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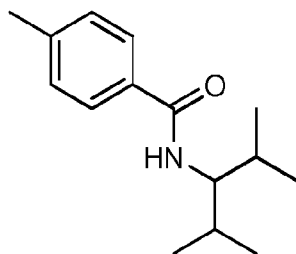
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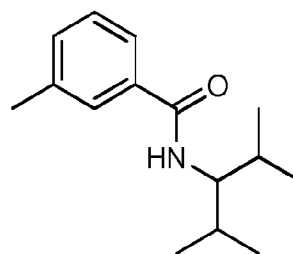
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(54) Title: N-(2,4-DIMETHYLPENTAN-3-YL)-METHYLBENZAMIDES AND THEIR USE AS FLAVORING AGENTS



(I)

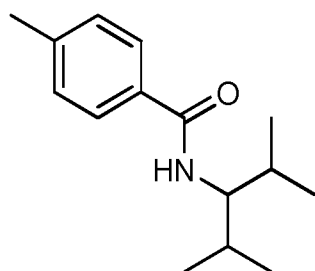


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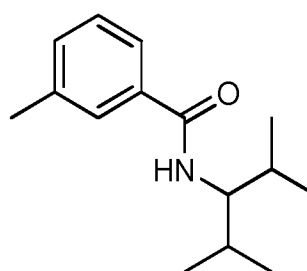
(57) Abstract: The present invention primarily relates to the amides of Formulae (I) and (II) (see below) and mixtures thereof, and to the use thereof as flavoring agents. The compounds in accordance with the present invention are suitable for producing, imparting, or intensifying an umami flavor and/or a physiological cooling effect. The invention further relates to flavoring mixtures, compositions for oral consumption as well as ready-to-eat, ready-to-use and semifinished products, comprising an effective amount of the compound of Formula (I) and/or Formula (II) and to specific methods for producing, imparting, modifying and/or intensifying specific flavor impressions.

### N-(2,4-Dimethylpentan-3-yl)-methylbenzamides and their use as flavoring agents

The present invention primarily relates to the amides of Formulae (I) and (II) (see below) and mixtures thereof, and to the use thereof as flavoring agents. The compounds in accordance with the present invention are suitable for producing, imparting, or intensifying an umami flavor and/or a physiological cooling effect. The invention further relates to flavoring mixtures, compositions for oral consumption as well as ready-to-eat, ready-to-use and semifinished products, comprising an effective amount of the compound of Formula (I) and/or Formula (II) and to specific methods for producing, imparting, modifying and/or intensifying specific flavor impressions.

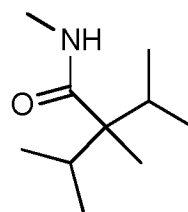
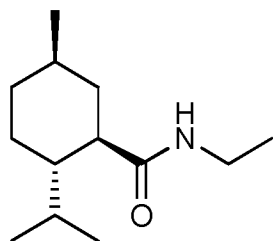


(I)



(II)

Sensorially important amides include the spicing agents capsaicin from chilli and piperine of pepper. Several naturally occurring alkamides, such as spilanthol, display, in addition to a salivatory and tingling effect, a long-lasting and numbing effect in the oral cavity. Several important physiological cooling agents, such as WS-3 (FEMA 3455) and WS-23 (FEMA 3804), have an amide structure (FEMA = Flavor and Extract Manufacturers' Association):



WS-3 (FEMA 3455 )

WS-23 (FEMA 3804)

One of the basic tastes is the "umami" flavor, produced upon oral consumption of monosodium glutamate (sodium glutamate, "MSG"). MSG is known to produce adverse reactions in some people, and some progress has been made in identifying artificial  
5 substitutes for MSG. It is known that a few naturally occurring materials can increase or enhance the effectiveness of MSG as a savory flavoring agent, so that less MSG would be needed for a given flavoring application. For example the naturally occurring nucleotide compounds inosine monophosphate (IMP) or guanosine monophosphate (GMP) are known to have a multiplier effect on the savory taste of MSG, but IMP and  
10 GMP are very difficult and expensive to isolate and purify from natural sources, or synthesize, and hence have only limited practical application to most commercial applications. New flavoring agents able to provide a taste profile similar to that of MSG, in order to partially or fully substitute MSG in a flavor, or new compounds that enhance the effectiveness of MSG in order to substitute IMP or GMP as MSG enhancers, could  
15 be of high value.

In the past years some alternative substances have been described as being able to create or enhance umami taste, in particular for replacing monosodium glutamate. Some of these "umami"-compounds have already been awarded GRAS (generally recognized as safe) status by the FEMA for use in food products.

20 According to US 2004/0202760 and US 2004/0202619 N-cyclopropyl-E2,Z6-nonadienamide (FEMA 4087), N-ethyl-E2,Z6-dodecadienamide and N-ethyl-E2,Z6-nonadienamide (FEMA 4113) create an umami-like impression.

US 2006/057268 and US 2006/068071 disclose certain amides, such as *N*-3,7-dimethyl-2,6-octadienyl cyclopropylcarboxamide (FEMA 4267), as intensifier for salt and umami  
25 taste impressions.

US 2005/084506 A1 describes a large number of flavor-active amides, for example *N*-(heptan-4-yl)benzo[d][1,3]dioxol-5-carboxamide (FEMA 4232).

US 2006/0045953 discloses a very large number of aromatic amides and ureas as sweet or umami flavor modifiers, tastants and taste enhancers.

30 US 2008/0292763 teaches certain substituted neo-menthyl - derivatives, cyclopropanecarboxylic acid (3-methyl-cyclohexyl)amides, as flavoring agents, in particular as umami substances.

US 2009/0311401 and US 2009/0110796 propose certain neomenthyl derivatives as flavor materials mainly having umami and/or salty taste. US 2009/0311401 inter alia describes the flavor profile of the racemate of (1S,2S,5R)-2-isopropyl-5-methylcyclohexyl ethyl carbamate as "cooling, umami, menthol note".

- 5 US 2009/0280230 proposes the use of certain savory taste modifiers as flavoring agents and/or enhancers of monosodium glutamate in a process for preparing a solid flavorant concentrate composition or a lipophilic savory flavorant concentrate composition.

10 In US 2010/0189863 it is stated that different stereoisomers of 2-isopropyl-5-methyl-bicyclo[4.1.0]heptane-7-carboxylic acid ethylamide have significantly different sensory properties. For example, (1S,2S,5R,6R,7S)-2-isopropyl-5-methyl-bicyclo[4.1.0]heptane-7-carboxylic acid ethylamide was reported as having a slight cooling effect, but only a moderate umami taste, whereas (1R,2S,5R,6S,7R)-2-isopropyl-5-methyl-bicyclo[4.1.0]heptane-7-carboxylic acid ethylamide showed no cooling effect, but a very  
15 strong umami taste.

US 2011/0020517 suggests certain pyridine-derivatives to impart or enhance a kokumi or umami taste.

There remains in the art a need for new and preferably improved flavoring agents, i.e. flavor-active compounds or compounds which can produce, impart, modify or intensify a  
20 flavor impression. In particular, there is a demand for compounds of the type that can produce, impart, modify or intensify the „umami“ impression. In particular, flavoring agents providing a complex and multi-facetted taste profile, e.g. one or more further flavor aspects in addition to an umami taste, are of particular interest. In combination  
25 with other flavoring agents, preferably of certain taste directions, such flavoring agents would allow the creation of interesting sensorial impressions and exceptional taste profiles.

The object of the present invention was therefore to provide one or more compounds and corresponding methods and uses by means of which certain flavor notes, preferably of the „umami“ type, can be produced, imparted, modified or intensified (enhanced).

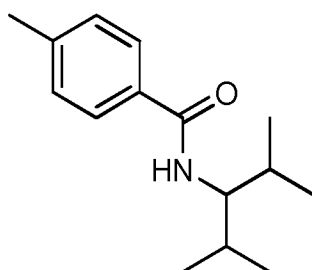
30 Compounds of the umami type may well be combined with other sensorially active substances imparting one or more flavor impressions such as warming, hot, tingling, numbing, sulfurous, alliaceous, phenolic, smoky, tangy (sharp) and/or pungent flavor

notes. Although such flavor notes are often characteristic for a certain flavor direction, these notes are often experienced as unpleasant, objectionable and/or disturbing, in particular as too strong or too dominant within a flavor profile. However, without these flavor notes or without the substances producing these flavor notes, the flavor direction  
5 would be experienced as less typical, less authentic, less valuable, and often would be less preferred by consumers.

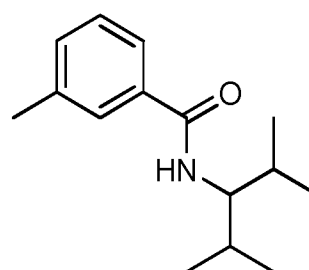
It would thus additionally be desirable if the one or more new compounds would be able not only to produce or enhance certain desired notes, but also reduce one or more unwanted notes, improve and/or round off the overall flavor profile without impairing or adulterating it to an appreciable extent.

In particular, said one or more new compounds should be able to enhance, intensify and/or round off one or more sensory impressions of one or more other flavoring substances, wherein preferably one, several or all of the sensory impressions mouthfeel, meaty, roasty, salty, mouth-watering and long-lastingness of said or more  
15 other flavoring substances are enhanced, intensified, and/or rounded off.

According to the present invention, this object is achieved by (using) a compound of Formula (I) or of Formula (II)



(1)



(11)

The chemical name of the compound of Formula (I) is N-(2,4-dimethylpentan-3-yl)-4-methylbenzamide. The chemical name of the compound of Formula (II) is N-(2,4-dimethylpentan-3-yl)-3-methylbenzamide.

25 The present invention also relates to a mixture of compounds comprising, essentially consisting of or consisting of compounds of Formulae (I) and (II), wherein the ratio by weight of the compound of Formula (I) to the compound of Formula (II) preferably is in

the range of 98 : 2 to 2 : 98, more preferably in the range of 25 : 1 to 1 : 25, even more preferably in the range of 10 : 1 to 1 : 10, even more preferably in the range of 6 : 1 to 1 : 6.

5 The compounds of Formula (I), of Formula (II), and the mixtures thereof were found to have interesting sensorial properties allowing to produce, impart, modify or intensify an „umami“ impression. Further, the compounds of Formula (I), of Formula (II), and the mixtures thereof provide a multi-facetted taste profile, namely a slight, but noticeable and interesting physiological cooling effect in addition to a pronounced umami taste. Without wishing to be bound by theory, and although the reason for these various  
10 sensory effects observed and described hereinafter in detail is not fully understood, it may be assumed that the combination of a pronounced umami taste and a subsidiary physiological cooling effect is relevant for achieving the diverse sensory effects.

Although the compounds of Formula (I), of Formula (II), and the mixtures thereof primarily exhibit umami taste properties and additionally a weak cooling effect, they do  
15 not impart flavor notes of peppermint or menthol, in particular they lack the unwanted harsh or bitter notes often associated with menthol.

In combination with other flavoring agents, preferably of certain taste directions indicated below, the compounds of Formula (I), of Formula (II), and the mixtures thereof allow the creation of interesting sensorial impressions and exceptional taste profiles.

20 The compounds of Formula (I), of Formula (II), and the mixtures thereof are able to enhance, intensify, round off, harmonize, balance, smooth and/or mellow one or more sensory impressions of one or more other flavoring substances, preferably of one or more other flavoring substances producing or imparting one, several or all of the sensory impressions mouthfeel (sometimes also called “fullness in the mouth”), meaty,  
25 roasty, salty, mouth-watering and long-lastingness.

In particular, in combination with other flavoring substances producing a warming, hot, tingling, numbing, sulfurous, alliaceous, phenolic, smoky, tangy and/or pungent (piquant) flavor impression, the compounds of Formula (I), of Formula (II), and the mixtures thereof are able to produce a flavor profile that is perceived as smoother,  
30 mellower, rounder (more rounded-off), more harmonious, more balanced and more pleasant, thus as having overall improved flavor properties.

