

EXHIBIT 7



(12) **United States Patent**
Lauten et al.

(10) **Patent No.:** **US 9,018,177 B2**
(45) **Date of Patent:** **Apr. 28, 2015**

(54) **COSMETIC COMPOSITIONS FOR INCREASING BIOAVAILABILITY OF THE ACTIVE COMPOUNDS BAICALIN AND/OR VITAMIN C**

(71) Applicant: **L’Oreal S.A.**, Paris (FR)
(72) Inventors: **Elizabeth Hunter Lauten**, New York, NY (US); **Jean-Thierry Simonnet**, Mamaroneck, NY (US); **Zhi Pan**, Fort Lee, NJ (US); **Guive Balooch**, New York, NY (US)

(73) Assignee: **L’Oreal S.A.**, Paris (FR)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 98 days.

(21) Appl. No.: **13/650,933**
(22) Filed: **Oct. 12, 2012**

(65) **Prior Publication Data**
US 2014/0107047 A1 Apr. 17, 2014

(51) **Int. Cl.**
A61K 9/00 (2006.01)
A61K 47/12 (2006.01)
A61K 47/22 (2006.01)
A61K 31/7048 (2006.01)
A61K 8/368 (2006.01)
A61K 8/49 (2006.01)
A61K 8/67 (2006.01)
A61Q 19/00 (2006.01)

(52) **U.S. Cl.**
CPC **A61K 9/0014** (2013.01); **A61K 47/12** (2013.01); **A61K 47/22** (2013.01); **A61K 31/7048** (2013.01); **A61K 8/368** (2013.01); **A61K 8/4913** (2013.01); **A61K 8/4953** (2013.01); **A61K 8/498** (2013.01); **A61K 8/675** (2013.01); **A61K 8/676** (2013.01); **A61Q 19/00** (2013.01); **A61K 2800/10** (2013.01)

(58) **Field of Classification Search**
CPC A61K 47/00; A61K 8/4973; A61K 8/60; A61K 31/7032; A61Q 19/00; A61Q 90/00
See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS
3,501,409 A 3/1970 Matson
3,839,210 A 10/1974 Beiswanger et al.
4,680,143 A 7/1987 Edge et al.
5,532,012 A 7/1996 Balentine et al.
5,686,082 A 11/1997 N’Guyen
5,900,416 A * 5/1999 Markson 424/728
6,121,209 A 9/2000 Watts et al.

6,331,520 B1 12/2001 Richardson
6,355,657 B1 3/2002 Osborne
6,423,327 B1 7/2002 Dobson, Jr. et al.
6,479,442 B1 11/2002 Berube et al.
6,645,513 B2 11/2003 Dobson, Jr. et al.
6,646,035 B2 11/2003 Koch et al.
6,733,797 B1 5/2004 Summers
6,949,496 B1 9/2005 Boutique et al.
7,452,549 B2 11/2008 Hasler-Nguyen et al.
2002/0086042 A1 7/2002 Delrieu et al.
2002/0110604 A1 8/2002 Babish et al.
2003/0031715 A1 2/2003 Park et al.
2003/0206972 A1 11/2003 Babish et al.
2004/0146474 A1 7/2004 Galely
2005/0158271 A1 7/2005 Lee et al.
2005/0266121 A1 12/2005 Lines et al.
2006/0110439 A1 5/2006 Tobia et al.
2007/0208088 A1 9/2007 Lipshutz
2007/0232561 A1 10/2007 Leung et al.
2008/0095866 A1 4/2008 Declercq et al.
2008/0176956 A1 7/2008 Hsu
2008/0219927 A1 9/2008 Thakur et al.
2009/0110674 A1 4/2009 Loizou
2009/0233876 A1 9/2009 Auriol et al.
2010/0047297 A1 2/2010 Petersen
2011/0033525 A1 2/2011 Liu
2011/0067294 A1 3/2011 Ng et al.
2011/0136245 A1 6/2011 Parker
2011/0152214 A1 6/2011 Boison et al.
2012/0071550 A1 3/2012 Zelkha et al.

FOREIGN PATENT DOCUMENTS

JP 6150918 A * 3/1986 A61K 31/35
WO WO-2013016257 A1 1/2013

OTHER PUBLICATIONS

Mou, H., Wang, X., Lv, T., Xie, L., & Xie, H. (2011). On-line dissolution determination of Baicalin in solid dispersion based on near infrared spectroscopy and circulation dissolution system. *Chemometrics and Intelligent Laboratory Systems*, 105(1), 38-42.*
Makoto et al., JP 6150918 A, Mar. 1986, machine translation of abstract, <http://worldwide.espacenet.com>, and Derwent record from EAST. Retrieved on Mar. 19, 2014.*
Suzuki, H. et al., “Mechanistic Studies on Hydrotropic Solubilization of Nifedipine in Nicotinamide Solution.” *Chem. Pharm. Bull.* 46(1), 125-130 (1998).

(Continued)

Primary Examiner — Shaojia Anna Jiang
Assistant Examiner — Dale R Miller
(74) *Attorney, Agent, or Firm* — Novak Druce Connolly Bove + Quigg LLP

(57) **ABSTRACT**

Aqueous compositions comprising a) at least one active compound and b) at least one hydrotrope in an amount effective to increase transdermal penetration of the active compound, and methods for increasing bioavailability of active compounds are provided.

