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(54) Title: MIXTURE OF 3-HEXENYL ESTER ISOMERS AND USES THEREOF

Mixture of *trans*-3-hexen-1-yl acetate and
cis-3-hexen-1-yl acetate

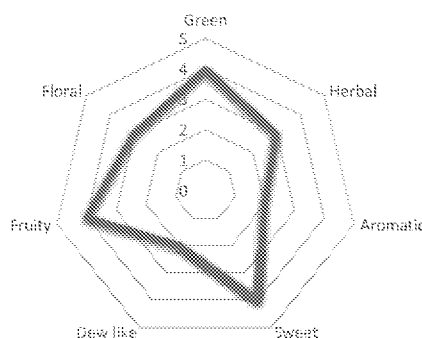


FIG. 1A

(57) Abstract: A composition comprising a mixture of an ester of *trans*-3-hexen-1-ol at a concentration in a range of from 55 % to 95 % by weight of the total mixture and an ester of *cis*-3-hexen-1-ol is at a concentration in a range of from 5 % to 45 % by weight of the total mixture, processes of preparing same and uses thereof are provided.



MIXTURE OF 3-HEXENYL ESTER ISOMERS AND USES THEREOF

RELATED APPLICATION/S

This application claims the benefit of priority of U.S. Provisional Patent Application
5 No. 63/330,829 filed on 14 April 2022, the contents of which are incorporated herein by reference
in their entirety.

FIELD OF THE INVENTION

The present invention relates to odoriferous and/or flavourous substances, and more
10 particularly to novel odoriferous and/or flavourous mixture of ester of *cis*-3-hexenyl and ester of
trans-3-hexenyl, and to fragrance and/or flavor compositions containing the same.

BACKGROUND

Odoriferous and flavourous substances are widely used in fields such as beverages,
15 cosmetics, sanitary and hygienic goods, detergents, bath refreshing additives, medicines, and
agricultural chemicals. Odoriferous substances are used for imparting scent, odor, aroma, or
fragrance to the product or to the body.

A fragrance (or scent, odor, or aroma) results from a combination of a variety of
components in a fragrance composition. Ordinarily, fragrances are created by blending odoriferous
20 substances, optionally along with carrier and other chemical materials. These materials are blended
in order to achieve what are known as substances with “high volatility”, (molecules with high vapor
pressure, evaporate quickly, and give the first impression–high volatility), substances with
“medium volatility” and substances with “low volatility” components (molecules with relatively
low vapor pressure, low volatility, which evaporate slowly and keep the main character of the
25 odor). As a result, the character of the odor, often referred to as “odor profile”, may change
overtime.

In recent years, "green odor descriptors" are of a particular interest. The fresh aroma of
freshly cut green grass fragrance-imparting agents are widely used, for example, in perfumery,
candles, potpourri, bath and body products, melt-and-pour soap, cold process soap, gel wax, and
30 the like, and for imparting a grass scent to artificial grass or turf.

The most recognized green odor descriptor-imparting odoriferous substance is *cis*-3-hexen-
1-ol, which is also known as “leaf alcohol”. Other green odor descriptor-imparting agents which

are widely used in the industry include, for example, n-hexanal, n-hexanol, *trans*-2-hexenal, *trans*-2-hexen-1-ol, *cis*-3-hexenal, and the corresponding ester derivatives thereof.

Leaf alcohol derivatives are a common type of green leaf volatiles (GLVs) and are produced within plant cells during developmental processes or in response to external stress. GLVs are mainly known for controlling plant-plant and plant-herbivore interactions. Ester derivatives of leaf alcohol were also found to act as microbial agents [Lopez-Gresa *et al.* (2017) *Front. Plant Sci.* 8, 1188; Scala *et al.* (2013) *Int. J. Mol. Sci.* 14(9), 17781-17811], and in some cases it is used as odor and/or food additive.

Extracting green-scent imparting substances from green plants and leaves typically involve high production costs and low production amounts and are therefore commercially ineffective. In addition, the demand for green odor descriptors has grown to exceed their supply from traditional natural sources such as mint (*Mentha arvensis*) oil and other plant oils. This has motivated research efforts toward finding alternative ways for obtaining these materials.

However, there is still a need for additional synthetic sources for improved green odor compositions.

SUMMARY OF THE INVENTION

The present invention is related to a fragrance and/or flavor composition comprising a mixture of esters of *trans*-3-hexen-1-ol and esters of *cis*-3-hexen-1-ol.

In addition, the present invention is related to a process of preparing of said fragrance and/or flavor composition, comprising reaction of the compound of formula I:



wherein;

R is C₁-C₁₂ alkyl, C₁-C₁₂ alkyl carbonyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, aryl, heteroaryl, arylene, cycloalkyl, optionally interrupted by at least one heteroatom;

R¹ is hydrogen, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, aryl, heteroaryl, arylene, cycloalkyl, optionally interrupted by at least one heteroatom;

with a mixture of *trans*-3-hexen-1-ol present in an amount of from 55 % to 95 % by weight and *cis*-3-hexen-1-ol, present in amount of from 5 % to 45 % by weight, based on the weight of total mixture, in the presence of an esterification agent, optionally in the presence of a solvent.

In addition, the present invention is related to a process of preparing of said fragrance and/or flavor composition, comprising reaction of compound of formula II



wherein;

R is C₁-C₁₂ alkyl, C₁-C₁₂ alkyl carbonyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, aryl, heteroaryl, arylene, cycloalkyl optionally interrupted by at least one heteroatom;

5 R² is C₁-C₆ alkyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, aryl, heteroaryl, arylene, cycloalkyl optionally interrupted by at least one heteroatom;

with a mixture of *trans*-3-hexen-1-ol present in an amount of from 55 % to 95 % by weight and *cis*-3-hexen-1-ol present in an amount of from 5 % to 45 % by weight, based on the weight of total mixture, optionally in the presence of a solvent.

10 The present invention is also related to odor-imparting formulations comprising fragrance and/or flavor composition disclosed herein.

The present invention is also related to flavor-imparting formulation comprising fragrance and/or flavor compositions disclosed herein.

DESCRIPTION OF THE INVENTION:

15 Definitions:

Prior to setting forth the present subject matter in detail, it may be helpful to provide definitions of certain terms to be used herein. Unless defined otherwise, all technical and scientific terms used herein have the same meaning as is commonly understood by one of skill in the art to which this subject matter pertains.

20 Throughout the application, descriptions of various embodiments use the term “comprising”; however, it will be understood by one skilled in the art, that in some specific instances, an embodiment can alternatively be described using the language “consisting essentially of” or “consisting of”.

25 The term “a” or “an” as used herein includes the singular and the plural, unless specifically stated otherwise. Therefore, the terms “a,” “an” or “at least one” can be used interchangeably in this application.

The term “alkyl” as used herein refers to a branched, unbranched, or cyclic carbon chain.

The term “halogen” or “halo” as used herein refers to one or more halogen atoms, defined as F, Cl, Br, and I.

30 The term “carbonyl” as used herein refers to the group of -C=O.

The term “hydroxy,” as used herein, refers to a hydrogen attached to the parent molecular moiety through an oxygen atom.

The term "alkoxy," as used herein, refers to an alkyl group attached to the parent molecular moiety through an oxygen atom.

The term " aryloxy," as used herein, refers to an aryl group attached to the parent molecular moiety through an oxygen atom.

5 The term "alkenyl" describes an unsaturated aliphatic hydrocarbon end group which comprises at least one carbon-carbon double bond, including straight chain and branched chain groups. The alkenyl group may be substituted or non-substituted. Substituted alkenyl may have one or more substituents, whereby each substituent group can independently be, for example, alkenyl, aryl, heteroaryl, cycloalkyl optionally interrupted by heteroatom atoms, amine, halide, sulfonate, sulfoxide, phosphonate, hydroxy, alkoxy, aryloxy, cyano, nitro, azo, azide, sulfonamide, 10 carboxy, thiocarbamate, urea, thiourea, carbamate, amide, and hydrazine.

The term "alkynyl" describes an unsaturated aliphatic hydrocarbon end group which comprises at least one carbon-carbon triple bond, including straight chain and branched chain groups. The alkynyl group may be substituted or non-substituted. Substituted alkynyl may have 15 one or more substituents, whereby each substituent group can independently be, for example, alkenyl, aryl, heteroaryl, cycloalkyl optionally interrupted by heteroatom atoms, amine, halide, sulfonate, sulfoxide, phosphonate, hydroxy, alkoxy, aryloxy, cyano, nitro, azo, azide, sulfonamide, carboxy, thiocarbamate, urea, thiourea, carbamate, amide, and hydrazine.