The presence and the position of the methyl group on the aromatic ring of the compounds of Formulae (I) and (II) was found to be important for achieving the observed sensory effects and taste properties.

5 In contrast to the compounds of Formula (I) and/or (II) the isomeric compound N-(2,4-dimethylpentan-3-yl)-2-methylbenzamide (cf. Formula (YY) hereinbelow), i.e. the corresponding ortho-methyl isomer, does not impart or enhance an umami sensory effect, nor a physiological cooling sensation. The same was found to apply for the structurally closely related compounds 2-chloro-N-(2,4-dimethylpentan-3-yl)benzamide and 2-iodo-N-(2,4-dimethylpentan-3-yl)benzamide.

10 Surprisingly, it was also found that the absence of a methyl group on the phenyl ring resulted in an almost complete loss of sensorial properties, i.e. N-(2,4-dimethylpentan-3-yl)benzamide was found not to be sufficiently active as a flavoring agent and did in particular not impart or enhance umami and physiological cooling properties to a noticeable extent.

15 In another aspect, the present invention therefore relates to the use of a

- (i) compound of Formula (I) or a compound of Formula (II),
- (ii) mixture of compounds of Formulae (I) and (II),
- or
- (iii) a composition comprising one or both compounds of Formulae (I) and (II),

20

as food additive, beverage additive, and/or flavoring agent.

Our own sensory tests revealed that the compounds of Formulae (I) and (II) according to the present invention or the above-described mixtures can impart or modify the above  
25 mentioned sensory effects in MSG-reduced or in MSG-free orally consumable compositions.

The initial flavor impact, the flavor profile and the longer-lastingness - and thus also the overall sensory experience - was generally felt to be pleasant and multifaceted, in many cases even preferred and more varied in comparison to corresponding flavor containing  
30 MSG instead of the compounds of Formulae (I) and (II).

The compounds of the Formulae (I) and (II) produce an umami taste and intensify or enhance the umami taste of flavored compositions. In our own investigations a trained

panel found, in a statistically significant manner, that simply by adding 20 ppm of the compound to a bouillon of 0.5 wt.% of beef extract, the umami-effect observed was roughly the same as is achieved by the addition of 0.05 wt.% (500 ppm) of MSG.

5 The flavor impressions mouthfeel, salty, meaty, roasty, sweet, sour, mouth-watering and long-lastingness were intensified by the addition of the compounds of the Formulae (I) and (II), in some cases they were even stronger enhanced when using the compounds of the Formulae (I) and (II) as compared to using MSG (see Sensory Test 2 described in detail hereinbelow).

10 In a preferred embodiment, the present invention relates to the use of a compound of Formula (I) and/or a compound of Formula (II), or a composition comprising one or both compounds of Formulae (I) and (II), as flavoring agent for

(i) producing, imparting, or intensifying an umami flavor and/or a physiological cooling effect,

and/or

15 (ii) enhancing, intensifying and/or rounding off one or more sensory impressions of one or more other flavoring substances [i.e. flavoring substances not corresponding to Formulae (I) and (II) or not comprising a compound of Formulae (I) and (II)], wherein preferably one, several or all of the sensory impressions mouthfeel, meaty, roasty, salty, mouth-watering and long-lastingness of said or more other flavoring substances are  
20 enhanced, intensified, and/or rounded off (i.e. the flavor profile and overall taste is harmonized and smoothed, e.g. the sensory impression is improved because being less sharp, less pungent, more natural, and more balanced).

In a preferred aspect, the present invention relates to the use of a compound of Formula (I) and/or a compound of Formula (II), or a composition comprising one or both  
25 compounds of Formulae (I) and (II), for producing, imparting, modifying or intensifying an umami flavor, preferably an umami flavor and a weak physiological cooling effect.

It was further found in the course of our own investigations that the above described sensory effects and the prominent performance were particularly and in a more pronounced manner observed in liquid compositions. For example, when the  
30 compounds of Formulae (I) and (II) were evaluated as part of a solid food product (e.g. solid snacks like crackers, chips, nuts, beef jerky and the like), the sensory effects described above were somewhat weaker in comparison to the same concentration of



the compounds of Formulae (I) and (II) in a non-solid food product (e.g. wet soups, spreads, spicy sauces, creams, pastes, and the like).

In the context of the present invention, the term "flavor" includes both gustatory and nasal sensory impressions, perceptions and effects. Thus, the term "flavor" includes the  
5 taste perceived on the tongue and the smell (aroma, bouquet) perceived in the nose (via orthonasal and/or retronasal perception). However, regarding the sensory effects umami, mouth-watering, and mouthfeel (and preferably also physiological cooling), the term "flavor" is understood as relating to taste impressions, perceptions and effects, since said sensory effects mainly or solely occur in the mouth and/or on the tongue.

10 In the context of the present invention, the term "sensorially effective amount" defines an amount sufficient to produce a flavor impression upon oral consumption, in particular an umami and/or a physiological cooling impression, and/or to modify (including intensifying, enhancing, rounding off, reducing unwanted notes, and the like) the perception of a flavor of one or more other flavoring agents, in particular other flavoring  
15 agents producing or imparting one, several, or all of the following aspects or sensory effects mouthfeel, meaty, roasty, salty, mouth-watering and long-lastingness.

In the context of the present invention, "essentially consists of" or "essentially consisting of" means that the total weight share is 92 wt.% or more, preferably 95 wt.% or more, more preferably 96 wt.% or more, most preferably 97 wt.% or more, based on the total  
20 respective mass used.

The compounds of Formula (I) and (II) may be obtained in analogy to well-known synthetic methods.

For example, for manufacturing the compounds of Formula (I) or (II) via the Schotten-Baumann reaction, to the respective (para- or meta-) toluoyl chloride or (para- or meta-)  
25 toluoyl bromide (optionally in a solvent) are slowly added 1.5 - 5 molar equivalents of 2,4-dimethylpentan-3-amine (CAS No. 4083-57-2), optionally in the presence of an inorganic base or tertiary organic base (preferably in the presence of at least one molar equivalent of sodium hydroxide, potassium hydroxide or pyridine). The resulting mixture is then generally allowed to warm to about 20 °C and stirred further for 1 to 12 hours.  
30 Subsequently, the reaction mixture may be diluted with an organic solvent (such as dichloromethane or ethyl acetate), and after separation of the phases the solvents are removed from the organic phase. The residue obtained may be further purified, for

example by chromatographic (e.g. HPLC) or thermal (e.g. distillation) methods, to give the compounds of Formula (I) or (II) in high purity.

Also the reaction of the respective (para- or meta-) methyl benzoic acid and 2,4-dimethylpentan-3-amine via dehydration yields the compounds of Formula (I) and (II),  
5 preferably by using carbodiimides as dehydrating agents. For this reaction, generally the respective methyl substituted benzoic acid (toluic acid) is reacted with 1 – 3 molar equivalents of 2,4-dimethylpentan-3-amine in the presence of 1.25 – 5 molar equivalents of a carbodiimide (preferably dicyclohexylcarbodiimide (DCC), diisopropylcarbodiimide (DIC), or 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide (EDC)  
10 or its hydrochloride) in a solvent like dichloromethane, DMF or NMP.

Alternatively, reacting the respective methyl benzoic acid and 2,4-dimethylpentan-3-amine may also be performed in the presence of a tertiary amine (such as triethyl amine), certain isonitriles, and optionally hydroxysuccinimide, as described in US 4,442,029.

15 Similarly, other methods known to the skilled person for synthesizing amides are also suitable for obtaining the compounds of Formulae (I) and (II).

According to a further aspect, the present invention relates to a flavoring mixture comprising

(A) a sensorially effective amount of a compound of Formula (I) or (II) or of a mixture  
20 of the compounds of Formulae (I) and (II) as defined above,

and

(B) a sensorially effective amount of one or more, preferably two or more, more preferably three or more other ingredients [i.e. additional ingredients not  
25 corresponding to Formulae (I) and (II)] selected from the group of substances imparting one or more sensory (preferably one or more flavor) impressions, preferably substances imparting one or more sensory impressions selected from the group consisting of warming, heating, tingling, numbing, stinging, salivating (i.e. salivation-inducing substances), sulfurous, alliaceous (i.e. substances part of  
30 the aroma or reminiscent of *Allium* species), pungent (piquant), meat, fish, seafood, seaweed, mushroom, aromatic, smoky, tangy, spicy, herbal, savory, and mouthfeel.

Preferably, a flavoring mixture according to the present invention, comprises one or more, more preferably two or more, even more preferably three or more additional ingredients of group (B) are selected from the group consisting of constituents (B-1), (B-2), (B-3), (B-4), (B-5), (B-6), and (B-7)

- 5 (B-1) substances selected from the group consisting of physiologically warming and/or tingling sensates,

(B-2) aroma molecules imparting one or more sulfurous, alliaceous and/or pungent notes, preferably selected from the group consisting of notes associated with radish, horseradish, wasabi, mustard, onion, garlic, leek, shallot, chive, and cress,

- 10 preferably selected from the group consisting of sulfur-containing aroma molecules with a molecular weight of less than 300 g/mol, preferably selected from the group consisting of thiols (mercaptans), thioethers, disulfides, trisulfides, thiophenes, thiocyanates, isothiocyanates, thionoesters, thioesters, dithiines, dithianes, dithiazines, pentathiepanes, tetrathianes, dithiolanes, trithiolanes, and S-oxides, more preferably  
15 with a molecular weight of less than 290 g/mol, more preferably with a molecular weight of less than 270 g/mol, particularly preferably with a molecular weight of less than 250 g/mol, most preferably with a molecular weight of less than 235 g/mol,

(B-3) aroma molecules found in meat or contributing to the aroma of meat, preferably selected from the group consisting of

- 20 C4-C12-pyrazines (i.e. pyrazines having a total of 4 to 12 carbon atoms), C5-C12-pyridines, C4-C12-pyrroles, C4-C12-pyrrolines, C4-C10-oxazolines C4-C10-thiazoles, C4-C10-thiazolines, C3-C8-thiazolidines, C4-C12-furans, C4-C12-furanones, straight- or branched-chain alkanals having a total of 4 to 15 carbon atoms, straight- or branched-chain alkanols having a total of 5 to 10 carbon atoms, C4-C15-ketones, gamma-  
25 lactones having an even-number of total carbon atoms in the range of 6 to 12 carbon atoms, delta-lactones having an uneven-number of total carbon atoms in the range of 7 to 13 carbon atoms, C4-C8-alkanoic acids, C6-C15-hydrocarbons, and C16-C30-alkanoic acids having 0 to 5 (i.e. 0, 1, 2, 3, 4 or 5) carbon-carbon-double bonds, and C6-C12-phenols with 1 or 2 hydroxyl groups and 0 to 2 (i.e. 0, 1 or 2) methoxy groups,

- 30 (B-4) aroma molecules imparting one or more sensorial impressions selected from the group consisting of thyme, clove, cinnamon, pimento, black pepper, white pepper, red

chili, green chili, anise, lemongrass, vanilla, coconut, caramel, coriander, ginger, basil, sweet basil, tarragon, lemon, curry, fenugreek, and lime,

(B-5) amino acids, preferably selected from the group consisting of amino carboxylic acids and amino sulfonic acids, and the physiologically acceptable salts thereof,

5 (B-6) further flavor enhancers for meaty and/or roasty notes,

and

(B-7) substances selected from the group consisting of beef extract, soy sauce, soy sauce extract, soy protein, yeast extract, autolyzed yeast extract, malt extract, hydrolyzed vegetable protein, whey protein, caseinate, and barley extract, preferably in  
10 dry (i.e. essentially water-free, preferably water-free), more preferably in powdered form.

The agents of constituent (B1) - upon oral consumption - produce a perception of a physiological warming, hot, burning and/or tingling sensation to the consumer, and may additionally be accompanied by a numbing and/or pungent sensation.

