

CLAIMS

1. Composition tonality determination method (100), characterized in that it comprises:
- a step of inputting (105) at least one volatile molecule digital identifier, upon a
5 computer interface, said volatile molecule digital identifier being representative of a fragrant volatile molecule, said input defining a formula,
 - a step of calculating (110), by a computing system, for at least one volatile molecule digital identifier of the formula, a value representative of an impact of each said molecule on an activity level of an odorant receptor, represented by
10 an odorant receptor digital identifier, each volatile molecule digital identifier being associated with at least one odorant receptor digital identifier, said association being a many-to-many association and
 - a step of determining (115), by a computing system, for the formula and as a function of at least one odorant receptor activity level impact calculated and a
15 value representative of an odorant receptor activation threshold, a value representative of at least one tonality forming a composition, each odorant receptor digital identifier being associated with one tonality digital identifier, said association being a one-to-one association.
- 20 2. Method (100) according to claim 1, which comprises, downstream of the step of calculating (110), a step of computing (120), by a computing system, for at least one odorant receptor, a total activity level as a function of at least one impact on an activity level calculated.
- 25 3. Method (100) according to either claim 1 or 2, which comprises:
- a step of modification (125), upon a computer interface, of a value representative of a fragrance tonality of the composition,
 - a step of calculation (130), by a computing system, of a modification of total activity level of at least one odorant receptor,
 - 30 - a step of determination (135), by a computing system, of a set of at least one volatile molecule digital identifier presenting a total activity level impact value equal to the total activity level modification calculated,
 - a step of supplying (140) said set to a computer interface.

4. Method (100) according to claim 3, in which each tonality is associated to a tonality digital identifier, said method comprising a step of automatic tonality selection (145) as a function of the result of comparing the tonality digital identifiers of the composition to a set of at least one predetermined tonality digital identifier, the step of modification (125) of a value representative of a fragrance of said selected tonality identifiers of the composition being configured to reduce the value of said selected tonality identifiers to a reduced value, preferably to zero.
5. Method (100) according to any one of claims 1 to 4, in which the value representative of an impact of a molecule, represented by a volatile molecule digital identifier, on an activity level of an odorant receptor is representative of:
- the activation of said odorant receptor,
 - the deactivation of said odorant receptor,
 - the enhancement of said odorant receptor and/or
 - the inhibition of said odorant receptor.
6. Method (100) according to claim 5 and any one of claims 3 or 4, in which the step of determination (135) is configured to provide at least one volatile molecule digital identifier presenting a value representative of an impact on the activity of an odorant receptor associated to a tonality modified during the step of modification (125), said impact corresponding either to the enhancement of said odorant receptor or to the inhibition of said odorant receptor.
7. Method (100) according to any one of claims 1 to 5, which comprises:
- a step of selecting (150) a volatile molecule digital identifier of the formula, upon a computer interface,
 - a step of determination (155), by a computing system, of at least a set of at least one volatile molecule digital identifier presenting a value representative of an impact on an activity level of a odorant receptor equal to the value representative of the impact on the activity level on said odorant receptor of the selected volatile molecule digital identifier and
 - a step of supplying (140) said set to a computer interface.

8. Method (100) according to any one of claims 1 to 7, which comprises:

- a step of selecting (160) at least two volatile molecule digital identifiers of the formula, at least two said volatile molecules being associated with the activation of at least two distinct odorant receptors, called "target receptors",
- 5 - a step of determination (165) of one volatile molecule digital identifier presenting a value representative of an impact on an activity level of each target receptor equal to the value representative of the impact on the activity level on said odorant receptor of the selected volatile molecule digital identifiers and
- 10 - a step of supplying (140) the determined volatile molecule digital identifier to a computer interface.

9. Method (100) according to any one of claims 3 to 8, which comprises, downstream of either a step of determination (135, 155, 165), a step of estimation (170) of a quantity for at least one said volatile molecule digital identifier, said quantity being used in a
15 downstream step of supplying (140).