The term "cycloalkyl" describes an all-carbon monocyclic or fused ring (i.e., rings which 20 share an adjacent pair of carbon atoms) group where one or more of the rings does not have a completely conjugated pi-electron system. The cycloalkyl group may be substituted or non-substituted. Substituted cycloalkyl may have one or more substituents, whereby each substituent group can independently be, for example, alkyl, alkenyl, alkynyl, aryl, heteroaryl, cycloalkyl optionally interrupted by heteroatom atoms, amine, halide, sulfonate, sulfoxide, phosphonate, 25 hydroxy, alkoxy, aryloxy, cyano, nitro, azo, azide, sulfonamide, carboxy, thiocarbamate, urea, thiourea, carbamate, amide, and hydrazine. The cycloalkyl group can be an end group, as this phrase is defined herein, wherein it is attached to a single adjacent atom, or a linking group, as this phrase is defined herein, connecting two or more moieties. The term "cycloalkyl optionally interrupted by heteroatom atoms" means monocyclic or fused carbon atom ring group having in 30 the ring(s) one or more atoms such as nitrogen, oxygen and sulfur. The rings may also have one or more double bonds. However, the rings do not have a completely conjugated pi-electron system. The "cycloalkyl optionally interrupted by heteroatom atoms" may be substituted or non-substituted. Substituted cycloalkyl optionally interrupted by heteroatom atoms may have one or

more substituents, whereby each substituent group can independently be, for example, alkyl, alkenyl, alkynyl, aryl, heteroaryl, amine, halide, sulfonate, sulfoxide, phosphonate, hydroxy, alkoxy, aryloxy, cyano, nitro, azo, azide, sulfonamide, carboxy, thiocarbamate, urea, thiourea, carbamate, amide, hydrazine and cycloalkyl optionally interrupted by heteroatom atoms. The cycloalkyl optionally interrupted by heteroatom atoms group can be an end group, as this phrase is defined herein, where it is attached to a single adjacent atom, or a linking group, as this phrase is defined herein, connecting two or more moieties. Representative examples are piperidine, piperazine, tetrahydrofuran, tetrahydropyran, morpholine and the like.

The term "aryl" describes an all-carbon monocyclic or fused-ring polycyclic (i.e., rings which share adjacent pairs of carbon atoms) end group (as this term is defined herein) having a completely conjugated pi-electron system. The aryl group may be substituted or non-substituted. Substituted aryl may have one or more substituents, whereby each substituent group can independently be, for example, alkyl, alkenyl, alkynyl, aryl, heteroaryl, amine, halide, sulfonate, sulfoxide, phosphonate, hydroxy, alkoxy, aryloxy, cyano, nitro, azo, azide, sulfonamide, carboxy, thiocarbamate, urea, thiourea, carbamate, amide, hydrazine and cycloalkyl optionally interrupted by heteroatom atoms. Phenyl and naphthyl are representative aryl end groups.

The term "heteroaryl" describes a monocyclic or fused carbon-based ring (i.e., rings which share an adjacent pair of atoms) having in the ring(s) one or more heteroatoms, such as, for example, nitrogen, oxygen and sulfur and, in addition, having a completely conjugated pi-electron system. Examples, without limitation, of heteroaryl groups include pyrrole, furan, thiophene, imidazole, oxazole, thiazole, pyrazole, pyridine, pyrimidine, quinoline, isoquinoline and purine. The heteroaryl group may be substituted or non-substituted. Substituted heteroaryl may have one or more substituents, whereby each substituent group can independently be, for example, alkyl, alkenyl, alkynyl, aryl, heteroaryl, amine, halide, sulfonate, sulfoxide, phosphonate, hydroxy, alkoxy, aryloxy, cyano, nitro, azo, azide, sulfonamide, carboxy, thiocarbamate, urea, thiourea, carbamate, amide, hydrazine and cycloalkyl optionally interrupted by heteroatom atoms. The heteroaryl group can be an end group, as this phrase is defined herein, where it is attached to a single adjacent atom, or a linking group, as this phrase is defined herein, connecting two or more moieties. Representative examples are pyridine, pyrrole, oxazole, indole, purine and the like.

The term "arylene" is a group derived from an aromatic hydrocarbon by removal of a hydrogen atom from each of two carbon atoms of the aryl nucleus, such as, for example, Furan, Pyrrole, Thiophene, Indole, Benzofuran, Carbazole, Quinoline, Isoquinoline, Imidazole, Oxazole, Pyrazole, Pyridazine, Pyrimidine and Purine.

It is appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention, which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable combination or as suitable in any other described embodiment of the invention. Certain features described in the context of various embodiments are not to be considered essential features of those embodiments, unless the embodiment is inoperative without those elements.

The term “salts”, as used herein, refers to organic salts such as chloride, bromide, fluoride, iodide, acetate, hydrogen sulfates, phosphates, formates, nitrate, carbonate etc., or, if applicable, alkaline metal salts such as sodium, potassium, calcium, lithium, cesium, magnesium, barium and the like.

Unless indicated to the contrary, the numerical parameters set forth in the following specification and attached claims are approximations that may vary depending upon the desired properties sought to be obtained. For purposes of better understanding the present teachings and in no way limiting the scope of the teachings, unless otherwise indicated, all numbers expressing quantities, percentages, or proportions, and other numerical values used in the specification and claims, are to be understood as being modified in all instances by the term “about.”

In addition, each numerical parameter should at least be construed in light of the number of reported significant digits and by applying ordinary rounding techniques. In an embodiment, use of the term “about” herein specifically includes $\pm 10\%$ from the indicated values in the range. In addition, the endpoints of all ranges directed to the same component or property herein are inclusive of the endpoints, are independently combinable, and include all intermediate points and ranges.

Unless otherwise defined, all technical and/or scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the invention pertains. Although methods and materials similar or equivalent to those described herein can be used in the practice or testing of embodiments of the invention, exemplary methods and/or materials are described below. In case of conflict, the patent specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and are not intended to be necessarily limiting.

The term “odoriferous substance”, as used herein and in the art, describes a chemical substance or a mixture of chemical substances featuring an odor which is commonly conceived as pleasant.

Each of the “odor descriptor” and “odor profiles” described herein, such as “green”, “floral”, “sweet”, “soapy-like”, etc., are well defined by the Dravnieks atlas (ASTM publication code number 05-061000-36).

The term “descriptive analysis” used herein, refers to a sensory methodology utilizing a panel of trained assessors to identify and describe specific sensory attributes, also called “descriptors”. The panel of which, test sample, identifying, characterizing, and scaling the importance, also called “score”, “strength” or “intensity”, of these attributes.

Although the present invention is mostly odoriferous oriented, this invention also relates to flavourous substances. Any odoriferous description and use of these disclosed mixtures herein can also be acknowledged as flavourous description and can be use in flavourous applications.

The present invention provides a fragrance and/or flavor composition comprising a mixture of esters of *trans*-3-hexen-1-ol and esters of *cis*-3-hexen-1-ol.

In an embodiment, a fragrance and/or flavor composition comprises a mixture of the same esters of *trans*-3-hexen-1-ol and the *cis*-3-hexen-1-ol derived from a particular carboxylic acid.

In an embodiment, a fragrance and/or flavor composition comprises a mixture of the same esters of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol, derived from a particular organic anhydride.

In an embodiment, a fragrance and/or flavor composition comprises a mixture of the same esters of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol, derived from a particular organic ester.

According to an embodiment, the present invention provides a fragrance and/or flavor composition comprising a mixture of an ester of *trans*-3-hexen-1-ol in an amount of from 55 % to 95 % by weight and an ester of *cis*-3-hexen-1-ol in an amount of from 5 % to 45 % based on the weight of the total composition.

According to an embodiment, the present invention provides a fragrance and/or flavor composition comprising a mixture of an ester of *trans*-3-hexen-1-ol in an amount of from 60 % to 90 % by weight of the total mixture and an ester of *cis*-3-hexen-1-ol in an amount of from 10 % to 40 % based on the weight of the total composition.

According to an embodiment, the present invention provides a fragrance and/or flavor composition comprising a mixture of an ester of *trans*-3-hexen-1-ol in an amount of from 65 % to 85 % by weight of the total mixture and an ester of *cis*-3-hexen-1-ol in an amount of from 15 % to 35 % based on the weight of the total composition.

According to an embodiment, the present invention provides a fragrance and/or flavor composition comprising a mixture of an ester of *trans*-3-hexen-1-ol in an amount of from 67 % to

82 % by weight of the total mixture and an ester of *cis*-3-hexen-1-ol in an amount of from 18 % to 33 % based on the weight of the total composition.

In some embodiment, the fragrance and/or flavor composition comprising a mixture of an ester of *trans*-3-hexen-1-ol in an amount of from 70 % to 80 % by weight of the total mixture and
5 an ester of *cis*-3-hexen-1-ol in an amount of from 20 % to 30 % based on the weight of the total composition.

According to an embodiment, the weight ratio of the ester of *trans*-3-hexen-1-ol to the ester of *cis*-3-hexen-1-ol in the mixture is in a range of from about 9.5:0.5 to 5.5:4.5.

According to an embodiment, the weight ratio of the ester of *trans*-3-hexen-1-ol to the ester
10 of *cis*-3-hexen-1-ol in the mixture is in a range of from about 9.5:0.5 to 5.5:4.5.

According to an embodiment, the weight ratio of the ester of *trans*-3-hexen-1-ol to the ester of *cis*-3-hexen-1-ol in the mixture is in a range of from about 9:1 to 6:4.

According to an embodiment, the weight ratio of the ester of *trans*-3-hexen-1-ol to the ester of *cis*-3-hexen-1-ol in the mixture is in a range of from about 8.5:2.5 to 6.5:4.5.