The aroma molecules of constituent (B3) contribute to the flavor profiles of cooked  
15 and/or smoked meat, in particular boiled, roasted, grilled, fried or smoked meat, in particular boiled, roasted, grilled, fried or smoked beef. The sensory impression "meat" preferably relates to cooked meat. Based on sensory evaluation, several different qualities or descriptors are generally used to describe the flavor of cooked meat: buttery, caramel, burnt/roasty, green, oily/fatty, nutty and meaty. Constituent (B3) also  
20 includes aroma molecules typically found in smoke (flavor), e.g. obtained by pyrolysis of wood.

A preferred flavoring mixture according to the present invention comprises one or more, preferably two or more, more preferably three or more additional ingredients selected from the group consisting of constituents (B-1), (B-2), (B-3), (B-4), (B-5), (B-6), and (B-  
25 7), wherein constituent

(B-1) comprises or consists of substances selected from the group consisting of spilanthol (2E,6Z,8E-decatrienoic acid N-isobutylamide), 2E,6Z,8E,10E-dodecatetraenoic acid N-(2-methylpropyl)amide ([alpha]-sanshool), 2E,6Z,8E,10E-dodecatetraenoic acid N-(2-hydroxy-2-methylpropyl)amide [alpha]-hydroxysanshool),  
30 2E,6E,8E,10E-dodecatetraenoic acid N-(2-hydroxy-2-methylpropyl)amide ([gamma]-hydroxysanshool), 2E,4E,8Z,10E,12E-tetradecapentaenoic acid N-(2-hydroxy-2-

- methylpropyl)amide ([gamma]-hydroxysanshool), 2E,4E,8E,10E,12E-tetradecapentaenoic acid N-(2-hydroxy-2-methylpropyl)amide ([gamma]-hydroxyisosanshool), 2E,4E,8Z,10E,12E-tetradecapentaenoic acid N-(2-methyl-2-propenyl)amide ([gamma]-dehydrosanshool), 2E,4E,8Z,10E,12E-tetradecapentaenoic acid N-(2-methylpropyl)amide ([gamma]-sanshool), 2E,4E,8Z,11Z-tetradecatetraenoic acid N-(2-hydroxy-2-methylpropyl)amide (bungeanol), 2E,4E,8Z,11E-tetradecatetraenoic acid N-(2-hydroxy-2-methylpropyl)amide (isobungeanol), 2E,4E,8Z-tetradecatrienoic acid N-(2-hydroxy-2-methylpropyl)amide (dihydrobungeanol), 2E,4E-tetradecadienoic acid N-(2-hydroxy-2-methylpropyl)amide (tetrahydrobungeanol), 2E,4E-decadienoic acid N-isobutylamide (trans-pellitorine), 2E,4Z-decadienoic acid N-isobutylamide (cis-pellitorine), 2Z,4Z-decadienoic acid N-isobutylamide, 2Z,4E-decadienoic acid N-isobutylamide, 2E,4E-decadienoic acid N-([2S]-2-methylbutyl)amide, 2E,4E-decadienoic acid N-([2S]-2-methylbutyl)amide, 2E,4E-decadienoic acid N-([2R]-2-methylbutyl)amide, 2E,4Z-decadienoic acid N-(2-methylbutyl)amide, 2E,4E-decadienoic acid N-piperide (achilleamide), 2E,4E-decadienoic acid N-piperide (sarmentine), 2E-decenoic acid N-isobutylamide, 3E-decenoic acid N-isobutylamide, 3E-nonenoic acid N-isobutylamide, 2E,7Z,9E-undeca-2,7,9-trienoic acid N-isobutyl amide, 2E-undeca-2-en-8,10-diynoic acid N-isobutyl amide,
- vanillyl alcohol n-propyl ether, vanillyl alcohol isopropyl ether, vanillyl alcohol n-butyl ether, vanillyl alcohol isobutyl ether, vanillyl alcohol isoamyl ether, vanillyl alcohol n-hexyl ether, vanillyl alcohol methyl ether, vanillyl alcohol ethyl ether, gingerols (preferably 6-gingerol, 8-gingerol, 10-gingerol), gingerdiones (preferably gingerdione-[2], gingerdione-[3], gingerdione-[4], gingerdione-[6], gingerdione-[8], gingerdione-[10], gingerdione-[12]), shogaols (preferably [6]-shogaol, [8]-shogaol, [10]-shogaol), paradols (preferably [6]-paradol, [8]-paradol, [10]-paradol), zingerone, capsaicin, dihydrocapsaicin, nordihydrocapsaicin, homocapsaicin, homodihydrocapsaicin, pseudocapsaicin (nonivamide; N-[(4-hydroxy-3-methoxyphenyl)methyl]nonanamide),
- chavicine, piperine, 1'-acetoxychavicol, 1'-acetoxychavicol acetate, polygodial, warburganal, muzigadial, merulidial, acetylmerulidial, aframodial, cinnamodial, cinnamolide, cinnamosmolide, capsicodendrin, velleral, isovelleral, isoisovelleral, isodrimeninol,
- echinacea extract, jambu oleoresin, ginger oleoresin, ginger extract, pepper extract (Piper spp., in particular P. nigrum, P. hispidum, P. tuberculatum, P. longum, P.

arboreum, *P. futokadsura*, *P. guineense*, *P. sarmentosum*), black pepper extract, red pepper oleoresin, red pepper oil, Japanese pepper extract, extracts of toothache grass (*Ctenium aromaticum*), extracts of tarragon (*Artemisia dracunculus*), pellitory root extracts (*Anacyclus* spp., in particular *Anacyclus pyrethrum* L.), echinacea extracts (Echinaceae spp., for example *E. angustifolia*), extracts of Szechuan pepper (*Zanthoxylum* spp., in particular *Zanthoxylum piperitum*, *Z. clava-herculin*, *Z. bungeanum*, *Z. zanthoxyloides*), *Spilanthes* or paracress extracts (*Spilanthes* spp., in particular *Spilanthes acmella*), extracts of *Acemella* spp. (for example *A. ciliata*), extracts of *Achillea* spp. (for example *Achillea wilsoniana*), extracts of *Fagara* species (*Fagara zanthoxyloides*), extracts of *Heliopsis* spp. (preferably *H. longipes*), extracts of *Cissampelos glaberrima*, extracts of *Diosperma erythrocarpa*, bark extracts of *Esenbeckia alata*, extracts of *Stauroanthus perforatus*, extracts of water pepper (*Persicaria hydropiper*),

and/or

(B-2) comprises or consists of methanethiol (methyl mercaptan), ethanethiol (ethyl mercaptan), propanethiol, isopropylthiol, allyl mercaptan, furfuryl mercaptan, 5-methyl-2-furfurylthiol, dimethyl sulfide, diallyl sulfide, methyl propyl sulfide, methyl isopropyl sulfide, dimethyl disulfide, diethyl sulfide, dipropyl disulfide, diallyl disulfide, allyl propyl disulfide, methyl isopropyl disulfide, methyl propyl disulfide, propyl propenyl disulfide, difurfuryl disulfide, furfuryl methyl disulfide (methyl 2-furyl methyl disulfide), bis(2-methyl-3-furyl) disulfide, dimethyl trisulfide, diisopropyl trisulfide, dipropyl trisulfide, allyl methyl trisulfide, ethyl methyl trisulfide (2,3,4-trithiahexane), diallyl trisulfide, 2,3,5-trithiahexane (methyl disulfanylmethylsulfanylmethane), allyl isothiocyanate, phenylethyl isothiocyanate, cyclopropyl isothiocyanate, butyl isothiocyanate, 3-methylthiopropyl isothiocyanate, 4-hydroxybenzyl isothiocyanate, 4-methoxybenzyl isothiocyanate, sulforaphane (1-isothiocyanato-4-methylsulfanylbutane), 3-methylthiopropional (3-methylsulfanyl propanal; methional), 3-(methylthio) hexan-1-ol, 3-mercaptohexan-1-ol, 3-mercaptohexyl acetate, 3-mercaptohexyl butyrate, S-methyl thioacetate, 2-methylthiophene, 2-ethylthiophene, 2-propylthiophene, 2-butylthiophene, 2-hexylthiophene, 2-octylthiophene, 2,5-dimethylthiophene, 2-acetylthiophene, 3-(methylthiomethyl)thiophene, 2-thiophenyl methanethiol, 3-methyl-2-thiophenyl methanethiol, methyl-1,3-dithiolane, 3,5-dimethyl-1,2,4-trithiolane, allicin (2-propene-1-sulfinothioic acid S-2-propenyl ester), ajoene ((E/Z)-4,5,9-trithiadodeca-1,6,11-triene 9-oxide), 3-[(prop-2-ene-1-sulfinyl)sulfanyl]prop-1-ene, 3-vinyl-(4*H*)-1,2-dithiin, 2-vinyl-(4*H*)-1,3-dithiin, syn-propanethial S-oxide, syn-butanethial S-oxide, 2,4,6-trimethyl-

perhydro-1,3,5-dithiazine, 2,4,6-trimethyldihydro-4H-1,3,5-dithiazine, 2,4,6-triethyldihydro-4H-1,3,5-dithiazine, 2-isopropyl-4,6-dimethyldihydro-1,3,5-dithiazine, 4-isopropyl-2,6-dimethyldihydro-1,3,5-dithiazine, 2,4,6-triisobutyl-5,6-dihydro-4H-1,3,5-dithiazine, 2-methyl-(3-methylthio)-furan, 2-methylfuran-3-thiol, 2-methyl-3-methylthiofuran, 2-methyltetrahydrofuran-3-thiol, 2,5-dimethylfuran-3-thiol, 2-methyl-3-(methyl-disulfanyl)furan, 2-methyl-3-(methyl dithio)furan, 1,4-dithiane, 2,5-dihydroxy-1,4-dithiane, and 2,5-dihydroxy-2,5-dimethyl-1,4-dithiane,

and/or

(B-3) comprises or consists of aroma molecules selected from the group consisting of 2-acetyl-1-pyrroline, 2-propionylpyrroline, 2-acetylpyrrole, pyridine, 2-methylpyridine, 3-methylpyridine, 6-acetyl-2,3,4,5-tetrahydropyridine, 2-pentylpyridine, 2-(3-phenylpropyl)pyridine, furfural, 5-hydroxymethylfurfural, 2,5-dimethylfuran, 2-methyl-5-ethylfuran, 2-ethylfuran, 2-propylfuran, 2-butylfuran, 2-pentylfuran, 2-pentenylfuran, 2-acetylfuran, 4-hydroxy-5-methyl-3(2H)-furanone, 2,5-dimethyl-4-hydroxy-(2H)furan-3-one, 4,5-dimethyl-3-hydroxy-2(5H)furanone, 2,4-dimethyl-3-oxazoline, 2,4-dimethyl-5-ethyl-3-oxazoline, 2,5-dimethyl-4-ethyl-3-oxazoline, 2,4,5-trimethyl-3-oxazoline, 2-acetyl-2-thiazoline, 2-propionyl-2-thiazoline, 2,4-dimethyl-3-thiazoline, 2,4,5-trimethylthiazoline, 2-isobutyl-4,5-dimethyl-3-thiazoline, 4-methylthiazole, 2-methylthiazole, 2-acetyl-2-thiazole, 2,4,5-trimethylthiazole, 2,4-dimethyl-5-ethylthiazole, 5-hydroxyethyl-4-methylthiazole (sulfurol), 1,3-benzothiazole, 1,3-thiazolidine, 2-methyl-1,3-thiazolidine, 2-isopropyl-1,3-thiazolidine,

2-methylpyrazine, 2-ethylpyrazine, 2-propylpyrazine, 2-isopropylpyrazine, 2-methoxypyrazine, 2,3-dimethylpyrazine, 2,5-dimethylpyrazine, 2,6-dimethylpyrazine, 2,3,5-trimethylpyrazine, 2,3,5,6-tetramethylpyrazine, 2-methyl-3-ethylpyrazine, 2-ethyl-3,5-dimethylpyrazine, 2-ethyl-3,6-dimethylpyrazine, 3-ethyl-2,5-dimethylpyrazine, 2,3-diethyl-5-methylpyrazine, 3-isobutyl-2-methoxypyrazine, 3-isopropyl-2-methoxypyrazine, 2-acetylpyrazine, 2-acetyl-3-methylpyrazine, 5-acetyl-2-methylpyrazine, 6-acetyl-2-ethylpyrazine,

