fermented to produce ethanol.

[0003] The manufacture of ethanol from bio-based sources does not completely consume the bio-based material. Instead, there are typically considerable quantities of byproducts remaining after the fermentable sugars are converted into ethanol. Depending on the bio-based source, these byproducts may be quite valuable. For example, the production of ethanol from corn using the dry mill production process results in a byproduct stream that is used primarily as an animal feed (dry distillers grains (DDG) or wet distillers grain(WDG)).

[0004] Bio-based sources for the production of ethanol often include significant proportions of oils. For example, most crop plants contain some amount of oils. The oils in plants are primarily triglycerides. As such, they are not fermentable and remain in the by-product stream through the ethanol manufacturing processes. Further, bio-based sources may be modified to increase the proportion of the source that is oil. For example, plant breeders began attempting to modify the oil content of corn in studies that date back to the turn of the 20<sup>th</sup> century. In the 1950s, it was possible to produce low oil corn having less than one percent oil by weight and high oil corn having greater than 15% oil. Currently, high oil corn hybrids are

commercially available that contain up to about 8% oil. The value of the oil is dependent upon the nature of the bio-based source. For example, peanut oil and olive oil may have substantial value as food products. However, many bio-based oils derive their value from their capacity to serve as a fuel; for example, bio-diesel is a transesterification product of triglycerides, primarily obtained from soy, which has become a significant fuel source. Oil from the byproduct stream of the bio-based production of ethanol may be a secondary product stream providing additional value to the overall process, so long as the cost of obtaining the oil is below the value derived.

[0005] Production facilities for bio-based ethanol generation have a clear focus on ethanol as the core product. However, the byproduct streams may provide an important and significant revenue stream that provides additional economic incentive for production growth. In particular, dried distillers grains with soluble (DDGS) has been the primary byproduct from these production facilities and its use as a feedstock for animals has become important to the feed market. A production facility using corn as feedstock may produce almost 3 gallons of ethanol and almost 20 lbs. of distiller's grains with solubles (dry basis) per bushel of corn. While valuable, increasing the value of this byproduct stream enhances the overall value of the ethanol production process. One manner of improving the value of the byproduct stream is the extraction of oil from this stream for either food or fuel use.

[0006] The DDGS byproduct stream is currently used as feed for animals; in particular, DDGS is feed for livestock such as ruminants. As such, the oil content has value as a component of the feed. The value of this byproduct has increased in response to the demand on the corn supply by ethanol production. In particular, as greater proportions of the corn supply are used to produce ethanol, the price of corn has increased and the value of feed supplements, such as DDGS, has also risen. While DDGS is useful as a feed supplement, its inclusion at high levels does have a negative effect on the livestock. For example, dairy cows consuming high DDGS levels exhibit reduced milk fat production. High DDGS levels may also result in reduced conception rates. Increased soft fat in pork and bacon and reduced weight gain in beef feedlot cattle have also been observed. These negative effects are correlated to the high oil content of DDGS; thus, removal of oil from the byproduct stream increases the utility of the resulting DDGS product while also generating another valuable byproduct stream, the oil.

[0007] In one popular method of removing the oil from the byproduct stream, mechanical forces are used to separate the oil from thin stillage. Generally, this method recovers

oil by recovering whole stillage from the process used for producing the ethanol and mechanically processing the whole stillage to provide distillers wet grains and thin stillage. The thin stillage is concentrated by evaporation and heated under pressure to effectuate separation. The thin stillage is then treated with high temperatures and pressures prior to being separated into an aqueous phase and an oil phase through centrifugation.

[0008] While this approach is effective, useful, and experiencing significant commercialization, there are disadvantages associated with this method. One disadvantage is that the use of elevated temperatures and pressures requires additional energy expenditure. This expenditure is accompanied by the concomitant financial and environmental expense. Furthermore, extensive applications of heat and pressure may have deleterious effects on the remaining byproduct streams. For example, high temperatures and pressures may degrade (*e.g.* oxidize or hydrolyze) components of the thin stillage so that the resulting feed composition has a diminished value. Another limitation is that mechanical separation techniques have efficiencies directly related to the elevated temperatures, pressures, and mechanical force inputs. Thus, while inputting additional energy into the process generally increases yield, the return on investment calculation dictates that the removal remains somewhat inefficient. As such, substantial oil is left within the byproduct streams to maximize the cost-benefit of the extraction.

### SUMMARY OF THE INVENTION

[0009] One aspect of the present invention involves a method of extracting oil from a byproduct stream of a bio-based ethanol production process. An oil concentrator is applied to the byproduct stream of the bio-based ethanol production process and mixed with the byproduct stream. The oil concentrator reduces interactions between the oil and oil sequestering components of the byproduct stream facilitating extraction of the oil from the byproduct stream.

[0010] Another aspect of the present invention involves an organic composition including an oil derived from a byproduct stream of a bio-based ethanol production process and an oil concentrator. The oil concentrator includes a compound having a hydrophilic group and a lipophilic group. These groups provide the oil concentrator a hydrophile-lipophile balance (HLB) of about 12 to about 18.

[0011] Other aspects and advantages of the present invention will be apparent from the following descriptions with reference to the drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 is a schematic showing byproduct streams generated from the production of ethanol from a bio-based source material;

[0013] FIG. 2 is a schematic showing a method of extracting oil from the whole stillage byproduct stream from FIG. 1, showing process steps in dashed boxes and byproduct streams in solid line boxes;

[0014] FIG. 3 is a schematic showing the concentrate and separate oil step shown in FIG. 2 with exemplary additional detail;

[0015] FIG. 4 is a schematic showing a second method of extracting oil from the whole stillage byproduct stream from FIG. 1, wherein the oil concentrator is applied directly to the whole stillage byproduct stream; and

[0016] FIG. 5(A-B) are schematics showing the layering of the aqueous layer, the rag layer, and the oil layer which occurs with (FIG. 5A) and without (FIG. 5B) applying an oil concentrator.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0017] For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

[0018] It is desired to increase the value of byproduct streams from the production of ethanol from bio-based sources. One manner of increasing the value is to separate the oil, which has greater value as a separate byproduct stream, from the stillage stream. Another manner of increasing the value of the byproduct stream is to separate the oil from the stillage stream according to a method that enhances, or maintains, the value of the remaining stillage byproduct stream. Yet another manner of increasing the value of the byproduct streams is to enhance the efficiency by which the oil is separated from the byproduct stream. The use of an oil concentrator on the whole stillage byproduct stream or a secondary byproduct stream derived therefrom provides a means for increasing the value of the byproduct streams. As described herein, application of an oil concentrator to the byproduct stream increases the overall value of the byproduct streams so that the production of ethanol from the bio-based source returns greater value per quantity of source material used. In illustrative embodiments, a method of extracting oil from a byproduct stream of a bio-based ethanol production process comprises applying an oil concentrator to the byproduct stream of the bio-based ethanol production process, mixing the oil concentrator with the byproduct stream so that the oil concentrator reduces interactions between the oil and oil sequestering components of the byproduct stream, and separating the oil from the byproduct stream.

[0019] Referring to FIG. 1, a bio-based source material can be used to produce ethanol through several well known techniques. The production of ethanol generates a byproduct stream that includes those non-fermentable components of the source material. For example, a dry milling method for producing ethanol uses the starch in corn to produce ethanol through fermentation and creates a byproduct stream commonly referred to as “whole stillage.” As