In some embodiment, the weight ratio of the ester of *trans*-3-hexen-1-ol to the ester of *cis*-
15 3-hexen-1-ol in the mixture is in a range of from about 8:2 to 7:3.

According to an embodiment, the fragrance and/or flavor composition of the ester of *trans*-3-hexen-1-ol and the ester of *cis*-3-hexen-1-ol, disclosed herein, features alike odor profile of the corresponding ester of the *cis*-3-hexen-1-ol.

According to an embodiment, the fragrance and/or flavor composition of the ester of *trans*-
20 3-hexen-1-ol and the ester of *cis*-3-hexen-1-ol, disclosed herein, features an odor profile, that differs from the ester of the *cis*-3-hexen-1-ol by at least one odor descriptor.

According to an embodiment, the fragrance and/or flavor composition of the ester of *trans*-
25 3-hexen-1-ol and the ester of *cis*-3-hexen-1-ol, disclosed herein, features an odor profile, that differs from the ester of the *cis*-3-hexen-1-ol by at least two odor descriptors.

According to an embodiment, the fragrance and/or flavor composition of the ester of *trans*-3-hexen-1-ol and the ester of *cis*-3-hexen-1-ol, disclosed herein, features an odor profile, that differs from the ester of the *cis*-3-hexen-1-ol by at least three odor descriptors.

According to an embodiment, the odor descriptor is selected from a group comprising
30 floral, citrus, fruity, aquatic, spicy, edible, animalic, green, woody, earthy, amber, aldehydes, balsamic, gourmandy, grain, herbaceous, mineral, mossy, musk, oriental, resinous, smokey, textile, tobacco odor.

According an embodiment, the odor descriptor is selected from a group comprising fresh, rose, mushroom, coconut, soapy, jasmine, lavender, lilies, violets, lilacs, orange, clementine, lemon, grapefruit, lime, apple, pineapple, berries, peach, lychee, cascalone, seaweed, seawater, cucumber, coral reef, cinnamon, cloves, coffee, ginger, coriander, saffron, mushroom, nutmeg,
5 cotton candy, sweets, coca-cola, bubble gum, lemonade, caramel, musk, amber, civet, leather, goat hair, truffle, basil, mint, green tea, aloe vera, cilantro, fern, cedar, bamboo, sandalwood, eucalyptus, pine tree, agarwood (oud), vetiver, patchouli, labdanum, hay, dew like, powdery, amber, ambreine, aquatic, balsamic, cologne, fresh, green, anise, lavender, chamomile, lemongrass, geranium, pine, passion fruit, caramel, guava, banana, melon, berries, muguet, fig,
10 strawberry, watermelon, verbena, cedarwood, sandalwood, vanilla, oak moss, musk, fougere, gourmand odor.

According to an embodiment, the fragrance and/or flavor composition of an ester of *trans*-3-hexen-1-ol and an ester of *cis*-3-hexen-1-ol, disclosed herein, features an odor descriptor, that differs from the ester of the *cis*-3-hexen-1-ol by at least one score.

15 According to an embodiment, the fragrance and/or flavor composition of an ester of *trans*-3-hexen-1-ol and an ester of *cis*-3-hexen-1-ol, disclosed herein, features an odor descriptor, that differs from the ester of the *cis*-3-hexen-1-ol by at least two scores.

According to an embodiment, the fragrance and/or flavor composition of an ester of *trans*-3-hexen-1-ol and an ester of *cis*-3-hexen-1-ol, disclosed herein, features an odor descriptor, that
20 differs from the ester of the *cis*-3-hexen-1-ol by at least three scores.

According to an embodiment, the ester of *trans*-3-hexen-1-ol and/or *cis*-3-hexen-1-ol is selected from a group comprising: acetate, salicylate, propionate, cyclopropionate, tiglate, isobutyrate, butyrate, 2-methyl butyrate, 2-methyl butanoate, 3-methyl butanoate, benzoate, aminobenzoate, anthranilate, crotonate, phenyl acetate, 2-methyl-2-pentenoate, hexanoate,
25 heptanoate, octanoate, nonanoate, decanoate, formate, isovalerate, lactate, levulinate, nicotinate, pyruvate, valerate, anisate, caproate, caprylate, cinnamate, dihydrocinnamate, palmitate, pivalate, senecioate, oct-2-ynoate, 5-hexanoate, 3-phenyl-2-propenoate, 3-methylbutyrate, 3-hydroxybutanoate, methyl carbonate.

According to an embodiment, the ester is acetate.

30 According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl acetate in an amount of from 55 % to 95 % by weight and *cis*-3-hexen-1-yl acetate in an amount of from 5 % to 45 % based on the weight of the total composition.

According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl acetate in an amount of from 60 % to 90 % by weight and *cis*-3-hexen-1-yl acetate in an amount of from 10 % to 40 % based on the weight of the total composition.

5 According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl acetate in an amount of from 65 % to 85 % by weight and *cis*-3-hexen-1-yl acetate in an amount of from 15 % to 35 % based on the weight of the total composition.

According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl acetate in an amount of from 67 % to 82 % by weight and *cis*-3-hexen-1-yl acetate in an amount of from 18 % to 33 % based on the weight of the total composition.

10 According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl acetate in an amount of from 70 % to 80 % by weight and *cis*-3-hexen-1-yl acetate in an amount of from 20 % to 30 % based on the weight of the total composition.

According to an embodiment, the weight ratio of *trans*-3-hexen-1-yl acetate to *cis*-3-hexen-1-yl acetate is from 9.5:0.5 to 5.5:4.5.

15 According to an embodiment, the weight ratio of *trans*-3-hexen-1-yl acetate to *cis*-3-hexen-1-yl acetate is from 9:1 to 6:4.

According to an embodiment, the weight ratio of *trans*-3-hexen-1-yl acetate to *cis*-3-hexen-1-yl acetate is from 6.5:4.5 to 8.5:2.5.

20 According to an embodiment, the weight ratio of *trans*-3-hexen-1-yl acetate to *cis*-3-hexen-1-yl acetate is from 8:2 to 7:3.

According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and of *cis*-3-hexen-1-yl acetate, featuring odor descriptors of floral, green, herbal, aromatic, sweet, dew like and fruity.

25 According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features an odor profile, that differs from *cis*-3-hexen-1-yl acetate by at least one odor descriptor.

According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features an odor profile, that differs from the ester of *cis*-3-hexen-1-yl acetate by at least two odor descriptors.

30 According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features an odor profile, that differs from the ester of *cis*-3-hexen-1-yl acetate by at least three odor descriptors.

According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features a green odor descriptor, that differs from *cis*-3-hexen-1-yl acetate by at least four odor scores.

5 According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features a green odor descriptor, that differs from *cis*-3-hexen-1-yl acetate by at least three odor scores.

According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features a green odor descriptor, that differs from *cis*-3-hexen-1-yl acetate by at least two odor scores.

10 According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features a sweet odor descriptor, that differs from *cis*-3-hexen-1-yl acetate by at least four odor scores.

According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features a sweet odor descriptor, that differs from *cis*-3-hexen-1-yl acetate by at least three odor scores.

15 According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features a sweet odor descriptor, that differs from *cis*-3-hexen-1-yl acetate by at least two odor scores.

20 According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features a fruity odor descriptor, that differs from *cis*-3-hexen-1-yl acetate by at least four odor scores.

According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features a fruity odor descriptor, that differs from *cis*-3-hexen-1-yl acetate by at least three odor scores.

25 According to an embodiment, the fragrance and/or flavor composition of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate, disclosed herein, features a fruity odor descriptor, that differs from *cis*-3-hexen-1-yl acetate by at least two odor scores.

According to an embodiment, the ester is salicylate.

30 According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl salicylate in an amount of from 55 % to 95 % by weight and *cis*-3-hexen-1-yl salicylate in an amount of from 5 % to 45 % based on the weight of the total composition.

According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl salicylate in an amount of from 60 % to 90 % by weight and *cis*-3-hexen-1-yl salicylate in an amount of from 10 % to 40 % based on the weight of the total composition.

5 According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl salicylate in an amount of from 65 % to 85 % by weight and *cis*-3-hexen-1-yl salicylate in an amount of from 15 % to 35 % based on the weight of the total composition.

According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl salicylate in an amount of from 67 % to 82 % by weight and *cis*-3-hexen-1-yl salicylate in an amount of from 18 % to 33 % based on the weight of the total composition.

10 According to an embodiment, the fragrance and/or flavor composition comprises a mixture of *trans*-3-hexen-1-yl salicylate in an amount of from 70 % to 80 % by weight and *cis*-3-hexen-1-yl salicylate in an amount of from 20 % to 30 % based on the weight of the total composition.

According to an embodiment, the weight ratio of *trans*-3-hexen-1-yl salicylate to *cis*-3-hexen-1-yl salicylate is from 9.5:0.5 to 5.5:4.5.

15 According to an embodiment, the weight ratio of *trans*-3-hexen-1-yl salicylate to *cis*-3-hexen-1-yl salicylate is from 9:1 to 6:4.

According to an embodiment, the weight ratio of *trans*-3-hexen-1-yl salicylate to *cis*-3-hexen-1-yl salicylate is from 6.5:4.5 to 8.5:2.5.