2-methylpropanal, 2-methylbutanal, 3-methylbutanal, 4-pentenal, (E)-2-nonenal, hexanal, (E)-2-hexenal, 2,4-hexadienal, heptanal, 4-heptenal, octanal, (E)-2-octenal, octadienal, nonanal, (E,E)-2,4-nonadienal, (2E,6Z)-nonadienal, (E,E)-2,4-decadienal, (E,Z)-2,4-decadienal, (E)-2-undecenal, 12-methyl-tridecanal,

3-methyl-1-butanol, 1-pentanol, 1-penten-3-ol, 3-cis-hexenol, 3-methyl-2-hexen-1-ol, 1-heptanol, 3-octanol, 1-octene-3-ol,

3-hydroxy-2-butanone (acetoin), 2-butanone, 2,3-butanedione (diacetyl), 2-pentanone, methyl isobutyl ketone, 1-pentene-3-one, 2-hexanone, oct-1-en-3-one, 2,3-octanedione,  
 5 2-nonanone, 2-decanone, 4-undecanone, 2-tridecanone, 3-methylcyclopentanone, 3-methylcyclopentenone, methyl cyclopentenolone (3-methyl-1,2-cyclopentanedione), dimethyl cyclopentenolone (3,4-dimethyl-1,2-cyclopentanedione, 3,5-dimethyl-1,2-cyclopentanedione), ethyl cyclopentenolone (3-ethyl-1,2-cyclopentanedione),

gamma-hexalactone, gamma-octalactone, gamma-decalactone, gamma-dodecalactone,  
 10 delta-nonolactone,

butyric acid, isobutyric acid, isovaleric acid, pentanoic acid, hexanoic acid, isocaproic acid, heptanoic acid,

4-ethyl-1-methylhexane, 1,1,3-trimethylcyclohexane, naphthalene, alpha-pinene, beta-pinene, 3,6-dimethylundecane,

15 palmitic acid, stearic acid, linoleic acid, vaccenic acid, 11,14-eicosdienoic acid, arachidonic acid, 5,8,11,14,17-eicosapentaenoic acid,

phenol, o-cresol, m-cresol, p-cresol, guaiacol, 4-methylguaiacol, 4-ethylguaiacol, 4-propylguaiacol, 4-vinylguaiacol, 1,2-dihydroxybenzene, vanillin, eugenol, (E)-isoeugenol, (Z)-isoeugenol, acetovanillone, 4-(2-propio)-vanillone, 4-(1-propio)-  
 20 vanillone, 2,6-dimethoxyphenol (syringol), 4-methylsyringol, 4-ethylsyringol, 4-propylsyringol, syringaldehyde, 4-acetosyringol, 4-(2-propio)-syringone, 4-(1-propio)-syringone, 4-(2-propenyl)-syringol, (Z)-4-(1-propenyl)-syringol, (E)-4-(1-propenyl)-syringol, and 4-acetosyringone,

and/or

25 (B-4) comprises or consists of aroma molecules selected from the group consisting of

eugenol, cinnamaldehyde (preferably trans-cinnamaldehyde), anisole, anethole (preferably trans-anethole), estragole, thymol, carvacrol, vanillin, maltol, ethyl maltol, nerol, citral, citronellal, citronellol, nerolidol, linalool, massoia lactone, sotolon, caryophyllene, alpha-phellandrene, terpinene-4-ol, and gamma-nonolactone,

30 and/or



(B-5) comprises or consists of amino acids selected from the group consisting of arginine, alanine, valine, isoleucine, leucine, methionine, phenylalanine, tyrosine, tryptophan, serine, asparagine, aspartic acid, threonine, cysteine, proline, 4-hydroxyproline, glutamine, lysine, 5-hydroxylysine, histidine, anserine, carnosine, S-allylmercaptocysteine, S-allylcysteine, alliin, taurine, gamma-amino acids (preferably gamma-amino butyric acid) and the physiologically acceptable salts thereof, preferably the hydrochlorides thereof,

and/or

(B-6) comprises or consists of the group consisting of sodium lactate, potassium lactate, sodium chloride, potassium chloride, hexametaphosphate salts, sodium and/or potassium salts of tripolyphosphate, tetrasodium pyrophosphate, monosodium glutamate, inosinic acid (inosine monophosphate), disodium inosinate, guanosine monophosphate, and disodium guanylate,

and/or

(B-7) substances selected from the group consisting of beef extract, soy sauce, soy sauce extract, soy protein, yeast extract, autolyzed yeast extract, malt extract, hydrolyzed vegetable protein, whey protein, preferably in dry, more preferably in powdered form.

A more preferred flavoring mixture according to the present invention comprises one or more, preferably two or more, more preferably three or more additional ingredients selected from the group consisting of constituents (B-1), (B-2), (B-3), (B-4), and (B-5), wherein constituent

(B-1) comprises or consists of substances selected from the group consisting of spilanthol (2E,6Z,8E-decatricenoic acid N-isobutylamide), 2E,6Z,8E,10E-dodecatetraenoic acid N-(2-methylpropyl)amide ([alpha]-sanshool), 2E,6Z,8E,10E-dodecatetraenoic acid N-(2-hydroxy-2-methylpropyl)amide [alpha]-hydroxysanshool), 2E,6E,8E,10E-dodecatetraenoic acid N-(2-hydroxy-2-methylpropyl)amide ([gamma]-hydroxysanshool), 2E,4E,8Z,10E,12E-tetradecapentaenoic acid N-(2-hydroxy-2-methylpropyl)amide ([gamma]-hydroxysanshool), 2E,4E,8Z,10E,12E-tetradecapentaenoic acid N-(2-methylpropyl)amide ([gamma]-sanshool), 2E,4E,8Z,11Z-tetradecapentaenoic acid N-(2-hydroxy-2-methylpropyl)amide (bungeanol), 2E,4E-

decadienoic acid N-isobutylamide (trans-pellitorine), 2E,4E-decadienoic acid N-piperide (sarmentine),

6-gingerol, 8-gingerol, 10-gingerol, gingerdione-[2], gingerdione-[3], gingerdione-[4], gingerdione-[6], gingerdione-[8], gingerdione-[10], gingerdione-[12], [6]-shogaol, [8]-shogaol, [10]-shogaol, [6]-paradol, [8]-paradol, [10]-paradol, zingerone, capsaicin, dihydrocapsaicin, nordihydrocapsaicin, homocapsaicin, homodihydrocapsaicin,

chavicine, piperine,

and/or

(B-2) comprises or consists of methanethiol (methyl mercaptan), ethanthiol (ethyl mercaptan), propanethiol, isopropylthiol, allyl mercaptan, furfuryl mercaptan, 5-methyl-2-furfurylthiol, dimethyl sulfide, diallyl sulfide, methyl propyl sulfide, methyl isopropyl sulfide, dimethyl disulfide, diethyl sulfide, dipropyl disulfide, diallyl disulfide, allyl propyl disulfide, methyl isopropyl disulfide, methyl propyl disulfide, propyl propenyl disulfide, difurfuryl disulfide, furfuryl methyl disulfide (methyl 2-furyl methyl disulfide), bis(2-methyl-3-furyl) disulfide, dimethyl trisulfide, diisopropyl trisulfide, dipropyl trisulfide, allyl methyl trisulfide, diallyl trisulfide, 2,3,5-trithiahexane (methyldisulfanyl-methylsulfanylmethane), allyl isothiocyanate, 3-methylthiopropyl isothiocyanate, 3-methylthiopropional (3-methylsulfanyl propanal; methional), 3-(methylthio) hexan-1-ol, 3-mercaptohexan-1-ol, 3-mercaptohexyl acetate, 2-acetylthiophene, 3-(methylthiomethyl)thiophene, allicin (2-propene-1-sulfinothioic acid S-2-propenyl ester), 2-methyl-(3-methylthio)-furan, 2-methylfuran-3-thiol, 2-methyl-3-methylthiofuran, 2-methyltetrahydrofuran-3-thiol, 2,5-dimethylfuran-3-thiol, 2-methyl-3-(methyldisulfanyl)furan, 2-methyl-3-(methyl dithio)furan, 1,4-dithiane, 2,5-dihydroxy-1,4-dithiane, and 2,5-dihydroxy-2,5-dimethyl-1,4-dithiane,

and/or

(B-3) comprises or consists of aroma molecules selected from the group consisting of 2-acetyl-1-pyrroline, 2-propionylpyrroline, 2-acetylpyrrole, pyridine, 2-methylpyridine, 3-methylpyridine, 6-acetyl-2,3,4,5-tetrahydropyridine, 2-pentylpyridine, 2-(3-phenylpropyl)pyridine, 5-hydroxymethylfurfural, 2-pentylfuran, 2-pentenylfuran, 2-acetylfuran, 4-hydroxy-5-methyl-3(2H)-furanone, 2,5-dimethyl-4-hydroxy-(2H)furan-3-one, 4,5-dimethyl-3-hydroxy-2(5H)furanone, 2,4-dimethyl-3-oxazoline, 2,4-dimethyl-5-ethyl-3-oxazoline, 2,5-dimethyl-4-ethyl-3-oxazoline, 2,4,5-trimethyl-3-oxazoline, 2-

acetyl-2-thiazoline, 2-propionyl-2-thiazoline, 2,4-dimethyl-3-thiazoline, 2-isobutyl-4,5-dimethyl-3-thiazoline, 4-methylthiazole, 2-methylthiazole, 2-acetyl-2-thiazole, 2,4,5-trimethylthiazole, 2,4-dimethyl-5-ethylthiazole, 5-hydroxyethyl-4-methylthiazole (sulfurol),

5 3-isobutyl-2-methoxypyrazine, 3-isopropyl-2-methoxypyrazine, 2-acetylpyrazine, 2-acetyl-3-methylpyrazine, 5-acetyl-2-methylpyrazine, 6-acetyl-2-ethylpyrazine,

(E,E)-2,4-nonadienal, (2E,6Z)-nonadienal, (E,E)-2,4-decadienal, (E,Z)-2,4-decadienal, (E)-2-undecenal, 12-methyl-tridecanal,

3-hydroxy-2-butanone (acetoin), 2-butanone, 2-pentanone, 1-pentene-3-one, oct-1-en-  
10 3-one, 2,3-octanedione, 2-nonanone, 2-decanone, 4-undecanone, 2-tridecanone,

gamma-decalactone, gamma-dodecalactone, delta-nonolactone,

isovaleric acid, pentanoic acid, hexanoic acid, isocaproic acid, heptanoic acid,

3,6-dimethylundecane,

4-methylguaiacol, 4-ethylguaiacol, 4-propylguaiacol, 4-vinylguaiacol, 1,2-  
15 dihydroxybenzene, (E)-isoeugenol, (Z)-isoeugenol, acetovanillone, 2,6-dimethoxyphenol (syringol), syringaldehyde, 4-acetosyringol, and 4-acetosyringone,

and/or

(B-4) comprises or consists of aroma molecules selected from the group consisting of

eugenol, cinnamaldehyde (preferably trans-cinnamaldehyde), anisole, anethole  
20 (preferably trans-anethole), thymol, vanillin, maltol, ethyl maltol, and sotolon,

and/or

(B-5) comprises or consists of amino acids selected from the group consisting of alanine, valine, isoleucine, leucine, methionine, phenylalanine, tyrosine, tryptophan, threonine, cysteine, proline, 4-hydroxyproline, lysine, 5-hydroxylysine, carnosine, S-  
25 allylmercaptocysteine, S-allylcysteine, alliin, taurine, gamma-amino butyric acid, and the physiologically acceptable salts thereof, preferably the hydrochlorides thereof.

