



(51) International Patent Classification:

C08J 3/075 (2006.01) C08L 1/02 (2006.01)
C08J 3/24 (2006.01) C08L 3/02 (2006.01)
A23L 33/19 (2016.01) C08L 5/04 (2006.01)
A23C 21/00 (2006.01) C08L 5/06 (2006.01)

(21) International Application Number:

PCT/US2023/019509

(22) International Filing Date:

22 April 2023 (22.04.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/333,819 22 April 2022 (22.04.2022) US

(71) Applicant: **THE UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE** [US/US]; 85 S. Prospect Street, 357 Waterman Bldg., Burlington, VT 05405 (US).

(72) Inventors: **FLOREANI, Rachael**; 85 S. Prospect Street, 357 Waterman Bldg., Burlington, VT 05405 (US). **CHAR- RON, Patrick**; 85 S. Prospect Street, 357 Waterman Bldg., Burlington, VT 05405 (US).

(74) Agent: **HELLER, Morgan, S., II**; Downs Rachlin Martin PLLC, 199 Main Street, P.O. Box 190, Burlington, VT 05402-0190 (US).

(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, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, 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, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE,

(54) Title: POLYMER/MILK-PROTEIN HYDROGELS, CELL SCAFFOLDS AND CULTURED MEAT PRODUCTS MADE THEREWITH, AND ASSOCIATED METHODS

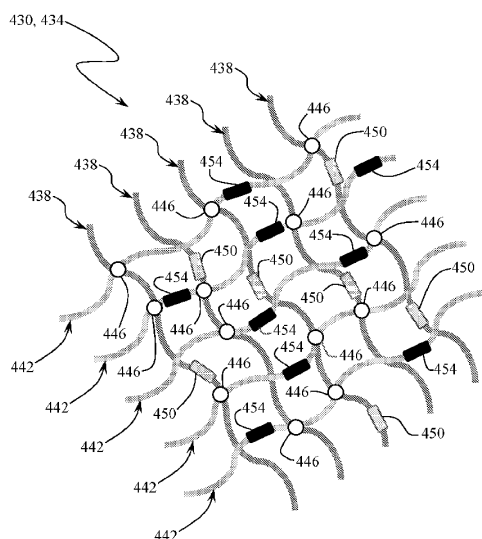


FIG. 4C

(57) Abstract: Hydrogels that comprise one or more polymers and one or more milk proteins, wherein the polymer(s) and the milk protein(s) form an interconnected polymeric network via conjugation. In some embodiments, molecules of the polymer(s) are chemically modified to promote conjugation within the hydrogel. In some embodiments, molecules of the milk protein(s) are chemically modified to promote conjugation within the hydrogel. In some embodiments, molecules of both the polymer(s) and the milk protein(s) are chemically modified to promote conjugation(s) within the hydrogel to create the interconnected polymeric network. Examples of conjugation include, but are not limited to physical chain entanglement, ionic bonding, covalent bonding, secondary bonding, and hydrophobic-hydrophobic interactions, among others. The hydrogels can be enhanced with one or more cell-adhesion agents. The hydrogels can be used to form micro-carriers and/or cell scaffolds for holding and proliferating living cells for creating comestible products, such as cultivated meat products, among others.

[Continued on next page]

SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))*