20 According to an embodiment, the weight ratio of *trans*-3-hexen-1-yl salicylate to *cis*-3-hexen-1-yl salicylate is from 8:2 to 7:3.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and of *cis*-3-hexen-1-yl salicylate, featuring odor descriptors of floral, herbal, powdery, coconut-like and soapy.

25 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features alike odor profile, of *cis*-3-hexen-1-yl salicylate.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features an odor profile, that differs from *cis*-3-hexen-1-yl salicylate by at least one odor descriptor.

30 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features an odor profile, that differs from *cis*-3-hexen-1-yl salicylate by at least one odor descriptor.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features an odor profile, that differs from the ester of *cis*-3-hexen-1-yl salicylate by at least two odor descriptors.

5 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features an odor profile, that differs from the ester of *cis*-3-hexen-1-yl salicylate by at least three odor descriptors.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a floral odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least three odor scores.

10 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a floral odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least two odor scores.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a floral odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least one odor scores.

15 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features an herbal odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least three odor scores.

20 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features an herbal odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least two odor scores.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features an herbal odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least one odor scores.

25 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a coconut-like odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least three odor scores.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a coconut-like odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least two odor scores.

30 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a coconut-like odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least one odor scores.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a powdery odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least three odor scores.

5 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a powdery odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least two odor scores.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a powdery odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least one odor scores.

10 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a floral odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least three odor scores.

According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a floral odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least two odor scores.

15 According to an embodiment, a fragrance and/or flavor composition of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate, disclosed herein, features a floral odor descriptor, that differs from *cis*-3-hexen-1-yl salicylate by at least one odor scores.

20 According to another aspect, the present invention provides a process of preparing of fragrance or flavor composition comprising reaction of compound of formula I



wherein;

R is C₁-C₁₂ alkyl, C₁-C₁₂ alkyl carbonyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, aryl, heteroaryl, arylene, cycloalkyl, optionally interrupted by at least one heteroatom;

25 R¹ is hydrogen, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, aryl, heteroaryl, arylene, cycloalkyl, optionally interrupted by at least one heteroatom;

with a mixture of *trans*-3-hexen-1-ol present in an amount of from 55 % to 95 % by weight and *cis*-3-hexen-1-ol present in an amount of from 5 % to 45 % by weight, based on the weight of total mixture, in the presence of an esterification agent, optionally in the presence of a solvent.

30 According to an embodiment, the compound of formula (I) is selected from the group comprising acetic acid, salicylic acid, propionic acid, cyclopropionic acid, tiglic acid, isobutyric acid, butyric acid, 2-methyl butyric acid, 2-methyl butanoic acid, 3-methyl butanoic acid, benzoic acid, aminobenzoic acid, anthranilic acid, crotonic acid, phenyl acetic acid, 2-methyl-2-pentenoic

acid, hexanoic acid, heptanoic acid, octanoic acid, nonanoic acid, decanoic acid, formic acid, isovaleric acid, lactic acid, levulinic acid, nicotinic acid, pyruvic acid, valeric acid, anisic acid, caproic acid, caprylic acid, cinnamic acid, dihydrocinnamic acid, palmitic acid, pivalic acid, senecioic acid, oct-2-ynoic acid, 5-hexanoic acid, 3-phenyl-2-propenoic acid, 3-methylbutyric acid, 3-hydroxybutanoic acid and methyl carbonic acid, methyl acetate, methyl salicylate, methyl propionate, methyl cyclopropionate, methyl tiglate, methyl isobutyrate, methyl butyrate, methyl 2-methyl butyrate, methyl 2-methyl butanoate, methyl 3-methyl butanoate, methyl benzoate, methyl aminobenzoate, anthranilate, methyl crotonate, methyl phenyl acetate, methyl 2-methyl-2-pentenoate, methyl hexanoate, methyl heptanoate, methyl octanoate, methyl nonanoate, methyl decanoate, methyl formate, methyl isovalerate, methyl lactate, methyl levulinate, methyl nicotinate, methyl pyruvate, methyl valerate, methyl anisate, methyl caproate, methyl caprylate, methyl cinnamate, methyl dihydrocinnamate, methyl palmitate, methyl pivalate, methyl senecioate, methyl oct-2-ynoate, methyl 5-hexanoate, methyl 3-phenyl-2-propenoate, methyl 3-methylbutyrate, methyl 3-hydroxybutanoate and methyl methyl carbonate., ethyl acetate, ethyl salicylate, ethyl propionate, ethyl cyclopropionate, ethyl tiglate, ethyl isobutyrate, ethyl butyrate, ethyl 2-methyl butyrate, ethyl 2-methyl butanoate, ethyl 3-methyl butanoate, ethyl benzoate, ethyl aminobenzoate, anthranilate, ethyl crotonate, ethyl phenyl acetate, ethyl 2-methyl-2-pentenoate, ethyl hexanoate, ethyl heptanoate, ethyl octanoate, ethyl nonanoate, ethyl decanoate, ethyl formate, ethyl isovalerate, ethyl lactate, ethyl levulinate, ethyl nicotinate, ethyl pyruvate, ethyl valerate, ethyl anisate, ethyl caproate, ethyl caprylate, ethyl cinnamate, ethyl dihydrocinnamate, ethyl palmitate, ethyl pivalate, ethyl senecioate, ethyl oct-2-ynoate, ethyl 5-hexanoate, ethyl 3-phenyl-2-propenoate, ethyl 3-methylbutyrate, ethyl 3-hydroxybutanoate and ethyl methyl carbonate.

According to an embodiment, the compound of formula (I) is acetic acid.

According to an embodiment, the compound of formula (I) is salicylic acid.

According to an embodiment, the compound of formula (I) is ethyl acetate.

According to an embodiment, the compound of formula (I) is methyl salicylate.

According to an embodiment, the molar ratio between the mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol to the compound of formula (I) is from about 1:0.1 to 1:20, from about 1:0.5 to 1:10, preferably from about 1:0.5 to 1:5, most preferably from about 1:0.8 to 1:1.5.

According to an embodiment, the esterification agent is selected from a group comprising: sulfuric acid, p-toluenesulfonic, methanesulfonic acid, methanesulfonyl chloride, 4-hydroxybenzenesulfonic acid, dodecylbenzenesulfonic acid, trimethylsilyl triflate, phosphoric

acid, dibutyltin oxide, dioctyltin oxide, calcium oxide, magnesium oxide, titanium isopropoxide, 4-(dimethylamino)pyridine, potassium carbonate, sodium carbonate, sodium bicarbonate, sodium hydroxide, potassium bisulfate, potassium hydroxide, sodium methoxide, sodium ethoxide, alumina, sodium bisulfate, ammonium chloride, triethylamine, pyridine, imidazole, diisopropylethylamine, acetic acid, acetic anhydride, trifluoroacetic acid, thionyl chloride, tosyl chloride, oxalyl chloride, hydrochloric acid, aluminum chloride, diisopropylcarbodiimide, amberlyst 15, and the mixtures thereof.

According to an embodiment, the esterification agent is sulfuric acid.

According to an embodiment, the esterification agent is p-toluenesulfonic.

10 According to an embodiment, the esterification agent is methanesulfonic acid.

According to an embodiment, the esterification agent is dibutyltin oxide.

According to an embodiment, the esterification agent is dibutyltin diacetate.

According to an embodiment, the esterification agent is potassium carbonate.

According to an embodiment, the esterification agent is aluminum isopropoxide.

15 According to an embodiment, the molar ratio between the mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol to the esterification agent is from about 1:0.001 to 1:1, preferably from about 1:0.01 to 1:0.3, most preferably from about 1:0.05 to 1:0.15.

According to an embodiment, the reaction is performed in the presence of a solvent wherein the solvent is selected from a group comprising: water, toluene, dichloromethane, ethyl acetate, tetrahydrofuran, hexane, pentane, dimethylformamide, acetonitrile, dimethyl sulfoxide, diisopropyl ether, acetone, heptane, xylene, *m*-xylene, pyridine, diethyl ether, benzene, 1,4-dioxane, *tert*-butyl methyl ether, chloroform, 1,2-dichlorobenzene, octane, chlorobenzene, 1,2-dichloroethane, *tert*-butyl acetate, cyclohexane, cyclopentyl methyl ether, and the mixtures thereof.

25 According to an embodiment, the solvent is toluene.

According to an embodiment, solvent is cyclohexane.

According to an embodiment, the reaction is performed in the absence of a solvent.

According to an embodiment, the reaction of the mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol and the compound of formula (I) is performed in the temperature interval of from about 0°C to 130°C. A preferred temperature interval is from about 50°C to 130°C, more preferably from about 110°C to 120°C.

30 According to an embodiment the reaction is terminated when the concentration of the mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol is between 0-50%, preferably from 0-10%,

most preferably, in particular, when no more than 1% of compound of the mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol remains in the reaction media.

Finally, the reaction mixture containing the product is worked up using common techniques, including, but not limited to: addition of water and/or organic solvent, stirring, cooling, heating, phase separations, distillations, precipitations, recrystallizations, concentrations, filtrations, purifications, pH adjustments, extractions, and drying.