An even more preferred flavoring mixture according to the present invention comprises one or more, preferably two or more, more preferably three or more additional

ingredients selected from the group of constituents (B-1) to (B-7) consisting of spilanthol, 6-gingerol, 8-gingerol, gingerdione-[6], gingerdione-[8], [6]-shogaol, [8]-shogaol, [6]-paradol, [8]-paradol, zingerone, capsaicin, dihydrocapsaicin, nordihydrocapsaicin, chavicine, piperine, allyl mercaptan, furfuryl mercaptan, 5-methyl-  
5 2-furfurylthiol, diallyl sulfide, dipropyl disulfide, diallyl disulfide, difurfuryl disulfide, dimethyl trisulfide, diisopropyl trisulfide, dipropyl trisulfide, allyl methyl trisulfide, diallyl trisulfide, allyl isothiocyanate, 3-methylthiopropyl isothiocyanate, 3-methylthiopropional (3-methylsulfanyl propanal; methional), 2-acetyl-1-pyrroline, 2-pentylfuran, 2-acetylfuran, 4-hydroxy-5-methyl-3(2*H*)-furanone, 2,5-dimethyl-4-hydroxy-(2*H*)-furan-3-  
10 one, 4,5-dimethyl-3-hydroxy-2(5*H*)-furanone, 2,4-dimethyl-3-oxazoline, 2,4,5-trimethyl-3-oxazoline, 2-acetyl-2-thiazoline, 2-isobutyl-4,5-dimethyl-3-thiazoline, 5-hydroxyethyl-4-methylthiazole (sulfurol), 3-isobutyl-2-methoxypyrazine, 3-isopropyl-2-methoxypyrazine, 2-acetylpyrazine, (2*E*,6*Z*)-nonadienal, (*E,E*)-2,4-decadienal, (*E,Z*)-2,4-decadienal, 12-methyl-tridecanal, 2-nonanone, 2-decanone, 4-undecanone, 2-tridecanone, hexanoic  
15 acid, isocaproic acid, heptanoic acid, 4-methylguaiaicol, 4-vinylguaiaicol, (*E*)-isoeugenol, acetovanillone, 2,6-dimethoxyphenol (syringol), 4-acetosyringol, 4-acetosyringone, eugenol, cinnamaldehyde, anisole, sotolon, vanillin, linalool, methionine, cysteine, proline, 4-hydroxyproline, lysine, 5-hydroxylysine, carnosine, S-allylmercaptocysteine, S-allylcysteine, alliin, taurine, gamma-amino butyric acid, beef extract, soy sauce,  
20 powdered soy sauce, and yeast extract.

If a flavoring mixture according to the present invention contains one or more additional ingredients selected from the group of capsaicin, dihydrocapsaicin, nordihydrocapsaicin, chavicine, piperine, and allyl isothiocyanate, the total amount of the said additional ingredients preferably is 1 ppm or more, more preferably 10 ppm or more, more  
25 preferably 25 ppm or more, even more preferably 50 ppm or more, particularly preferably 100 ppm or more, in each case based on the total weight of the flavoring mixture.

A preferred flavoring mixture according to the present invention comprises three, four, five, six, seven, eight, nine, ten or more additional ingredients selected from the group  
30 consisting of constituents (B-1), (B-2), (B-3), (B-4), (B-5), (B-6), and (B-7), preferably selected from the preferred or particularly preferred constituents indicated above.

A preferred flavoring mixture according to the present invention comprises (i) one or more, preferably two or more, more preferably three or more additional ingredients selected from the group consisting of constituents (B-1), (B-2), (B-3), (B-4), (B-5), (B-6),

and (B-7), and (ii) one or more, preferably two or more additional ingredients selected from the group consisting of constituents (B-8) and (B-9):

(B-8) solid carrier substances selected from the group consisting of chemically modified starches, degraded starches, pectins, glutens, starch hydrolysates, chemically modified  
5 celluloses, gums, proteins, silicon dioxide (silica, silica gel), cyclodextrins, and milk powders,

and/or

(B-9) food acids, preferably selected from the group consisting of acetic acid, adipic acid, caffeotannic acid, citric acid, iso-citric acid, fumaric acid, galacturonic acid, glucuronic acid, glyceric acid, glycolic acid, lactic acid, malic acid, oxalic acid, pyruvic  
10 acid, quinic acid, shikimic acid, succinic acid, tannic acid, ascorbic acid and tartaric acid, and the physiologically acceptable salts thereof.

In a preferred embodiment, constituent (B-8) is selected from the group consisting of chemically modified starches (preferably chemically modified corn starch), dextrins, maltodextrins (preferably obtained from corn, tapioca, cassava, rice, sago, potato, sweet  
15 potato, wheat, buckwheat, rye, oat, yam, chestnut, water chestnut, peas or beans (such as mung beans)), hydrolyzed corn gluten, gum Arabic (acacia gum), gum traganth, gum ghatti, gum karaya, gellan gum, xanthan gum, guar gum, agar-agar, alginates, gelatins, carrageenan, beta-cyclodextrin, gamma-cyclodextrin, silica, methylcellulose, hydroxypropyl cellulose, hydroxypropyl methylcellulose, carboxymethyl cellulose,  
20 sodium carboxymethyl cellulose, milk powder, and nonfat dry milk.

Constituent (B-8) is preferably selected from the group consisting of are silicon dioxide, gum Arabic and maltodextrins, maltodextrins having DE (Dextrose Equivalent) values in the range of from 5 to 22 in turn being preferred, maltodextrins having DE values in the  
25 range of from 10 to 20 being even more preferred. It is in this case not critical which plant originally provided the starch for producing the starch hydrolysates. Suitable and readily available are corn-based starches and starches made up of tapioca, rice, wheat or potatoes. Constituent (B-8) may simultaneously act as anticaking agent (flow auxiliary, for example in case silicon dioxide is used.

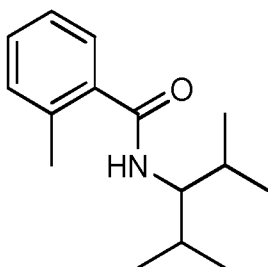
30 In a preferred embodiment, the one or more food acids from constituent (B-9) are selected from the group consisting of citric acid, lactic acid, malic acid, succinic acid,

fumaric acid, tartaric acid, ascorbic acid or adipic acid, and the physiologically acceptable salts thereof.

A flavoring mixture according to the present invention preferably imparts one or more sensory impressions selected from the group of meat, seafood, fish, seaweed, mushrooms and *Allium* species, preferably selected from the group consisting of (respectively raw, cooked, fried, baked, roasted and/or smoked) onion, garlic, leek, shallot, beef, pork, chicken, turkey, duck, goat, lamb, mutton, deer, springbok, catfish, tuna, cod, eel, sword fish, hake, salmon, trout, tilapia, whiting, mussel, scallop, clam shell, shrimp, prawn, squid, crab, button mushroom, brown mushroom, black ear mushroom, shiitake mushroom, chanterelle mushroom, chestnut mushroom, clamshell mushroom, cloud ear mushroom (mo-er mushroom), enoki mushrooms, eryngii mushroom, gamboni mushroom, maitake mushroom, matsutake mushroom, morels, nameko mushroom, oyster mushroom, porcini mushroom, portobello mushroom, puff ball mushroom, and straw mushroom.

A flavoring mixture according to the present invention preferably comprises the compound of Formula (I),  
and/or

does not comprise the compound of Formula (YY)



(YY)

In a further aspect, the present invention relates to a composition for oral consumption, comprising

(a) a sensorially effective amount of

- a compound of Formula (I) and/or (II) or of a mixture thereof as defined hereinbefore,
  - or
  - a flavoring mixture according to the present invention as defined above,
- 5 and
- (b) one or more further constituents suitable for oral consumption.

The compositions according to the invention, which are suitable for oral consumption and used for nutrition, oral care, or consumption for pleasure, are in many cases products which are intended to be introduced into the human oral cavity, to remain there  
10 for a specific time and subsequently to be either eaten (for example ready-to-eat food products, see also below) or removed again from the oral cavity (for example chewing gums or toothpaste). These products include in this case all substances or goods which are intended for human consumption in a processed, partly processed or unprocessed state. This also includes substances which are added to food products during the  
15 production, processing or treatment thereof and are intended to be introduced into the human oral cavity.

Within the scope of the present text, the terms “for oral consumption”, “for oral use”, “food product” and the like refer in particular to substances or mixtures which are intended to be swallowed by a human being in an unchanged, prepared or processed  
20 state and then to be digested. Thus, these terms also refer to casings, coatings or other encapsulations which are intended also to be swallowed, or in which swallowing is likely. Specific products which are conventionally removed from the oral cavity again (for example chewing gums) are also to be regarded as being “for oral consumption”, “for oral use”, or a “food product” within the scope of the present text, as there is a possibility  
25 that they are at least partly swallowed.

The term a “ready-to-eat food product” refers in this case to a product, the composition of which, in terms of the substances which determine the flavor, is already complete. The term “ready-to-eat food product” also includes beverages and solid or semisolid ready-to-eat food products. Examples include deep-frozen products which, prior to  
30 consumption, have to be defrosted and heated to eating temperature. The ready-to-eat food products also include products such as yoghurt or ice cream but also chewing gums or hard caramels.

The term "semifinished product" refers in connection with the present text to a product which on account of its very high content of flavoring substances is unsuitable for use as a ready-to-eat food product. It is only by mixing with at least one other constituent (i.e. by reducing the concentration of the respective aroma and flavoring substances) and, if  
5 appropriate, further process steps (e.g. heating, freezing) that the semifinished product is converted to a ready-to-eat food product. Examples of semifinished products are packet soups, baking flavorings and custard powder.

The term an "oral care product" (also referred to as an oral hygiene product) refers in the sense of the invention to one of the formulations with which a person skilled in the  
10 art is familiar for cleaning and caring for the oral cavity and the pharynx and for freshening breath. This expressly includes care for teeth and gums. Conventional oral hygiene products are administered in particular in the form of creams, gels, pastes, foams, emulsions, suspensions, aerosols, sprays, and also capsules, granules, lozenges, tablets, sweets or chewing gums, although this list should not be understood  
15 to limit this invention.

Preferred oral care products (oral hygiene product) include in particular those in the form of toothpaste, dental cream, dental gel, dental powder, tooth-cleaning liquid, tooth-cleaning foam, mouthwash, dental cream and mouthwash as a 2-in-1 product, oral spray, or dental care chewing gum.

20 Chewing gums generally comprise a chewing gum base, i.e. a masticatory substance which becomes plastic during chewing, a sweet tasting compound or mixture of compounds, like sugars, sugar substitutes, and/or sugar alcohols (in particular sorbitol, xylitol, mannitol), one or more cooling agents, optionally warming agents, humectants, thickeners, emulsifiers, decaking agents, and one or more flavorings (for example:  
25 eucalyptus-menthol, cherry, strawberry, grapefruit, vanilla, banana, citrus, peach, blackcurrant, tropical fruits, ginger, coffee, clove, cinnamon).

A large number of different chewing gum bases are known in the art. Today, conventional chewing gum bases usually comprise, in addition to traditionally used natural resins or the natural latex chicle, elastomers such as polyvinyl acetates,  
30 polyethylenes, (low or medium molecular weight) polyisobutenes, polybutadienes, isobutene/isoprene copolymers (butyl rubber), polyvinyl ethyl ethers, polyvinyl butyl ethers, copolymers of vinyl esters and vinyl ethers, styrene/butadiene copolymers (styrene/butadiene rubbers) or vinyl elastomers, for example based on vinyl acetate/vinyl laurate, vinyl acetate/vinyl stearate or ethylene/vinyl acetate, and mixtures



of the aforementioned elastomers, as described for example in EP 0 242 325, US 4,518,615, US 5,093,136, US 5,266,336 US 5,601,858 or US 6,986,709. In addition, chewing gum bases comprise further constituents such as for example (mineral) fillers, plasticizers, emulsifiers, antioxidants, waxes, fats or fatty oils, such as for example hardened (hydrogenated) vegetable or animal fats, monoglycerides, diglycerides or triglycerides. Suitable (mineral) fillers include for example calcium carbonate, titanium dioxide, silicon dioxide, talc, aluminum oxide, dicalcium phosphate, tricalcium phosphate, magnesium hydroxide and mixtures thereof. Suitable plasticizers or agents for preventing sticking (detackifiers) include for example lanolin, stearic acid, sodium stearate, ethyl acetate, diacetin (glycerol diacetate), triacetin (glycerol triacetate), triethyl citrate. Suitable waxes include for example paraffin waxes, candelilla wax, carnauba wax, microcrystalline waxes and polyethylene waxes. Suitable emulsifiers include for example phosphatides such as lecithin, monoglycerides and diglycerides of fatty acids, for example glycerol monostearate.