14 Claims, 3 Drawing Sheets

US 9,018,177 B2

Page 2

(56)

References Cited

OTHER PUBLICATIONS

Evstigneev, M.P. et al., "Effect of a mixture of caffeine and nicotinamide on the solubility of vitamin (B2) in aqueous solution," *European Journal of Pharmaceutical Sciences* 28, 59-66 (2006).
Da Silva, R.C. et al., "Investigations on the mechanism of aqueous solubility increase caused by some hydrotropes." *Thermochemica Acta* 328, 161-167 (1999).
Huh, K.M. et al., "A new hydrotropic block copolymer micelle system for aqueous solubilization of paclitaxel." *Journal of Controlled Release* 126, 122-129 (2008).

Takahashi, K. et al., "Application of hydrotropy to transdermal formulations: hydrotropic solubilization of polyol fatty acid monoesters in water and enhancement effect on skin permeation of 5-FU." *Journal of Pharmacy and Pharmacology* 63, 1008-1014 (2011).

Nicoli, S. et al., "Association of nicotinamide with parabens: Effect on solubility, partition and transdermal permeation." *European Journal of Pharmaceutics and Biopharmaceutics* 69, 613-621 (2008).

Nidhi, K. et al., "Hydrotropy: A Promising Tool for Solubility Enhancement: A Review." *International Journal of Drug Development & Research* 3(2), 26-33 (2011).

* cited by examiner

FIG 1.

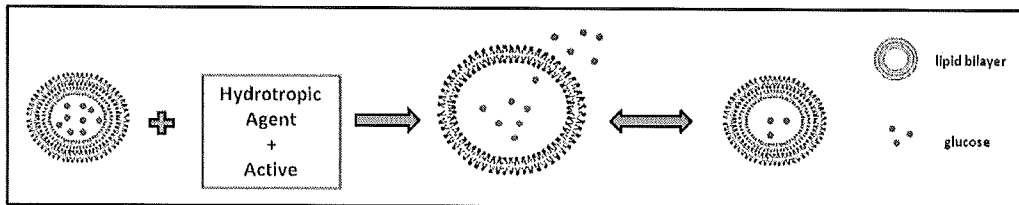


FIG. 2A

	Glucose Released from Lipids
control sample- lipids with no hydrotrope	0%
5% sodium salicylate	82%
3% sodium salicylate	80%
1% caffeine	73%
5% hydrovance	73%
3% niacinamide	71%
5% niacinamide	68%
3% hydrovance	67%
5% niacinamide +5% caffeine	59%
5% niacinamide +5% caffeine + 5% urea	57%
3% sodium PCA + 3% urea	57%
5% sodium PCA + 3% urea	51%
5% sodium PCA + 5% urea	48%
3% niacinamide + 5% caffeine	46%
5% sodium PCA	19%

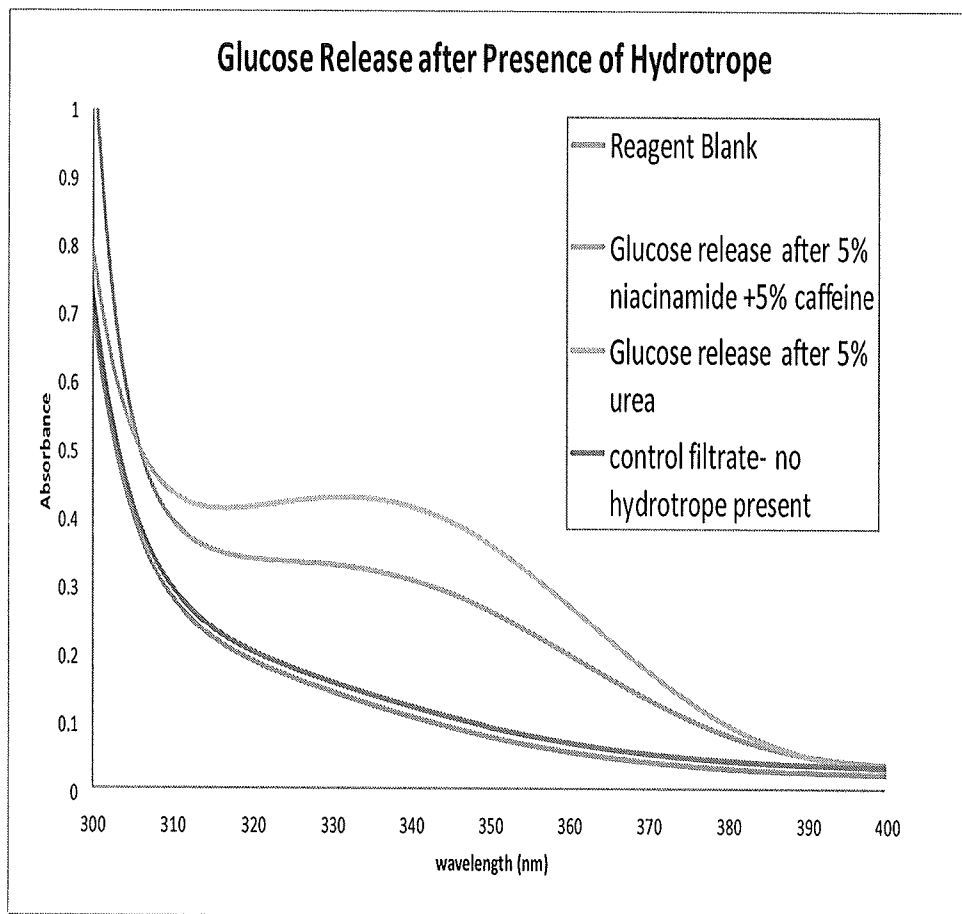


FIG. 2B

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.