According to another aspect, the present invention provides a process of preparing of fragrance or flavor composition comprising reaction of compound of formula II



wherein;

R is C₁-C₁₂ alkyl, C₁-C₁₂ alkyl carbonyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, aryl, heteroaryl, arylene, cycloalkyl optionally interrupted by at least one heteroatom;

R² is C₁-C₆ alkyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, aryl, heteroaryl, arylene, cycloalkyl optionally interrupted by at least one heteroatom;

with a mixture of *trans*-3-hexen-1-ol present in an amount of from 55 % to 95 % by weight and *cis*-3-hexen-1-ol present in an amount of from 5 % to 45 % by weight, based on the weight of total mixture, optionally in the presence of a solvent.

According to an embodiment, a compound of formula (II) is selected from the group comprising: acetic anhydride, salicylic anhydride, propionic anhydride, cyclopropionic anhydride, tiglic anhydride, isobutyric anhydride, butyric anhydride, 2-methyl butyric anhydride, 2-methyl butanoic anhydride, 3-methyl butanoic anhydride, benzoic anhydride, aminobenzoic anhydride, anthranilic anhydride, crotonic anhydride, phenyl acetic anhydride, 2-methyl-2-pentenoic anhydride, hexanoic anhydride, heptanoic anhydride, octanoic anhydride, nonanoic anhydride, decanoic anhydride, formic anhydride, isovaleric anhydride, lactic anhydride, levulinic anhydride, nicotinic anhydride, pyruvic anhydride, valeric anhydride, anisic anhydride, caproic anhydride, caprylic anhydride, cinnamic anhydride, dihydrocinnamic anhydride, palmitic anhydride, pivalic anhydride, senecioic anhydride, oct-2-ynoic anhydride, 5-hexanoic anhydride, 3-phenyl-2-propenoic anhydride, 3-methylbutyric anhydride, 3-hydroxybutanoic anhydride and methyl carbonic anhydride.

According to an embodiment, the compound of formula (II) is acetic anhydride.

According to an embodiment, the molar ratio between the mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol and the compound of formula (II) is from about 2:1 to 1:20, preferably from about 1:1 to 1:15, more preferably from about 1:1 to 1:10, most preferably from about 1:1 to 1:1.5.

According to an embodiment, the reaction is performed in the presence of a solvent, wherein the solvent is selected from a group comprising water, toluene, dichloromethane, ethyl acetate, tetrahydrofuran, hexane, pentane, dimethylformamide, acetonitrile, dimethyl sulfoxide, diisopropyl ether, acetone, heptane, xylene, *m*-xylene, pyridine, diethyl ether, benzene, 1,4-dioxane, *tert*-butyl methyl ether, chloroform, 1,2-dichlorobenzene, octane, chlorobenzene, 1,2-dichloroethane, *tert*-butyl acetate, cyclohexane, cyclopentyl methyl ether, and the mixtures thereof.

According to an embodiment, the solvent is toluene.

According to an embodiment, the solvent is cyclohexane.

According to an embodiment, the reaction is performed in the absence of a solvent.

According to an embodiment, the reaction of a mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol and a compound of formula (II) is performed in the temperature interval of from about 0°C to 130°C. A preferred temperature interval is from about 50°C to 100°C, more preferably from about 75°C to 85°C.

According to an embodiment, the reaction is terminated when concentration of the mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol is between 0-50%, more preferably from 0-10%.

In an embodiment, the reaction is terminated when no more than 1% of the starting mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol remains in the reaction media.

Finally, the reaction mixture containing the ester products is worked up using common techniques including, but not limited to: addition of water and/or organic solvent, stirring, cooling, heating, phase separations, distillations, precipitations, recrystallizations, concentrations, filtrations, purifications, pH adjustments, extractions, and drying.

Applications of inventive compositions:

As described herein, compositions according to any of the respective embodiments described herein comprise an ester of *cis*-3-hexen-1-ol and an ester of *trans*-3-hexen-1-ol. Such odoriferous and/or flavourous compounds can be incorporated into the odor/flavor-imparting formulations and/or into articles-of-manufacturing wherein the presence of such odor/flavor-imparting compound is beneficial.

Another aspect of the present invention provides an odor-imparting formulation (a fragrance formulation) and/or flavor-imparting formulation (a flavor formulation) comprising the composition as described herein in any of the respective embodiments. In some embodiments, the odor-imparting formulation and/or flavor-imparting formulation comprises at least one additional

odoriferous and/or flavourous substance. Alternatively, or additionally, the odor-imparting formulation and/or flavor-imparting formulation may optionally comprise at least one additional component which is not an odoriferous and/or flavourous substance, such as an acceptable carrier (e.g., alcoholic or water-containing carrier). The acceptable carrier may optionally be cosmetically acceptable, agriculturally acceptable, edible, and/or suitable for a detergent.

The fragrance and/or flavor composition as disclosed herein can be employed in widely varying amounts, depending upon the specific application and on the nature and quantity of other odorant ingredients and/or flavorant ingredients, if present.

According to an embodiment, the proportion of the fragrance and/or flavor composition is from 0.001 % to 20 % by weight, based on the total weight of the article-of-manufacturing or formulation containing same.

According to an embodiment, the proportion of the fragrance and/or flavor composition is from 20 % to 50 % by weight, based on the total weight of the article-of-manufacturing or formulation containing same.

The odor-imparting and/or flavor-imparting composition according to any of the embodiments described herein may be provided as a fragrance and/or flavor concentrate which can be incorporated an article-of-manufacturing as described herein.

The odor-imparting and/or flavor-imparting composition according to any of the embodiments described herein may be provided as a fragrance and/or flavor formulation which can be incorporated an article-of-manufacturing as described herein.

According to an embodiment, the present invention provides an article-of-manufacturing comprising a composition described herein.

In some embodiment, the article of manufacturing includes detergents such as body care products, including bath/shower gels, hair conditioners, shampoos, liquid soaps, tablet soaps, cosmetic products and talcum powders; perfume products, particularly alcoholic perfumes; cleansing products or compositions such as fabric care products or ambient and home care such as fabric softeners; and in lifestyle products, such as pot pourri, reed diffusers, electric diffusers, candles and incense.

Non-limiting examples of such article-of-manufacturing include; baby care, beauty care, fabric and home care, family care, feminine care, health care, snack and/or beverage products, and, more specifically, but without limitation, fine fragrance products or formulations (e.g. perfumes, colognes, eau de toilettes, after-shave lotions, pre-shave, face waters, tonics, and other fragrance-containing compositions for application directly to the skin), diapers, bibs, wipes; products for

and/or methods relating to treating hair (human, dog, and/or cat), including, bleaching, coloring, dyeing, conditioning, shampooing, styling formulations or products; deodorants and antiperspirants, personal cleansing, cosmetics and skin care products or formulations, including creams, lotions, and other topically applied products, and shaving products; products for and/or methods relating to treating fabrics, hard surfaces and any other surfaces in the area of fabric and home care, including air care, car care, dishwashing, fabric conditioning (including softening), laundry detergent, laundry and rinse additive and/or care, hard surface cleaning and/or treatment, and other cleaning compositions; products and/or methods relating to bath tissue, facial tissue, paper handkerchiefs, and/or paper towels; tampons, feminine napkins; products and/or methods relating to oral care including toothpastes, tooth gels, tooth rinses, denture adhesives, tooth whitening.

As used herein, the term “cleansing composition” includes washing agents, especially cleaning detergents, liquid, gel or paste-form all-purpose washing agents, liquid fine-fabric detergents, hand dishwashing agents or light duty dishwashing agents, machine dishwashing agents, including the various tablet, granular, liquid and rinse-aid types, cleaning and disinfecting agents, including antibacterial hand-wash types, cleaning bars, mouthwashes, denture cleaners, dentifrice, car or carpet shampoos, bathroom cleaners, hair shampoos and hair-rinses, shower gels and foam baths and metal cleaners, as well as cleaning auxiliaries such as bleach additives and “stain-stick” or pre-treat types, substrate-laden products such as dryer added sheets, dry and wetted wipes and pads, nonwoven substrates, and sponges, as well as sprays and mists.

As used herein, the term “fabric care composition” includes, unless otherwise indicated, fabric softening compositions, fabric enhancing compositions, fabric freshening compositions and combinations thereof.

The odor-imparting and/or flavor-imparting composition according to any of the embodiments described herein, or the formulation containing said composition may be directly mixed with the article-of-manufacturing to which it is applied. Optionally, the odor-imparting and/or flavor-imparting composition according to any of the embodiments described herein, or the formulation containing said composition may be entrapped or embedded in a delivery system such as, for example, polymers, capsules, microcapsules and nanocapsules, liposomes, film formers, absorbents such as carbon or zeolites, cyclic oligosaccharides, and mixtures thereof, or may be chemically bonded to substrates, which are adapted to release the odoriferous substance(s) and/or flavourous substance(s) upon application of an external stimulus such as light, enzyme, or the like, and then applied to the article-of-manufacturing.

