

(51) International Patent Classification:

C11B 1/00 (2006.01) B01J 37/36 (2006.01)

C11C 3/04 (2006.01) C07C 67/02 (2006.01)

C08G 63/48 (2006.01)

(21) International Application Number:

PCT/SG2012/000365

(22) International Filing Date:

1 October 2012 (01.10.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/541,239 30 September 2011 (30.09.2011) US

61/541,243 30 September 2011 (30.09.2011) US

61/564,962 30 November 2011 (30.11.2011) US

(71) Applicant: NATIONAL UNIVERSITY OF SINGAPORE [SG/SG]; 21 Lower Kent Ridge Road, Singapore 119077 (SG).

(72) Inventors: **LI, Zhi**; c/o National University of Singapore, Faculty of Engineering, Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **NGO, Nguyen Phuong Thao**; c/o National University of Singapore, Faculty of Engineering, Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **WANG, Wen**; c/o National University of Singapore, Faculty of Engineering, Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **ZILLILLAH, Zillillah**; c/o National University of Singapore, Faculty of Engineering, Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **TAN, Guowei**; c/o National University of Singapore, Faculty of Engineering, Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **LI, Ai-**

Tao; c/o National University of Singapore, Faculty of Engineering, Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **YAN, Jin-Yong**; c/o National University of Singapore, Faculty of Engineering, Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG).

(74) Agent: DONALDSON & BURKINSHAW; P.O.Box 3667, Robinson Road Post Office, Singapore 905667 (SG).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

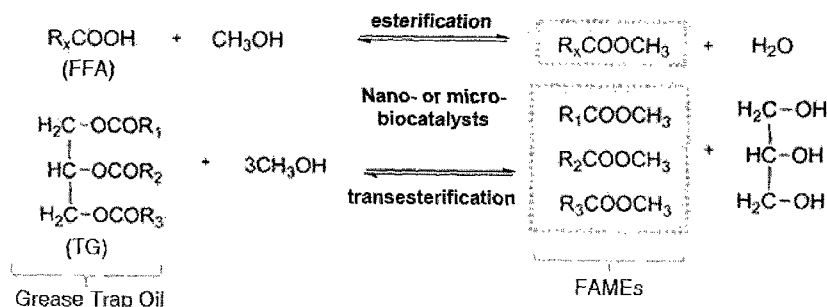
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

— with sequence listing part of description (Rule 5.2(a))

(54) Title: METHOD OF CONVERTING GREASE CONTAINING HIGH CONTENT OF FREE FATTY ACIDS TO FATTY ACID ESTERS AND CATALYSTS FOR USE IN SAID METHOD



(57) **Abstract:** A method of producing fatty acid esters from a composition comprising glycerides and at least 10% by weight of free fatty acids (FFA), the method comprising incubating a plurality of micro- or nano-sized catalysing particles with the composition, to catalyse the conversion of FFA to fatty acid esters, such that at least 80% of the FFA are converted to fatty acid esters.