

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

(19) World Intellectual Property
Organization

International Bureau

(43) International Publication Date
09 February 2023 (09.02.2023)



(10) International Publication Number
WO 2023/012111 A3

(51) International Patent Classification:

C12P 5/00 (2006.01) *A61K 8/31* (2006.01)
C12P 7/26 (2006.01) *A61Q 13/00* (2006.01)
C12P 23/00 (2006.01) *A61Q 19/00* (2006.01)
C12N 9/88 (2006.01) *A23L 27/20* (2016.01)
C12R 1/01 (2006.01) *C11B 9/00* (2006.01)

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(21) International Application Number:

PCT/EP2022/071567

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(22) International Filing Date:

01 August 2022 (01.08.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

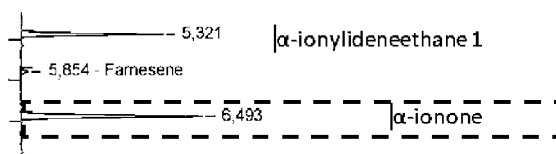
21189182.5 02 August 2021 (02.08.2021) EP

(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,

(54) Title: NOVEL PRODUCTION OF AROMA COMPOUNDS WITH IONYLIDENEETHANE SYNTHASES

Figure 3

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(57) **Abstract:** The present invention relates to the use of alpha-ionylideneethane as an aroma compound, and to the use of an alpha-ionylideneethane synthase in the production of one or more aroma compounds. The inventive method for preparing one or more aroma compounds comprises a) providing farnesyl diphosphate and an alpha-ionylideneethane synthase as defined herein, under conditions suitable for the alpha-ionylideneethane synthase to produce alpha-ionylideneethane, b) converting farnesyl diphosphate to alpha-ionylideneethane, in vitro or in a host cell, c) optionally, converting alpha-ionylideneethane to one or more further aroma compounds, d) isolating alpha-ionylideneethane and the optionally one or more further aroma compounds and, e) optionally, purifying alpha-ionylideneethane and the optionally one or more further aroma compounds. The invention pertains also to method for scenting a product, particularly for imparting and/or enhancing an odor or flavor, in which at least one alpha-ionylideneethane synthase is used. In addition, the invention provides an aroma compound or composition and/or fragrance composition and/or perfumed or fragranced product, comprising i) at least an alpha-ionylideneethane. Further encompassed by the invention is a perfumed or fragranced product comprising at least an alpha-ionylideneethane. The invention further relates to a method for producing alpha-ionone (4-(2,6,6-trimethylcyclohex-2-en-1-yl)but-3-en-2-one), comprising the steps in the following order: a) contacting farnesyl diphosphate with at least one alpha-ionylideneethane synthase, under conditions suitable to produce at least one alpha-ionylideneethane; b) producing the at least alpha-ionylideneethane; c) exposing the at least one alpha-ionylideneethane produced in step b) to conditions suitable for oxidative cleavage of alpha-ionylideneethane to produce alpha-ionone; and d) optionally, isolating the alpha-ionone produced in step c). The invention also relates to a host cell for producing alpha-ionone (4-(2,6,6-trimethylcyclohex-2-en-1-yl)but-3-en-2-one), wherein the host cell comprises farnesyl diphosphate and a heterologous nucleic acid encoding an alpha-ionylideneethane synthase, wherein the host cell is capable of oxidatively cleaving alpha-ionylideneethane to produce alpha-ionone. Finally, the invention relates to the use of a host cell comprising farnesyl diphosphate and a heterologous nucleic acid encoding an alpha-ionylideneethane synthase, for (i) producing alpha-ionylideneethane; (ii) producing alpha-ionone; (iii) producing vitamin A; (iv) converting alpha-ionylideneethane to alpha-ionone;

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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, 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, GH, GM, KE, LR, LS, MW, MZ, NA, RW, 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, 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).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *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))*
- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

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

06 July 2023 (06.07.2023)

(v) converting alpha-ionylideneethane to vitamin A; (vi) for heterologous reconstitution of a terpene or terpenoid; (vii) for producing an industrial product; (viii) a fermentative production system for producing a sesquiterpene.