Embodiments of the present invention thus further encompass methods of manufacturing articles-of-manufacturing as described herein, which comprise incorporating an odoriferous and/or flavourous mixture of esters of *trans*-3-hexen-1-ol and esters of *cis*-3-hexen-1-ol or an odor-imparting and/or an flavor-imparting formulation containing same in the article-of-manufacturing, typically using conventional techniques and methods. Through the addition of the odoriferous substance and/or flavourous substance of the present embodiments, the odor descriptors of the article-of-manufacturing may be improved, enhanced or modified.

It is expected that during the life of a patent maturing from this application many relevant article-of-manufacturing to which an odoriferous and/or flavourous and/or a odor-imparting and/or an flavor-imparting is beneficially added will be developed and the scope of the term “article-of-manufacturing” is intended to include all such new technologies *a priori*.

Various embodiments and aspects of the present invention as delineated hereinabove and as claimed in the claims section below find experimental support in the following examples.

EXAMPLES

Reference is now made to the following examples, which together with the above descriptions illustrate some embodiments of the invention in a non-limiting fashion.

MATERIALS AND EXPERIMENTAL METHODS

Gas Chromatography:

Gas chromatography (GC) analysis was performed using a 7693 instrument (Agilent Technologies), with an injection volume of 1 µl, inlet split ratio of 90:1 and temperature of 250 °C, ZB-WAX column (Restek) (polyethylene glycol capillary column phase, 30 m length, 0.25 mm internal diameter, 0.25 µm film thickness, 16.371 psi head pressure), and flame ionization detector (FID) (T = 260 °C, air flow of 360 ml/minute, H₂ flow of 30 ml/minute and He makeup of 24.8 ml/minute). Samples were diluted to 2 % in dichloromethane. The temperature was raised from 50 °C to 100 °C at a rate of 5 °C per minute, then from 100 °C to 220 °C at a rate of 10 °C per minute, followed by 3 minutes at 220 °C (total of 25 minutes).

Raw material preparation (Example A):

A mixture of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol, at a weight ratio in a range of from 7:3 to 8:2, including the procedure of its preparation, described in WO 2021/156870, which is incorporated by reference as if fully set forth herein.

Example 1: Preparation of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate mixture (by acetic acid):

In a 50 mL flask equipped with a Dean-Stark head, toluene (26 mL), *trans*-3-hexen-1-ol (77.8%) and *cis*-3-hexen-1-ol (20%) mixture (10 grams, 0.10 mol, prepared according to Example A), acetic acid (10.7 grams, 0.18 mol) and *para*-toluene sulfonic acid (0.77 gram, 4.4 mmol) were heated to reflux at 115 °C. The reaction mixture progress was monitored by GC analysis as described herein above. Once the amount of the *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol mixture was determined as less than 0.1 %, the reaction was cooled to room temperature and distilled under reduced pressure to obtain *trans*-3-hexen-1-ol acetate (69%) and *cis*-3-hexen-1-ol acetate (17%) mixture featuring purity of at least 86 % in at least 75 % yield, as determined by GC analysis.

Example 2: Preparation of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate mixture (by ethyl acetate):

In a 50 mL flask equipped with a Dean-Stark head, ethyl acetate (23.4mL), *trans*-3-hexen-1-ol (77.8%) and *cis*-3-hexen-1-ol (20%) mixture (9.6 grams, 0.095 mol, prepared according to Example A), and potassium carbonate (0.26 gram, 1.93mmol) were heated to reflux at 110 °C. The reaction mixture was then swirled for 4 hours and the reaction was cooled to room temperature. *Trans*-3-hexen-1-yl acetate (56%) and *cis*-3-hexen-1-yl acetate (13%) mixture was received with conversion of 70% as determined by GC analysis.

Example 3: Preparation of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate mixture (by acetic anhydride):

To a 1 L reactor equipped with reflux condenser, crude *trans*-3-hexen-1-ol (77.8%) and *cis*-3-hexen-1-ol (20%) mixture (385.61 grams, 3.85 mol, prepared according to Example A) was charged. The solution was heated to 80 °C and acetic anhydride (491.31 grams, 4.81 mol, 1.25 equivalents) was added dropwise for 1 hour. The reaction mixture was then swirled for another 0.5 hour, while monitoring the reaction progress by GC analysis of samples taken from the reaction, as described herein above. Once the amount of the *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol mixture was determined as less than 0.1 %, the mixture was cooled to 20 °C. Mixture was neutralized to pH 7.2 and phases were separated. Organic phase was distilled under reduced pressure to obtain *trans*-3-hexen-1-ol acetate (77.5%) and *cis*-3-hexen-1-ol acetate (19.8%) mixture featuring purity of at least 95 % in at least 82 % yield, as determined by GC analysis.

Example 4: Preparation of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate mixture (by salicylic acid):

In a 100 mL flask equipped with a Dean-Stark head, toluene (26 mL), a purified *trans*-3-hexen-1-ol (77.8%) and *cis*-3-hexen-1-ol (20%) mixture (10 grams, 0.10 mol, prepared according to Example A), salicylic acid (27.6 grams, 0.2 mol) and *para*-toluene sulfonic acid (0.77 gram, 4.4 mmol) were heated to reflux at 115 °C. The presence of *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol mixture was monitored by GC analysis as described herein. When less than 5 % *trans*-3-hexen-1-ol and *cis*-3-hexen-1-ol mixture remained, the reaction was cooled to 0 °C. Salicylic acid excess precipitated as a white solid, which was filtered and washed with toluene. The filtrate was washed thrice with 3 % Na₂CO₃ (40 mL) and warmed to 50 °C to allow phase separation. The aqueous phase was washed with toluene (10 mL), the organic phases were combined, toluene was evaporated, and the crude was distilled to obtain *trans*-3-hexen-1-yl salicylate (67.5%) and *cis*-3-hexen-1-yl salicylate (18.5%) mixture as a colorless oil featuring purity of at least 86 % at 60 % yield, as determined by GC analysis.

Example 5: Preparation of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate mixture (by methyl salicylate):

In a 250ml flask equipped with a Dean-Stark head, a purified *trans*-3-hexen-1-ol (77.8%) and *cis*-3-hexen-1-ol (20%) mixture (68 gram, 0.684 mol, prepared according to Example A), and dibutyltin oxide (6.55 gram, 0.026 mmol) were heated to reflux at 115 °C. Methyl salicylate (80 grams, 0.52 mol) was added for 2 hours. Temperature was raised to 125 °C and heated for 3h. The presence of methyl salicylate was monitored by GC analysis as described herein. When about 20% of methyl salicylate remained, reaction was cooled to 80 °C and 50ml of cyclohexane were added. Temperature was raised to 125 °C and azeotrope distillation cyclohexane/methanol was proceeded until the presence of methyl salicylate was less than 0.5%. The reaction mixture was distilled with PEG-2000 to obtain a mixture of *trans*-3-hexenyl salicylate (78%) and *cis*-3-hexenyl salicylate (19.5%) as a colorless oil featuring purity of not less than 97% and yield of at least 60%. Odor of the final product was improved significantly after stirring for 84h at ambient conditions or introducing a deodorization process to the product mixture.

Odor Characterization

Odor was analyzed by odor panels that consisted of individuals (panelists) selected and trained following the "Guidelines for Selection and Training of Sensory Panel Members" (ASTM Special Technical Publication 758). The Dravnieks descriptors was used as an acceptable guide to score the impotency level of each descriptor from 0 (not exist) to 5 (very noticeable and important in the overall odor profile)

Based on the results obtained from the odor panelists, the average of each descriptor was concluded, and an odor profile was obtained. The odor descriptors data was gathered and displayed in the tables below.

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Odor characterization of mixture of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate and mixture of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate:

FIGs. 1A-B is an odor spider chart, presenting the odor description of mixture of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate alone (FIG.1A) and in comparison, with *cis*-3-hexen-1-yl acetate (FIG. 1B).

FIGs. 2A-B is an odor spider chart, presenting the odor description of mixture of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate alone (FIG. 2A) and in comparison, with *cis*-3-hexen-1-yl salicylate (FIG. 2B).

20 **Table 1**

Odor descriptors	(<i>cis</i>)-3-hexen-1-yl acetate	Mixture of <i>trans</i> -3-hexen-1-yl acetate and <i>cis</i> -3-hexen-1-yl acetate
Green (score)	2	4
Herbal (score)	3	3
Aromatic (score)	2	2
Sweet (score)	5	4
Dew like (score)	2	2
Fruity (score)	3	4
Floral (score)	2	3

As can be seen, the inventive mixture of *trans*-3-hexen-1-yl acetate and *cis*-3-hexen-1-yl acetate features high score of green, floral, fruity and sweet odor descriptors, which are higher by 1 or 2 score than those of the *cis*-3-hexen-1-yl acetate, indicating that it is a powerful odorant and may be used, *inter alia*, for providing mid- and top- notes in formulations and products containing same.

Odor descriptors such as fresh, green, herbal, aromatic, sweet, dew like, fruity, and floral, which are shared by the two substances, differ in score by more than 1.