A number of compositions according to the invention are preferred. Particularly preferred is a (preferably spray-dried) composition comprising, in addition to a sensorially effective amount of one or more compounds of Formulae (I) and (II) or a mixture as defined above, and one or more solid excipients suitable for consumption. Preferred compositions consist of the compound or compounds of Formulae (I) and (II) in accordance with the invention or above-defined mixtures and the excipient or excipients. In this case, that which was stated hereinbefore applies accordingly with regard to compounds of Formula (I) and/or (II) and preferred mixtures.

A flavoring mixture according to the present invention or a composition for oral consumption according to the present invention (each as defined above) at 25°C and 1013 mbar preferably are solid, preferably in powdered form, preferably in spray-dried form. With regard to spray drying, reference may be made to US 3,159,585, US 3,971,852, US 4,532,145 or US 5,124,162.

A flavoring mixture according to the present invention or a composition for oral consumption according to the present invention preferably comprises a total amount of the compounds of Formulae (I) and (II) as defined above in the range of from 250 ppm to 25 wt.%, preferably of from 500 ppm to 15 wt.%, more preferably of from 1000 ppm to 10 wt.%, particularly preferably of from 2000 ppm (corresponding to 0.20 wt.%) to 5 wt.%.

Examples of advantageous excipients in preferred (preferably spray-dried) compositions according to the invention include silicon dioxide (silica, silica gel), carbohydrates and/or carbohydrate polymers (polysaccharides), cyclodextrins, starches, degraded starches (starch hydrolysates), chemically or physically modified starches, modified celluloses, gum Arabic, gum ghatti, gum tragacanth, gum karaya, carrageenan, guar flour, carob flour, alginates, pectin, inulin or xanthan gum. Preferred starch hydrolysates include maltodextrins and dextrins.

Preferred excipients are silicon dioxide, gum Arabic and maltodextrins, maltodextrins having DE values in the range of from 5 to 22 being preferred in this case too. It is in this case immaterial which plant originally provided the starch for producing the starch hydrolysates. Suitable and readily available are corn-based starches and starches made up of tapioca, rice, wheat or potatoes. The excipients can in this case also act as a flow auxiliary, such as for example silicon dioxide.

The compositions according to the invention, which also comprise, in addition to the compound or compounds of Formulae (I) and (II) in accordance with the invention or above-defined mixtures, one or more solid excipients, can be produced for example by mechanical mixing processes, wherein the present particles can at the same time also be size-reduced, or by means of spray-drying.

Compositions according to the invention which comprise solid excipients and are produced by means of spray drying are preferred.

Preferred compositions according to the invention which comprise excipients and are produced by means of spray drying have an average particle size in the range of from 30 to 300  $\mu\text{m}$  and residual moisture of less than or equal to 5 % by weight.

The ratio by weight of the total mass of the compounds of Formulae (I) and (II) or – if the above-defined mixtures are used – the ratio by weight of the total mass of the compounds of Formulae (I) and (II) to the solid excipient or excipients suitable for consumption lies preferably in the range of from 1 : 10 to 1 : 50000, more preferably in the range of from 1 : 50 to 1 : 20000, even more preferably in the range of from 1 : 100 to 1 : 10000, particularly preferably in the range of from 1 : 500 to 1 : 5000, based on the dry (i.e. essentially water-free, preferably water-free) mass of the composition.

In certain embodiments, in a composition according to the invention, the sum of the constituents comprising (i) compounds of Formulae (I) and (II) and (ii) excipients lies

preferably in the range of from 70 to 100 % by weight, preferably in the range of from 85 to 100 % by weight.

In preferred embodiments, a composition according to the present invention comprises one or more further constituents suitable for consumption, preferably

- 5        -        one or more emulsifiers, preferably selected from the group consisting of lecithins (preferably naturally occurring lecithins, particularly lecithin from egg or soy), phospholipids (preferably phosphatidylcholines), monoacylglycerols, and diacylglycerols,

and/or

- 10       -        one or more vegetable fatty oils, preferably selected from the group consisting of soy oil (soybean oil), olive oil, sunflower oil, safflower oil, corn oil, coconut oil, peanut oil, hazelnut oil, almond oil, walnut oil, palm kernel oil, pumpkin seed oil, canola oil (rapeseed oil), sesame oil, cottonseed oil, wheat germ oil, linseed oil, and rice bran oil,

and/or

- 15       -        one or more preservatives, preferably selected from the group consisting of benzoic acid, sorbic acid, phosphoric acid, and the physiologically acceptable salts of these acids, preferably sodium benzoate, potassium benzoate, sodium sorbate, potassium sorbate, monosodium phosphate, disodium phosphate, trisodium phosphate, monopotassium phosphate, dipotassium phosphate, and/or tripotassium phosphate),

20       and/or

- one or more antioxidants and optionally one or more substances for intensifying the antioxidative effect of said antioxidants,

and/or

- one or more vitamins and the physiologically acceptable salts or esters thereof,  
25       preferably selected from the group consisting of vitamin A, vitamin A palmitate, vitamin B1, vitamin B2 (riboflavin), vitamin B3 (niacin), vitamin B6, vitamin B9 (folic acid) vitamin B12, vitamin C, monosodium ascorbate, monopotassium ascorbate, calcium diascorbate, magnesium diascorbate, ascorbyl palmitate, ascorbyl stearate, vitamin D, and vitamin E, vitamin E acetate, vitamin E palmitate, vitamin H (biotin),

and/or

- one or more essential oils, preferably selected from the group consisting of aniseed oil, basil oil, bergamot oil, curry leaf oil, winter savory oil, summer savory oil, bucco-leaf oil, cardamom oil, lemon oil, coriander oil, costus root oil, cumin oil, dill oil, 5 dillseed oil, tarragon oil, fennel oil, asafoetida oil, ginger oil, garlic oil, onion oil, leek oil, shallot oil, carrot-seed oil, caraway oil, lemongrass oil, distilled lime oil, pressed lime oil, bay-leaf oil, mace oil, marjoram oil, nutmeg oil, myrtle oil, clove leaf oil, clove flower oil, neroli oil, orange oil, origanum oil, parsley leaf oil, parsley seed oil, pepper oil, pimento oil, pine oil, rosemary oil, celery seed oil, tagetes oil, tea-tree oil, thyme oil, verbena oil, 10 juniper oil, hyssop oil, cinnamon leaf oil, cinnamon bark oil,

and/or

- one or more coloring agents, preferably selected from the group consisting of carotenes (E-number E160a, preferably beta-carotene), paprika extract (E-number E160c), red beet juice powder (comprising betanine, beetroot red, E-number E162), 15 annatto (E-number E160b), anthocyanins (E-number E163), chlorophylls (E-number E140), turmeric (E-number E100, comprising curcumin), tartrazine (E-number E102), amaranth (E-number E123), titanium dioxide (E-number E171), iron oxides and iron hydroxides (E-number E172), erythrosine (E-number E127), and caramel (E-number E150).

- 20 It is also possible and in some cases preferred to combine or (wholly or partially) replace the one or more vegetable fatty oils optionally used in the context of the present invention with liquid neutral esters based on medium-chain fatty acids and glycerol, such as for example Miglyols (for example Miglyol 810, Miglyol 812). Use is preferably also made of fractionated coconut oils having mainly fatty acid radicals containing 6 to 8 25 carbon atoms. These are distinguished by their flavor neutrality and by their good oxidation stability.

In another aspect, the present invention relates to a ready-to-eat product, a ready-to-use product, or a semifinished product for oral use or oral consumption, comprising a sensorially effective amount of

- 30 - a compound of Formula (I) or Formula (II) or a mixture thereof as defined above, or

- a flavoring mixture according to the present invention as defined above, preferably in one of the preferred or particularly preferred embodiments, or
  - a composition for oral consumption according to the present invention as defined above, preferably in one of the preferred or particularly preferred embodiments,
- 5 and one or more further ingredients for oral consumption selected from the group consisting of base or bulk materials, additives, excipients, and functional ingredients.

A further preferred composition according to the invention, which is suitable for consumption and comprises (a) a compound of Formula (I) or Formula (II) in accordance with the invention or (b) an above-defined mixture thereof, is a water-in-oil  
10 (W/O) emulsion. In addition to the compound of Formula (I) and/or Formula (II) in accordance with the present invention or the above-defined mixtures, an emulsion of this type comprises water, an oil phase, one or more W/O emulsifiers, optionally one or more antioxidants and optionally one or more substances for intensifying an antioxidative effect.

15 Preferably, a composition according to the invention of this type (W/O emulsion) comprises, based on the total weight of the composition,

- a total of from 0.01 to 0.1 % by weight of compounds of Formulae (I) and (II),
- 5 to 30 % by weight, preferably 8 to 25 % by weight of water,
- 50 to 90 % by weight, preferably 60 to 80 % by weight of an oil phase,
- 20 - 0.1 to 5 % by weight of an edible W/O emulsifier,

and optionally one or more antioxidants and optionally one or more substances for intensifying an antioxidative effect.

In a preferred embodiment, a W/O emulsion according to the invention of this type consists of the aforementioned constituents in the aforementioned amounts.

25 Preferably, the edible W/O emulsifier is selected from the group consisting of lecithin (E 322), monoglycerides and diglycerides of edible fatty acids (E 471), acetic acid monoglycerides (E 472a), lactic acid monoglycerides (E 472b), citric acid monoglycerides (E 472c), tartaric acid monoglycerides (E 472d), diacetyl tartaric acid monoglycerides (E 472e), sorbitan monostearate (E 491).

Suitable antioxidants and substances which can intensify the antioxidative effect are the naturally occurring tocopherols and the derivatives thereof, tocotrienols, flavonoids, ascorbic acid and the salts thereof, alpha-hydroxy acids (for example citric acid, lactic acid, malic acid, tartaric acid) and the Na, K and Ca salts thereof, ingredients isolated  
5 from plants, extracts or fractions thereof, for example from tea, green tea, algae, grape seeds, wheat germs, rosemary, oregano, flavonoids, quercetin, phenolic benzylamines. Also suitable as antioxidants are propyl gallate, octyl gallate, dodecyl gallate, butylhydroxyanisol (BHA), butylhydroxytoluene (BHT), lecithins, monoglycerides and diglycerides of edible fatty acids esterified with citric acid, orthophosphates and Na, K  
10 and Ca salts of monophosphoric acid and ascorbyl palmitate.

The W/O emulsions according to the invention are particularly suitable for application to food product surfaces, the food products having preferably a water content of at most 10 % by weight, preferably of at most 5 % by weight. In a preferred embodiment, the W/O emulsion according to the invention at application temperature has a sufficiently low  
15 viscosity to allow application of the W/O emulsion by means of spraying. Preferred food products, to the surfaces of which a W/O emulsion according to the invention can be applied, include for example crackers, chips (for example based on potatoes, corn (maize), cereal or bread), extruded nibbles (snacks, for example flips) or pretzel-like baked goods (for example salt sticks). W/O emulsions according to the invention are  
20 typically applied to the food product surfaces in an amount of 0.5 to 6 wt.%, based on the total weight of the food product.

As mentioned hereinbefore, one aspect of the present invention relates to the use of a compound of the above-defined Formulae (I) and/or (II) for producing, imparting, modifying or intensifying an umami flavor.

25 Preferably, the compounds of Formulae (I) and/or (II) (in a sensorially effective amount), the above-defined flavoring mixtures or the compositions for oral consumption according to the invention are used in (i) ready-to-use or ready-to-eat products or (ii) semifinished products used for nutrition, or consumption for pleasure, in particular in sodium glutamate-reduced or sodium glutamate-free products used for nutrition, or consumption  
30 for pleasure. In this respect, that which was stated hereinbefore applies accordingly.

