



(51) International Patent Classification:

C12P 7/06 (2006.01) A23L 1/305 (2006.01)
C12P 7/10 (2006.01) A23L 1/314 (2006.01)
A23K 1/00 (2006.01)

(21) International Application Number:

PCT/EP2012/069601

(22) International Filing Date:

4 October 2012 (04.10.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/543,907	6 October 2011 (06.10.2011)	US
11184135.9	6 October 2011 (06.10.2011)	EP
61/638,777	26 April 2012 (26.04.2012)	US

(71) Applicant: HAMLET PROTEIN A/S [DK/DK]; Saturnvej 51, DK-8700 Horsens (DK).

(72) Inventors: HANSEN, Ole, Kaae; Skæring Strandvej 36, DK-8250 Egå (DK). ELLEGÅRD, Katrine, Hvid; Ahornvej 54A, DK-8680 Ry (DK). THOMSEN, Karl, Kristian; Askevej 29, DK-8700 Horsens (DK).

(74) Agent: ZACCO DENMARK A/S; Hans Bekkevolds Allé 7, DK-2900 Hellerup (DK).

(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))

(54) Title: METHOD FOR THE SIMULTANEOUS PRODUCTION OF ETHANOL AND A FERMENTED, SOLID PRODUCT

(57) Abstract: The invention relates to a method for the simultaneous production of a fermented, solid product and ethanol comprising the following steps: 1) providing a mixture of milled or flaked or otherwise disintegrated biomass, comprising oligosaccharides and/or polysaccharides and live yeast in a dry matter ratio of from 2:1 to 100:1, and water; 2) fermenting the mixture resulting from step (1) under conditions where the water content in the initial mixture does not exceed 65 % by weight, for 1-36 hours at a temperature of about 25-60°C under anaerobic conditions; 3) incubating the fermented mixture resulting from step (2) for 0.5-240 minutes at a temperature of about 70-150°C; and 4) separating wet fermented, solid product from the fermented mixture resulting from step (3); further comprising either a) that the fermentation in step (2) is performed in one or more interconnected paddle worm or continuous worm conveyers with inlet means for the fermentation mixture and additives and outlet means for the ferment as well as control means for rotation speed, temperature and pH, or b) that one or more processing aids are added in any of steps (1), (2) and (3) and further comprising a step of 5) separating crude ethanol from the fermented mixture in step (2) by vacuum and/or in step (3) by vacuum or by injection of steam and condensing the surplus stripping steam. The invention further relates to the products of this method as well as uses thereof.