Table 2

Odor descriptors	(<i>cis</i>)-3-hexen-1-yl salicylate	Mixture of <i>trans</i> -3-hexen-1-yl salicylate and <i>cis</i> -3-hexen-1-yl salicylate
Floral (score)	1-1.5	3
Herbal (score)	1	3
Powdery (score)	1	3
Gasoline solvent (score)	4	0
Mushroom-like (score)	3	0
Coconut-like (score)	0	2
Soapy (score)	0	1

The mixture of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate features floral, herbal, coconut-like odor with some dry and soapy odor descriptors.

As can be seen, odor descriptors such as floral, herbal, powdery, coconut-like, and powdery, which are shared by the *trans*-salicylate and *cis*-salicylate, differ in score by more than about 1 score.

As can be seen, while *cis*-3-hexen-1-yl salicylate features floral and herbal odor descriptors of 1 and 1.5 score, the mixture of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate features much higher score of floral and herbal odor descriptors – 3 score.

Cis-3-hexen-1-yl salicylate, also, features a high odor score of mushroom and gasoline solvent – 4 and 3 score, while the mixture of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl

salicylate features nearly nullified mushroom and gasoline solvent odor descriptors (less than 1 score),

In addition, mixture of *trans*-3-hexen-1-yl salicylate and *cis*-3-hexen-1-yl salicylate feature a desirable soapy and coconut like odor descriptors (about 1 and 2 score, respectively) which are absent in *cis*-3-hexen-1-yl salicylate.

The results above show that the mixture of *trans*-salicylate and *cis*-salicylate is a powerful odorant which could be used for providing mid- and top- notes in formulations and products containing same.

Although the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad scope of the appended claims.

It is the intent of the applicant(s) that all publications, patents, and patent applications referred to in this specification are to be incorporated in their entirety by reference into the specification, as if each individual publication, patent or patent application was specifically and individually noted when referenced that it is to be incorporated herein by reference. In addition, citation, or identification of any reference in this application shall not be construed as an admission that such reference is available as prior art to the present invention. To the extent that section headings are used, they should not be construed as necessarily limiting. In addition, any priority document(s) of this application is/are hereby incorporated herein by reference in its/their entirety.

WHAT IS CLAIMED IS:

1. A fragrance and/or flavor composition comprising a mixture of esters of *trans*-3-hexen-1-ol and esters of *cis*-3-hexen-1-ol.
2. The composition according to claim 1, wherein a fragrance and/or flavor composition comprises a mixture of the same esters of *trans*-3-hexen-1-ol and the *cis*-3-hexen-1-ol derived from a particular carboxylic acid or organic anhydride, or ester.
3. The composition according to any of claims 1, 2, wherein the ester of *trans*-3-hexen-1-ol is at a concentration in a range of from 55 % to 95 % by weight of the total composition and the ester of *cis*-3-hexen-1-ol is at a concentration in a range of from 5 % to 45 % by weight of the total composition.
4. The composition according to any of claims 1-3, wherein the weight ratio of the ester of *trans*-3-hexen-1-ol to the ester of *cis*-3-hexen-1-ol in the mixture is in a range of from 95:5 to 55:45.
5. The composition according to any of claims 1-4, featuring at least one odor descriptor that differs from the same odor descriptors of a respective ester of the *cis*-3-hexen-1-yl.
6. The composition according to any of claims 1-5, wherein the odor descriptor is selected from a group comprising: floral, herbal, aromatic, sweet, dew like, fruity, powdery, coconut, soapy, amber, ambreine, aquatic, balsamic, chypre, citrus, cologne, fresh, fougere, gourmand, green, mellis, oriental, spice, wood, anise, grapefruit, lavender, chamomile, rose, lemongrass, geranium, jasmine, lavender, cinnamon, pine, passion fruit, caramel, guava, pineapple, banana, melon, apple, berries, muguet, fig, strawberry, peach, watermelon, lily, verbena, cedarwood, sandalwood, vanilla, amber, patchouli, oak moss, musk, aquatic.
7. The composition according to any one of claims 1-6, wherein the ester is selected from a group comprising: acetate, salicylate, propionate, cyclopropionate, tiglate, isobutyrate, butyrate, 2-methyl butyrate, 2-methyl butanoate, 3-methyl butanoate, benzoate, aminobenzoate, anthranilate, crotonate, phenyl acetate, 2-methyl-2-pentenoate, hexanoate, heptanoate, octanoate,

nonanoate, decanoate, formate, isovalerate, lactate, levulinate, nicotinate, pyruvate, valerate, anisate, caproate, caprylate, cinnamate, dihydrocinnamate, palmitate, pivalate, senecioate, oct-2-ynoate, 5-hexanoate, 3-phenyl-2-propenoate, 3-methylbutyrate, 3-hydroxybutanoate and methyl carbonate.

8. The composition according to any of claims 1-7, wherein the ester is acetate.

9. The composition according to claim 8, comprising *trans*-3-hexen-1-yl acetate at a concentration of from 55 % to 95 % by weight and *cis*-3-hexen-1-yl acetate at a concentration of from 5 % to 45 % by weight, based on the weight of the total composition.

10. The composition according to any of claims 8-9, wherein the weight ratio of *trans*-hex-3-enyl acetate to *cis*-3-hexen-1-yl acetate is from 95:5 to 55:45.

11. The composition according to any of claims 8-10, featuring the odor descriptors which are alike, or differ by at least one odor descriptor than said odor descriptor of *cis*-3-hexen-1-yl acetate.

12. The composition according to any of claims 8-11, wherein the score of the odor descriptor differs by at least one score than said odor descriptor of *cis*-3-hexen-1-yl acetate.

13. The composition according to any of claims 8-12, having the odor descriptors comprising floral, green, herbal, aromatic, sweet, dew like, fruity odors.

14. The composition according to any of claims 1 - 7, wherein the ester is salicylate.

15. The composition according to claim 14, comprising a mixture of *trans*-3-hexen-1-yl salicylate at a concentration of from 55 % to 95 % by weight, and *cis*-3-hexen-1-yl salicylate at a concentration of from 5 % to 45 % by weight, based on the weight of the composition.

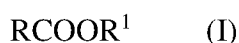
16. The composition according to any of claims 14-15, wherein the weight ratio of *trans*-hex-3-enyl salicylate to *cis*-hex-3-enyl salicylate in the mixture is in a range of from 95:5 to 55:45.

17. The composition according to any of claims 14-16, wherein the odor descriptors are alike, or differ by at least one odor descriptor than said odor descriptors of *cis*-3-hexen-1-yl salicylate.

18. The composition according to any one of claims 14-17, wherein the score of at least one odor descriptor differs by at least one score than said odor descriptor of *cis*-3-hexen-1-yl salicylate.

19. The composition according to any of claims 14-18, wherein the odor descriptors are floral, herbal, powdery, gasoline, mushroom-like, coconut-like, soapy.

20. A process of preparing of the composition of any of claims 1-19, comprising reaction of compound of formula I



wherein;

R is C₁-C₁₂ alkyl, C₁-C₁₂ alkyl carbonyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, aryl, heteroaryl, arylene, cycloalkyl, optionally interrupted by at least one heteroatom;

R¹ is hydrogen, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, aryl, heteroaryl, arylene, cycloalkyl, optionally interrupted by at least one heteroatom;

with a mixture of *trans*-3-hexen-1-ol present in an amount of from 55 % to 95 % by weight and *cis*-3-hexen-1-ol present in an amount of from 5 % to 45 % by weight, based on the weight of total mixture, in the presence of an esterification agent, optionally in the presence of a solvent.

21. A process according to claim 20, wherein the esterification agent is selected from a group comprising: sulfuric acid, p-toluenesulfonic, methanesulfonic acid, methanesulfonyl chloride, 4-hydroxybenzenesulfonic acid, dodecylbenzenesulfonic acid, trimethylsilyl triflate, phosphoric acid, dibutyltin oxide, dibutyltin diacetate, dioctyltin oxide, calcium oxide, magnesium oxide, titanium isopropoxide, 4-(dimethylamino)pyridine, potassium carbonate, sodium carbonate, sodium bicarbonate, sodium hydroxide, potassium bisulfate, potassium hydroxide, sodium methoxide, sodium ethoxide, alumina, sodium bisulfate, ammonium chloride, triethylamine, pyridine, imidazole, diisopropylethylamine, thionyl chloride, tosyl chloride, oxalyl chloride, hydrochloric acid, aluminum chloride, diisopropylcarbodiimide, amberlyst 15, and a mixture thereof.

22. A process according to claim 20, wherein the solvent is selected from a group comprising: water, toluene, dichloromethane, ethyl acetate, tetrahydrofuran, hexane, pentane, dimethylformamide, ethanol, acetonitrile, methanol, isopropanol, dimethyl sulfoxide, diisopropyl ether, acetone, heptane, xylene, *m*-xylene, pyridine, diethyl ether, benzene, *tert*-butanol, 2-methyl-2-butanol, 1,4-dioxane, *tert*-butyl methyl ether, chloroform, 1-propanol, 1,2-dichlorobenzene, octane, 1-butanol, chlorobenzene, 1,2-dichloroethane, *tert*-butyl acetate, cyclohexane, ethylene glycol, cyclopentyl methyl ether, and a mixture thereof.