10. Method (100) according to any one of claims 3 to 9, in which a step of determination (135, 155), by a computing system, of at least a set of at least one volatile molecule digital identifier executes an optimization rule which is at least one of the following:

- 20 - a first rule in which a determined set of at least one volatile molecule digital identifier is configured to present a minimal number of volatile molecule digital identifiers,
- a second rule in which a determined set of at least one volatile molecule digital identifier is configured to present a minimal total quantity indicator of
25 corresponding volatile molecule digital identifiers,
- a third rule in which a determined set of at least one volatile molecule digital identifier is configured to present a minimal number of negative impact volatile molecule digital identifiers,
- 30 - a fourth rule in which at least one volatile molecule digital identifier is associated to a volatile molecule delivery capacity indicator, said rule being configured to adapt a determined set of at least one volatile molecule digital identifier as a function of said volatile molecule delivery capacity indicator for the volatile molecule digital identifiers in the set,

- a fifth rule in which a set of at least two volatile molecule digital identifier is configured to minimize the overlap of odorant receptors activated by said set of molecules,
- a sixth rule in which a set of at least two volatile molecule digital identifier is configured to minimize the modulation of the odorant receptors activated by said set of molecules,
- a seventh rule in which determined set of at least one volatile molecule digital identifier is configured to maximize the negative modulation or inhibition of odorant receptor linked to a predetermined undesired olfactory tonality,
- an eighth rule in which determined set of at least one volatile molecule digital identifier is configured to maximize the positive modulation or enhancement of odorant receptor linked to a predetermined desired olfactory tonality and/or
- a ninth rule in which determined set of at least one volatile molecule digital identifier is configured to minimize or maximize at least one cost function, each volatile molecule being associated to at least one value representative of cost.

11. Method (100) according to any one of claims 1 to 10, which comprises a step of inputting (175) quantity of at least one input volatile molecule, upon a computer interface, said quantity being used in the step of calculating (110), by a computing system, for at least one volatile molecule digital identifier of the formula, a value representative of an impact on an activity level of an odorant receptor.

12. Method (100) according to any one of claims 1 to 11, in which at least one volatile molecule digital identifier is associated to a volatile molecule delivery capacity indicator, at least one of steps of calculating (110), determination (135, 155, 165) being performed as a function of the volatile molecule delivery capacity indicator associated to at least one input volatile molecule digital identifier.

13. Method (100) according to claim 12, in which the volatile molecule delivery capacity indicator is representative of a substrate upon which the associated volatile molecule is located.

14. Formula determination method (200), characterized in that it comprises:

- a step of inputting (205), for at least one tonality digital identifier, upon a computer interface, a value representative of the tonality of a composition resulting from a formula to be determined,
- a step of determining (210), by a computing system, for the formula to be determined and as a function of at least one value representative of at least one tonality of said composition, a value of odorant receptor activity level for at least one odorant receptor digital identifier representative of said odorant receptor, each odorant receptor digital identifier being associated with at least one tonality digital identifier, said association being a one-to-one association, and
- a step of determination (215) of a formula represented by at least a set of at least one volatile molecule digital identifier presenting a value representative of an impact on the activity level of said odorant receptor digital identifier equal to the determined value representative of the activity level on said odorant receptor, each volatile molecule digital identifier being associated with at least one odorant receptor digital identifier, said association being a many-to-many association.

15. Composition tonality determination system (300), characterized in that it comprises:

- a means of inputting (305) at least one volatile molecule digital identifier, said volatile molecule digital identifier being representative of a fragrant volatile molecule, said input defining a formula,
- a means of calculating (310), for at least one volatile molecule digital identifier of the formula, a value representative of an impact on an activity level of each said molecule on an activity level of an odorant receptor, represented by an odorant receptor digital identifier, each volatile molecule digital identifier being associated with at least one odorant receptor digital identifier, said association being a many-to-many association and
- a means of determining (315), for the composition and as a function of at least one odorant receptor activity level impact calculated and a value representative of an odorant receptor activation threshold, a value representative of at least one tonality forming a composition, each odorant receptor digital identifier being associated with one tonality digital identifier, said association being a one-to-one association.

16. Formula determination system (400), characterized in that it comprises:

- a means of inputting (405), for at least one tonality digital identifier, upon a computer interface, a value representative of the tonality of a composition resulting from a formula to be determined,
- a means of determining (410), by a computing system, for the formula to be determined and as a function of at least one value representative of at least one tonality of said composition, a value of odorant receptor activity level for at least one odorant receptor digital identifier representative of said odorant receptor, each odorant receptor digital identifier being associated with one tonality digital identifier, said association being a one-to-one association, and
- a means of determination (415) of a formula represented by at least a set of at least one volatile molecule digital identifier presenting a value representative of an impact on the activity level of said odorant receptor digital identifier equal to the determined value representative of the activity level on said odorant receptor, each volatile molecule digital identifier being associated with at least one odorant receptor digital identifier, said association being a many-to-many association.