

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization

International Bureau

(43) International Publication Date
07 September 2023 (07.09.2023)



(10) International Publication Number
WO 2023/167638 A3

(51) International Patent Classification:

C12P 7/24 (2006.01) C12R 1/19 (2006.01)

C12N 1/21 (2006.01)

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

(21) International Application Number:

PCT/SG2023/050123

(22) International Filing Date:

01 March 2023 (01.03.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10202202053S 01 March 2022 (01.03.2022) SG

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

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

(71) Applicants: AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH [SG/SG]; 1 Fusionopolis Way, #20-10 Connexis North Tower, Singapore 138632 (SG). FERMATICS PTE. LTD. [SG/SG]; 63 East Coast Road #02-10, The Red House, Singapore 428776 (SG).

(88) Date of publication of the international search report:

05 October 2023 (05.10.2023)

(72) Inventors: HUANG, Ching-Ning; Singapore Institute of Food and Biotechnology Innovation (SIFBI), 61 Biopolis Drive, Proteos Level 4, Singapore 138673 (SG). CHEN, Xixian; Singapore Institute of Food and Biotechnology Innovations, 61 Biopolis Drive, Proteos Level 4, Singapore 138673 (SG). ZHANG, Congqiang; Singapore Institute of Food and Biotechnology Innovations, 61 Biopolis Drive, Proteos Level 4, Singapore 138673 (SG).

(74) Agent: SPRUSON & FERGUSON (ASIA) PTE LTD; P.O. Box 1531, Robinson Road Post Office, Singapore 903031 (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, 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, 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,

(54) Title: BIOSYNTHESIS OF APOCAROTENIDS BY CONTROLLING OXIDATIVE STRESS

(57) Abstract: The present invention relates to host cells comprising genes of the mevalonate, lycopene and α -ionone pathways and the hydroperoxide reductase or catalase genes. The present invention also relates to methods of producing apocarotenoids as well as kits for producing apocarotenoids comprising the host cells. In one embodiment, the hydroperoxide reductase isolated from *Escherichia coli* is alkyl hydroperoxide reductase (ahpC/F), wherein the catalase isolated from *Escherichia coli* is catalase G (KatG).

WO 2023/167638 A3