23. A process of preparing of the composition according to any of claims 1-19, comprising reaction of compound of formula II



wherein;

R is C₁-C₁₂ alkyl, C₁-C₁₂ alkyl carbonyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, aryl, heteroaryl, arylene, cycloalkyl, optionally interrupted by at least one heteroatom;

R² is C₁-C₆ alkyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, aryl, heteroaryl, arylene, cycloalkyl, optionally interrupted by at least one heteroatom;

with a mixture of *trans*-3-hexen-1-ol present in an amount of from 55 % to 95 % by weight and *cis*-3-hexen-1-ol present in an amount of from 5 % to 45 % by weight, based on the weight of total mixture, optionally in the presence of a solvent.

24. A process according to claim 23, wherein the solvent is selected from a group comprising: water, toluene, dichloromethane, ethyl acetate, tetrahydrofuran, hexane, pentane, dimethylformamide, ethanol, acetonitrile, methanol, isopropanol, dimethyl sulfoxide, diisopropyl ether, acetone, heptane, xylene, *m*-xylene, pyridine, diethyl ether, benzene, *tert*-butanol, 2-methyl-2-butanol, 1,4-dioxane, *tert*-butyl methyl ether, chloroform, 1-propanol, 1,2-dichlorobenzene, octane, 1-butanol, chlorobenzene, 1,2-dichloroethane, *tert*-butyl acetate, cyclohexane, ethylene glycol, cyclopentyl methyl ether, and a mixture thereof.

25. An odor-imparting formulation comprising the composition according to any of claims 1-24.

26. An article-of-manufacturing comprising the odor-imparting formulation according to claim 25.

27. A flavor-imparting formulation comprising the composition according to any of claims 1-24.

28. An article-of-manufacturing comprising the flavor-imparting formulation according to claim 27.

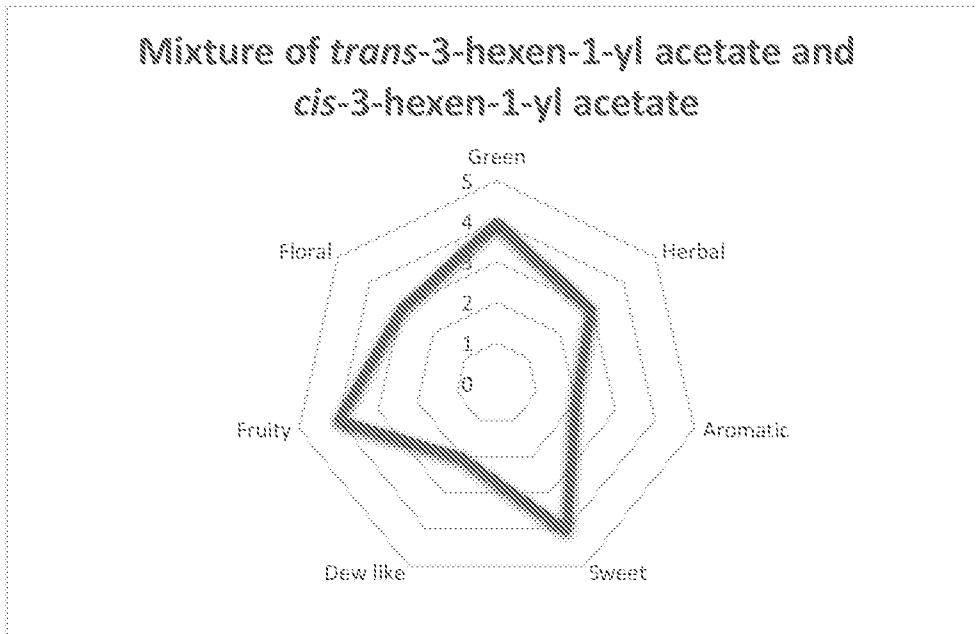


FIG. 1A

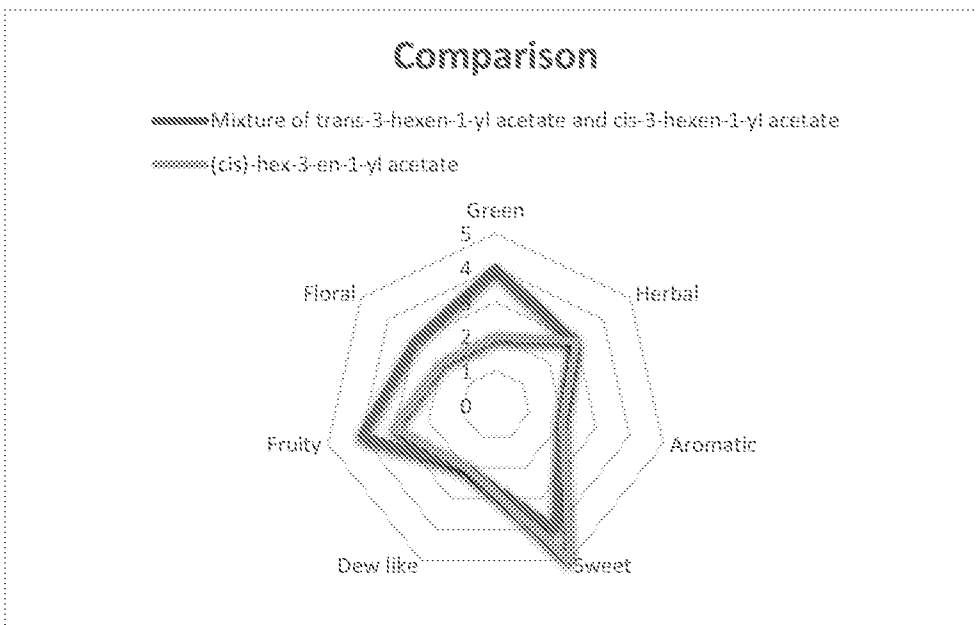


FIG. 1B

INTERNATIONAL SEARCH REPORT

International application No
PCT/IL2023/050391

A. CLASSIFICATION OF SUBJECT MATTER
INV. A23L27/20 A61Q13/00 C11B9/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A23L A61Q C11B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>JANZANTTI NATÁLIA S ET AL: "HS-GC-MS-O analysis and sensory acceptance of passion fruit during maturation", JOURNAL OF FOOD SCIENCE AND TECHNOLOGY, SPRINGER (INDIA) PRIVATE LTD, INDIA, vol. 54, no. 8, 8 May 2017 (2017-05-08), pages 2594-2601, XP036273207, ISSN: 0022-1155, DOI: 10.1007/S13197-017-2671-Z [retrieved on 2017-05-08] table 1</p> <p style="text-align: center;">----- -/--</p>	1, 25, 27

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

6 July 2023

14/07/2023

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Galleiske, Anke

INTERNATIONAL SEARCH REPORT

International application No
PCT/IL2023/050391

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>SOARES ET AL: "Volatile and non-volatile chemical composition of the white guava fruit (<i>Psidium guajava</i>) at different stages of maturity", FOOD CHEMISTRY, ELSEVIER LTD, NL, vol. 100, no. 1, 1 January 2007 (2007-01-01), pages 15-21, XP005517162, ISSN: 0308-8146, DOI: 10.1016/J.FOODCHEM.2005.07.061 table 2</p>	1, 25, 27
X	<p>AL-KATEB HUDA ET AL: "The relationship between growth stages and aroma composition of lemon basil <i>Ocimum citriodorum</i> Vis", FOOD CHEMISTRY, ELSEVIER LTD, NL, vol. 152, 7 December 2013 (2013-12-07), pages 440-446, XP028812372, ISSN: 0308-8146, DOI: 10.1016/J.FOODCHEM.2013.12.001 table 1</p>	1, 25, 27
X	<p>POLIDORO ALLAN DOS S ET AL: "Characterization of volatile fractions in green mate and mate leaves (<i>Ilex paraguariensis</i> A. St. Hil.) by comprehensive two-dimensional gas chromatography coupled to time-of-flight mass spectrometry (GCxGC/TOFMS)", MICROCHEMICAL JOURNAL, NEW YORK, NY, US, vol. 128, 9 April 2016 (2016-04-09), pages 118-127, XP029601489, ISSN: 0026-265X, DOI: 10.1016/J.MICROC.2016.03.019 table 1</p>	1
X	<p>US 2011/104089 A1 (WOEHRLE INGO [DE] ET AL) 5 May 2011 (2011-05-05)</p>	1-19, 25-28
Y	<p>claim 4</p>	1-19, 25-28
Y	<p>US 2010/087351 A1 (FADEL ADDI [US] ET AL) 8 April 2010 (2010-04-08) paragraph [0014]</p>	1-19, 25-28
X	<p>EP 3 290 087 B1 (PROCTER & GAMBLE [US]) 14 October 2020 (2020-10-14)</p>	1, 25, 27
Y	<p>paragraph [0003]</p>	1-19, 25-28
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INTERNATIONAL SEARCH REPORT

International application No
PCT/IL2023/050391

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	"cis-3-hexenyl hexanoate ED - Verhagen Hans; Leino Olli", FOOD AND CHEMICAL TOXICOLOGY, PERGAMON, GB, vol. 30, 1 January 1992 (1992-01-01), page 45, XP023810950, ISSN: 0278-6915 [retrieved on 1992-01-01] the whole document -----	20-24
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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