The term "sodium glutamate-reduced" refers in this case to the fact that the ready-to-use or ready-to-eat product or the semifinished product according to the invention contains much less sodium glutamate than is contained in the corresponding conventional products. The sodium glutamate content is in this case about 5 to 98 % by

weight, preferably 10 to 50 % by weight, particularly preferably 20 to 50 % by weight below the sodium glutamate content of the conventional products. If, in addition to one or more compounds of Formulae (I) and (II) or an above-defined mixture comprising one or more compounds of Formulae (I) and (II), sodium glutamate is also present in a ready-to-use or ready-to-eat product or semifinished product according to the invention, the ratio by weight of the total amount of compounds of Formulae (I) and (II) or above-defined mixtures to sodium glutamate lies preferably in the range of from 1 : 1 to 1 : 200, more preferably in the range of from 1 : 2 to 1 : 100, even more preferably in the range of from 1 : 5 to 1 : 50.

A ready-to-eat or ready-to-use product according to the present invention preferably comprises a total amount of the compounds of Formulae (I) and (II) as defined above in the range of from 1 ppm to 1000 ppm, preferably of from 2 ppm to 750 ppm, more preferably of from 4 ppm to 500 ppm, even more preferably of from 5 ppm to 250 ppm, particularly preferably of from 8 ppm to 200 ppm, most preferably of from 10 ppm to 100 ppm,

and preferably no sodium glutamate or a content of from 0.00001 to 2 % by weight, preferably 0.001 to 1 % by weight, more preferably 0.01 % by weight to 0.25 %, in particular 0.025 % by weight to 0.1 % by weight of sodium glutamate,

in each case based on the total weight of the product.

A semifinished product according to the present invention preferably comprises a total amount of the compounds of Formulae (I) and (II) as defined above in the range of from 50 ppm to 50000 ppm (corresponding to 5 wt.%), preferably of 75 ppm to 25000 ppm (corresponding to 2.5 wt.%), more preferably of from 100 ppm to 10000 ppm, particularly preferably of from 125 ppm to 5000 ppm,

and preferably no sodium glutamate or a content of from 0.001 to 10 % by weight, preferably 0.01 to 5 % by weight, in particular 0.1 % by weight to 2 % by weight of sodium glutamate,

in each case based on the total weight of the semifinished product.

A semifinished product according to the present invention optionally comprises a content of from 0.0001 % by weight to 40 % by weight, preferably 0.001 % by weight to 25 % by weight of an aroma composition, based on the total weight of the semifinished product.

Particularly relevant are sodium glutamate-reduced compositions or products according to the invention comprising sodium glutamate, wherein the amount of sodium glutamate is not sufficient to be perceived in a comparative composition or product, which is free comprises of a compound of Formula (I) or Formula (II) according to the invention but is  
5 otherwise identical in its composition, as a satisfactory umami flavor, and the amount of the mixture according to the invention is sufficient to achieve a satisfactory umami flavor impression.

If a ready-to-eat or ready-to-use product according to the present invention contains one or more additional ingredients selected from the group of capsaicin, dihydrocapsaicin,  
10 nordihydrocapsaicin, chavicine, piperine, and allyl isothiocyanate, the total amount of these additional ingredients preferably is 0.01 ppm or more, more preferably is 0.05 ppm or more, more preferably 0.1 ppm or more, even more preferably 0.5 ppm or more, particularly preferably 1 ppm or more, and most preferably 2 ppm or more, in each case based on the total weight of the ready-to-eat or ready-to-use product.

15 Ready-to-eat or ready-to-use products (typically used for nutrition, or consumption for pleasure) according to the present invention) are in particular baked goods (for example bread, dry biscuits, cakes, other pastries), beverages (for example vegetable juices, vegetable juice products), instant beverages (for example instant vegetable beverages), meat products (for example ham, fresh sausage or uncured sausage products, spiced  
20 or marinated fresh or cured meat products), eggs or egg products (dried egg, egg white, egg yolk), cereal products (for example precooked ready-to-eat rice products, rice flour products, millet and sorghum products, uncooked or precooked noodles and pasta products), dairy products (for example cream cheese, soft cheese, hard cheese, milk beverages, whey, butter, products containing partially or completely hydrolyzed milk  
25 protein), products made of soy protein or other soy bean fractions (for example soy milk and products produced therefrom, soy lecithin-containing products, fermented products such as tofu or tempeh or products produced therefrom, soy sauces), vegetable products (for example ketchup, sauces, dried vegetables, deep-frozen vegetables, precooked vegetables, vegetables pickled in vinegar, vegetable concentrates or pastes,  
30 vegetable preserves, potato products), nibbles (for example baked or fried potato chips or potato dough products, bread dough products, corn (maize), rice or peanut-based extrudates), fat and oil-based products or emulsions thereof (for example mayonnaise, remoulade, dressings, seasoning products), other ready meals and soups (for example dried soups, instant soups, precooked soups), sauces (instant sauces, dried sauces,  
35 ready-to-eat sources), spices or spiced products (for example mustard products,



horseradish products), seasoning mixes and in particular seasonings used for example in the snack sector.

Particularly preferred are semifinished products (preferably having a reduced sodium glutamate content) used for nutrition, or consumption for pleasure, for example baked goods (for example bread, dry biscuits, cakes, other pastries), vegetable juice products, meat products (for example ham, fresh sausage or uncured sausage products, spiced or marinated fresh or cured meat products), eggs or egg products (dried egg, egg white, egg yolk), cereal products (for example precooked ready-to-eat rice products, uncooked or precooked noodles and pasta products), dairy products (for example cream cheese, soft cheese, hard cheese, milk beverages, whey, butter, products containing partially or completely hydrolyzed milk protein), products made of soy protein or other soy bean fractions (for example soy milk and products produced therefrom, soy lecithin-containing products, fermented products such as tofu or tempeh or products produced therefrom, soy sauces), fish sauces such as for example anchovy sauces, oyster sauces, vegetable products (for example ketchup, sauces, dried vegetables, deep-frozen vegetables, precooked vegetables, vegetables pickled in vinegar, vegetable preserves, potato products), nibbles (for example baked or fried potato chips or potato dough products, bread dough products, corn or peanut-based extrudates), fat and oil-based products or emulsions thereof (for example mayonnaise, remoulade, dressings, seasoning products), ready meals, soups (for example dried soups, instant soups, precooked soups), stock cubes, sauces (instant sauces, dried sauces, ready-to-eat sources), spices, relishes, condiments, seasoning mixes and in particular seasonings used for example in the snack sector.

The products in the sense of the invention can also be in the form of capsules, tablets (non-coated and coated tablets, for example gastric juice-resistant coatings), dragées, granules, pellets, solid mixes, dispersions in liquid phases, as emulsions, as powders, as solutions, as pastes or as other swallowable or chewable products, for example as dietary supplements.

The semifinished products according to the invention are generally used to produce ready-to-use or ready-to-eat products (typically used for nutrition, or consumption for pleasure).

In particular, semifinished products according to the invention can serve additively to intensify the umami flavor of sodium glutamate-reduced food and luxury food products

and also directly as condiments for the industrial or non-industrial preparation of food and/or luxury food products.

The compositions and products according to the invention are preferably produced in that the compounds of Formulae (I) and (II) or above-defined mixtures are dissolved and  
5 mixed in mixtures of ethanol and optionally demineralized and/or purified water; subsequently, the solutions are transformed into an (at least almost) solid formulation by a drying process, preferably a spray drying, vacuum freeze drying, reverse osmosis, evaporation or other concentration process or a combination of the aforementioned processes. In this case, the drying can be carried out using excipients (for example  
10 starches, starch derivatives, maltodextrins, silica gel, celluloses, see above). Preferably, the drying is carried out by means of spray drying or vacuum freeze drying.

Preferred compositions and products according to the invention are relishes, seasoning mixes, condiments, stock cubes, instant soups, instant sauces, vegetarian (ready-to-eat) meals, meat-containing (ready-to-eat) meals, fish sauces such as for example  
15 anchovy sauces, oyster sauces and soy sauces.

According to a further preferred embodiment, for producing compositions and products according to the invention, compounds of Formulae (I) and (II) or above-defined mixtures and optionally other constituents are first incorporated in emulsions, in liposomes (for example starting from phosphatidylcholine), in microspheres, in  
20 nanospheres or else in capsules, granules or extrudates made up of a matrix suitable for food and luxury food products (for example of starch, starch derivatives, cellulose or cellulose derivatives such as hydroxypropyl cellulose, other polysaccharides such as alginate, natural fats, natural waxes such as beeswax or carnauba wax or of proteins such as gelatin).

25 In a further preferred production method, compounds of Formulae (I) and (II) or above-defined mixtures are used with one or more suitable complexing agents, for example complexed with cyclodextrins or cyclodextrin derivatives, preferably alpha or beta-cyclodextrin, and used in this complexed form.

Particularly preferred are products according to the invention in which the matrix is  
30 selected in such a way that the compounds of Formulae (I) and (II) or above-defined mixtures are released from the matrix in a delayed manner, thus providing a long-lasting effect. Examples of the matrix used in this case include natural fats, natural waxes (for

example beeswax, carnauba wax) or else natural bulking substances (wheat fibres, apple fibres, oat fibres, orange fibres).

Not preferred are flavoring mixtures, compositions for oral consumption, ready-to-eat products, ready-to-use products and/or semifinished products for oral use or oral  
5 consumption according to the present invention containing the compound of Formula (YY).

In the case the compounds of Formula (I) and/or (II) of the present invention are used in animal or pet food, these can advantageously be incorporated into and be part of vertebrate food, preferably food for pigs, cows, horses, sheep, goats, chicken, turkeys,  
10 rodents (preferably mice, rats, guinea pigs and hamsters), dogs and cats since these vertebrates are known to perceive "umami" tasting compounds. Preferred animal food is dog food, cat food, pig food, rat food and mouse food. Said animal food preferably comprises one or more amino acids, preferably one or more amino acids of constituent (B-5) defined above and glutamic acid and/or MSG.

15 Pig food comprising the compounds of Formula (I) and/or (II), a flavoring mixture according to the present invention or a composition for oral consumption according to the present invention, or pig food as a ready-to-eat or ready-to-use product according to the present invention, or as semifinished product according to the present invention preferably comprises asparagine, alanine, serine, 4-hydroxyproline, threonine, glutamic  
20 acid and/or MSG.

Cat food comprising the compounds of Formula (I) and/or (II), a flavoring mixture according to the present invention or a composition for oral consumption according to the present invention, or cat food as a ready-to-eat or ready-to-use product according to the present invention, or as semifinished product according to the present invention  
25 preferably comprises proline and/or taurine (as part of constituent (B-5) defined above), and optionally additionally nepetalactone and/or catnip.

Mouse food comprising the compounds of Formula (I) and/or (II), a flavoring mixture according to the present invention or a composition for oral consumption according to the present invention, or mouse food as a ready-to-eat or ready-to-use product  
30 according to the present invention, or as semifinished product according to the present invention preferably comprises methionine, cysteine, arginine and/or threonine.

Further constituents of a ready-to-eat product, a ready-to-use product or semifinished product according to the invention used for nutrition, or consumption for pleasure can be conventional primary materials, additives and auxiliaries for food or luxury food products, for example water, mixtures of fresh or processed, vegetable or animal  
5 primary or raw materials (for example raw, pan-fried, dried, fermented, smoked and/or boiled meat, bones, gristle, fish, vegetables, herbs, nuts, vegetable juices or pastes or mixtures thereof), digestible or non-digestible polycarbohydrates (amylose, amylopectin, inulin, xylans, cellulose), sugar alcohols (for example sorbitol, erythritol), natural or hardened fats (for example tallow, lard, palm fat, coconut fat, hardened vegetable fat),  
10 fatty acids or salts thereof (for example potassium stearate), peptides (for example glutathione), native or processed proteins (for example gelatin), enzymes (for example peptidases), nucleic acids, nucleotides, further flavor-masking agents for unpleasant flavor impressions, further flavor modulators for further, generally not unpleasant flavor impressions, other flavor-modulating substances (for example inositol phosphate or 2-  
15 phenoxypropionic acid), emulsifiers, stabilizers, preservatives (for example benzoic acid and salts thereof, sorbic acid and salts thereof), antioxidants (for example tocopherol, ascorbic acid), chelators (for example citric acid), organic or inorganic acidifying agents (for example acetic acid, phosphoric acid), additional bitter substances (for example quinine, caffeine, limonin, amarogentin, humulones, lupulones, catechins, tannins),  
20 substances preventing enzymatic browning (for example sulfite, ascorbic acid), (further) essential oils, plant extracts, and natural or synthetic colorants or coloring pigments (for example carotenoids, flavonoids, anthocyanins, chlorophyll and derivatives thereof).

