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

(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; (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.

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