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#### (12) United States Patent

#### Froderman et al.

#### (54) BIO-BASED OIL COMPOSITION AND METHOD FOR PRODUCING THE SAME

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- (\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 81 days.
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- (22) Filed: May 27, 2011
- (51) Int. Cl.

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| C11B 3/16  | (2006.01) |
| C11B 13/00 | (2006.01) |
|            |           |

#### (56) **References Cited**

#### U.S. PATENT DOCUMENTS

| 4,702,798<br>5,250,182<br>5,662,810<br>5,795,477<br>6,433,146<br>7,601,858<br>7,608,729 | A *<br>A A<br>A<br>B1<br>B2<br>B2 | 12/1953<br>10/1987<br>10/1993<br>9/1997<br>8/1998<br>8/2002<br>10/2009<br>10/2009 | Cantrell et al.<br>Winsness et al.                  |
|---|-----------------------------------|---|---|
| 7,608,729<br>2003/0180415<br>2004/0087808   | A1                                | 9/2003  | Winsness et al.<br>Stiefel et al.<br>Prevost et al. |

#### (10) Patent No.: US 8,962,059 B1

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| 2005/0155282 A1  | 7/2005  | Siggelkow et al.        |
|------------------|---------|-------------------------|
| 2006/0006116 A1  | 1/2006  | Scheimann et al.        |
| 2006/0041152 A1* | 2/2006  | Cantrell et al 554/8    |
| 2007/0210007 A1* | 9/2007  | Scheimann et al 210/728 |
| 2007/0238891 A1* | 10/2007 | Winsness et al 554/8    |
| 2008/0110577 A1  | 5/2008  | Winsness                |
| 2008/0125612 A1  | 5/2008  | Bruckmayer              |
| 2009/0227004 A1  | 9/2009  | Dale                    |
| 2009/0293344 A1  | 12/2009 | O'Brien et al.          |
| 2012/0245370 A1* | 9/2012  | Sheppard et al 554/204  |

#### OTHER PUBLICATIONS

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, Oct. 1980; pp. 576-579.\*

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.\*

Singh, N. et al., "Extraction of Oil From Corn Distillers Dried Grains With Solubles," *Transactions of the ASABE*, vol. 41, No. 6, Nov./Dec. 1998, pp. 1775-1777.

"The HLB System A Time-Saving Guide to Emulsifier Selection," © 1976 ICI United States Inc., 22 pages.

(Continued)

Primary Examiner — Humera Sheikh

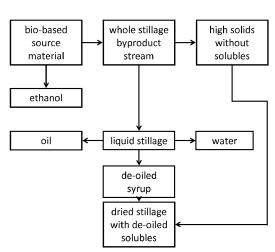
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#### (57) ABSTRACT

A method of extracting oil from a byproduct stream of a bio-based ethanol production process and a organic composition resulting from the method is provided. The method includes applying an oil concentrator to a byproduct stream, mixing the oil concentrator with the byproduct stream, and separating the oil from the byproduct stream. An organic composition comprising oil derived from a byproduct stream of a bio-based ethanol production process and an oil concentrator is also provided.

#### 16 Claims, 5 Drawing Sheets



#### (56) **References** Cited

#### OTHER PUBLICATIONS

Becher, Paul, Emulsions: Theory and Practice, Reinhold Publishing, New York, c. 1957, Chapter 6, "The Chemistry of Emulsifying Agents," p. 209-265.

Agents, p. 209-265. Watkins, Catherine, "Two Fuels From One Kernel," *Inform*, vol. 18, No. 11, Nov. 2007, pp. 714-718. Lumisorb PSTS-20 K (Polysorbate 65) Technical Data Sheet, Lambent Technologies, c. 2006, 2 pages.

Lumisorb PSMO-20 K (Polysorbate 80) Technical Data Sheet, Lambent Technologies, c. 2004, 2 pages.

GreenShift Corporation Corn Oil Extraction Process Description, [online], © 2005-2010, [retrieved Nov. 17, 2010]. Retrieved from the Internet: http://www.greenshift.com/cornoil.php?mode=2, 2 pages. FDA Part 172, Code of Federal Regulations Title 21, Part 172, [online], undated, [retrieved Dec. 3, 2012]. Retrieved from the Internet: http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/ CFRSearch.cfm?CFRPart=172, 5 pages.

\* cited by examiner

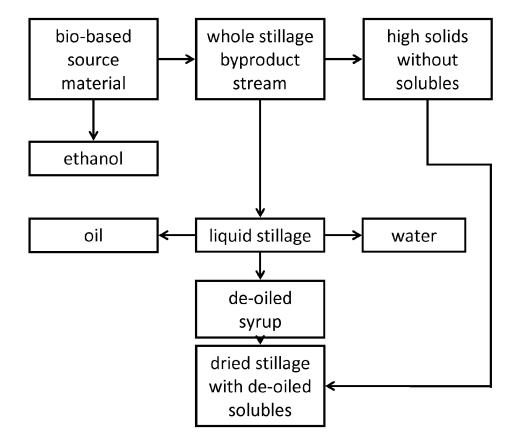


FIG. 1

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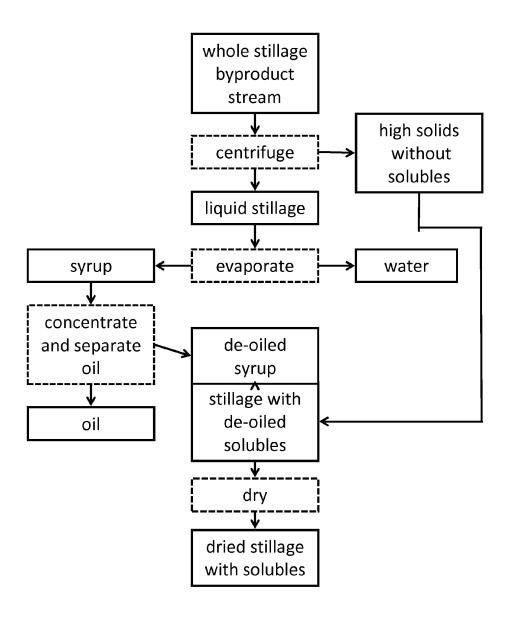


FIG. 2

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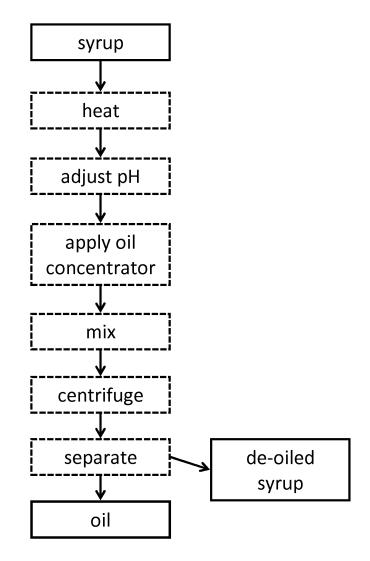


FIG. 3

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