Preferably, compositions or products according to the invention additionally contain an aroma composition comprising two or more, more preferably four or more, even more  
25 preferably six or more aroma substances in order to further complement and refine the flavor and/or the smell of a composition or product according to the invention. Suitable aroma compositions contain for example synthetic, natural or nature-identical aroma substances, fragrances and flavoring substances, reaction flavors, or the like.

Additional aroma and/or flavor modulating substances are preferably selected from the  
30 group consisting of adenosine-5'-monophosphate, cytidine-5'-monophosphate, inosine-5'-monophosphate, and the physiologically acceptable salts thereof, lactisole and its physiologically acceptable salts, 2,4-dihydroxybenzoic acid, 3-hydroxybenzoic acid, sodium salts, preferably sodium chloride, sodium lactate, sodium citrate, sodium acetate, and sodium gluconate.

According to another embodiment of the present invention, a composition, ready-to-use or ready-to-eat product or semifinished product in each case as described above additionally comprises one or more sweet tasting substances, preferably one or more mono- or disaccharide, one or more sugar alcohols and/or one or more sweeteners.

- 5 If the compound according to the invention of the Formula (I) or Formula (II) or the mixtures thereof according to the present invention (as described above) is or are used in combination with one or more mono- or disaccharides, one or more mono- or disaccharides are preferably selected from the group consisting of sucrose (= saccharose), lactose, glucose, maltose, fructose, maltose, glucose syrup, and high  
10 fructose corn sirup.

If the compound according to the invention of the Formula (I) or Formula (II) or the mixtures thereof according to the present invention (as described above) is or are used in combination with one or more sugar alcohols, one or more sugar alcohols are preferably selected from the group consisting of erythritol, sorbitol, xylitol, lactitol,  
15 mannitol, dulcitol, fucitol, maltitol, isomalt, and glycerol.

If the compound according to the invention of the Formula (I) or Formula (II) or the mixtures thereof according to the present invention (as described above) is or are used in combination with one or more sweetener, one or more sweeteners are preferably selected from the group consisting of sodium cyclamate, acesulfame K, neohesperidin  
20 dihydrochalcone, saccharin, saccharin sodium salt, aspartame, superaspartame, neotame, alitame, sucralose, magap, lugdunane, carrelame, sucrononate, sucrooctate, miraculin, curculin, monellin, mabinlin, thaumatin, curculin, brazzein, pentadin, or extracts or fractions thereof obtained from natural sources containing said amino acids and/or proteins, neohesperidin dihydrochalcone, steviolglycoside, stevioside,  
25 steviolbioside, rebaudiosides (preferably rebaudioside A, rebaudioside B, rebaudioside C, rebaudioside D, rebaudioside E, rebaudioside F, rebaudioside G, rebaudioside H, dulcoside, rubusoside), suavioside A, suavioside B, suavioside G, suavioside H, suavioside I, suavioside J, baiyunoside 1, baiyunoside 2, phlomisoside 1, phlomisoside 2, phlomisoside 3, phlomisoside 4, abrusoside A, abrusoside B, abrusoside C,  
30 abrusoside D, cyclocaryoside A and cyclocaryoside I, oslandin, polypodoside A, strogin 1, strogin 2, strogin 4, selliguanin A, dihydroquercetin-3-acetate, perillartine, telosmoside A<sub>15</sub>, periandrin I-V, pterocaryoside, cyclocaryoside, mukurozioside, bryoside, bryonoside, bryonodulcoside, carnosifloside, scandenoside, gypenoside, trilobatin, phloridzin, dihydroflavanol, hematoxylin, cyanin, chlorogenic acid,

albiziasaponin, telosmoside, gaudichaudioside, mogroside, hernandulcine, monatin, glycyrrhetin acid, glycyrrhizin, phyllodulcin, or the physiologically acceptable salts thereof, preferably the respective potassium, sodium, calcium or ammonium salts thereof.

5 A flavoring mixture according to the present invention, a composition for oral consumption according to the present invention, a ready-to-eat product according to the present invention, a ready-to-use product according to the present invention (in particular an oral care product), a semifinished product for oral use according to the present invention and a semifinished oral consumption according to the present  
10 invention as defined hereinbefore respectively may preferably additionally comprise one or more additional physiological cooling agents, and thereby may lead to modified, enhanced and/or intensified physiological cooling effects, preferably said one or more further physiological cooling agents are selected from the group consisting of menthol (preferably L-menthol, D-menthol, racemic menthol, isomenthol, neoisomenthol, neomenthol), isomenthone, menthone, menthone derivatives (preferably L-menthone  
15 glycerol ketal), p-menthane-3,8-diol, cubebol, isopulegol and its esters (preferably L-(-)-isopulegol, L-(-)-isopulegol acetate), menthyl ethers (preferably (L-menthoxy)-1,2-propanediol, (L-menthoxy)-2-methyl-1,2-propanediol, L-menthyl-methyl ether), menthyl esters (preferably menthyl formate, menthyl acetate, menthyl isobutyrate, menthyl  
20 lactate, L-menthyl-L-lactate, L-menthyl-D-lactate, L-menthyl-(2-methoxy)acetate, L-menthyl-(2-methoxyethoxy)acetate, L-menthyl pyroglutamate), menthyl carbonates (preferably L-menthyl propylene glycol carbonate, L-menthyl ethylene glycol carbonate, L-menthyl glycerol carbonate or mixtures thereof), semi-esters of menthols with a dicarboxylic acid or derivatives thereof (preferably menthyl oxamate, menthyl-N-  
25 methyloxamate, menthyl-N-ethyloxamate, mono-L-menthyl succinate, mono-L-menthyl glutarate, mono-L-menthyl malonate, O-L-menthyl succinic acid ester-N,N-(dimethyl)amide, O-L-menthyl succinic acid ester amide), 2,3-dimethyl-2-(2-propyl)-butanoic acid derivatives (preferably 2,3-dimethyl-2-(2-propyl)-butanoic acid-N-methyl amide [WS-23]), menthane carboxylic acid amides (preferably L-menthane carboxylic  
30 acid-N-ethyl amide [WS-3], N<sup>α</sup>-(L-menthanecarbonyl)glycine ethyl ester [WS-5], menthane carboxylic acid-N-(4-methoxyphenyl)-amide [WS-12], L-menthane carboxylic acid-N-tert-butyl amide [WS-14], L-menthane carboxylic acid-N-(4-cyanophenyl)amide, N-(4-cyanomethylphenyl) p-menthanecarboxamide), L-menthane carboxylic acid-N-(alkoxyalkyl)amides, L-menthane carboxylic acid-N-(alkylthioalkyl)amides, and  
35 pyrrolidone derivatives of cycloalkyldione derivatives (preferably 3-methyl-2(1-pyrrolidinyl)-2-cyclopenten-1-one).

A flavoring mixture according to the present invention, a composition for oral consumption according to the present invention, a ready-to-eat product according to the present invention, a ready-to-use product according to the present invention, a semifinished product for oral use according to the present invention and a semifinished oral consumption according to the present invention as defined hereinbefore respectively may preferably additionally comprise one or more further agents for masking or reducing an unpleasant flavor impression. Preferred additional masking agents are selected from the group of substances (further) reducing or eliminating undesired and unpleasant off-notes, in particular bitter, cardboardy, metallic, and/or rancid notes.

It will be clear from the foregoing that a further aspect of the present invention also relates to a method for producing, imparting, modifying or intensifying a flavor, in particular an umami flavor, in a (i) ready-to-use or ready-to-eat product or (ii) semifinished product for oral use or oral consumption, preferably used for nutrition, oral care, or consumption for pleasure.

Thus, the present invention also relates to a method for imparting or intensifying a sensory effect, in particular for

(a) imparting or intensifying an umami flavor and/or a physiological cooling effect,

and/or

(b) intensifying one, several or all of the sensory impressions mouthfeel, meaty, roasty, salty, mouth-watering and long-lastingness of other orally consumable constituents, preferably of other orally consumable constituents of (i) a ready-to-use or ready-to-eat product or (ii) a semifinished product for oral use or oral consumption according to the present invention as defined hereinbefore,

including the following steps:

1.) mixing a sensorially effective amount of a compound or mixture according to the present invention, a flavoring mixture according to the present invention, or a composition for oral consumption according to the present invention, with one or more further orally consumable constituents, preferably one or more further orally consumable constituents of (i) a ready-to-eat or ready-to-use product or (ii) a semifinished product, preferably one or more further orally consumable constituents of (i) a ready-to-eat or ready-to-use product or (ii) a semifinished product according to the present invention,

or

applying a sensorially effective amount of a compound or mixture according to the present invention, a flavoring mixture according to the present invention, or a composition for oral consumption according to the present invention, to (i) a ready-to-eat  
5 or ready-to-use product or (ii) a semifinished product, preferably (i) a ready-to-eat or ready-to-use product or (ii) a semifinished product according to the present invention,

and optionally,

2.) orally consuming the product obtained in step 1.).

The flavoring mixtures, compositions for oral consumption, ready-to-use or ready-to-eat  
10 products and semifinished products according to the present invention are easily prepared using conventional methods well-known in the art.

The present invention also relates to a method for producing

- a flavoring mixture according to the present invention as defined above, preferably in one of the preferred or particularly preferred embodiments, or
- 15 - a composition for oral consumption according to the present invention as defined above, preferably in one of the preferred or particularly preferred embodiments,
- (i) a ready-to-use or ready-to-eat product or (ii) a semifinished product for oral use or oral consumption according to the present invention (as defined above),

including the following step:

20 mixing a compound of Formula (I) and/or Formula (II) as defined above with

or

applying a compound of Formula (I) and/or Formula (II) as defined above to

or

25 embedding a compound of Formula (I) and/or Formula (II) in an enveloping or matrix material and subsequently mixing the resulting material with or applying the resulting material to



one, several or all further constituents of the said flavoring mixture, the said composition for oral consumption or the said product.

In this case, that which was stated hereinbefore applies accordingly with regard to preferred flavoring mixtures, compositions for oral consumption, ready-to-use or ready-to-eat products and semifinished products for oral use or oral consumption.

### **Examples:**

The following examples illustrate the present invention. Unless explicitly stated otherwise, all particulars (especially percentages and amounts) relate to the weight.

The sensory effects described above in detail were also perceived in the application examples described hereinbelow.

#### Synthesis Example 1: Reaction of toluoyl chloride and 2,4-dimethylpentan-3-amine

To a stirred and cooled (about 0°C) solution of 1 mol of p-toluoyl chloride or m-toluoyl chloride in 300 ml dichloromethane are 3.75 mol of 2,4-dimethylpentan-3-amine (CAS No. 4083-57-2) added slowly. After complete addition the resulting mixture is allowed to warm to approx. 20 °C and stirred at this temperature for additional 4 hours. Subsequently, the reaction mixture is slowly poured into 400 ml of ice cold water, diluted with 300 ml dichloromethane and the phases are separated. The organic phase is washed with 1N hydrochloric acid solution, 1N sodium hydroxide solution, water, and brine. After drying over sodium sulfate and removal of the organic solvent, the residue is purified via fractionated distillation.

Distillation of the residue under reduced pressure (b.p. 157-160 °C / 1 mm) gave N-(2,4-dimethylpentan-3-yl)-4-methylbenzamide (I) in good yield and high purity (>96% purity).

Distillation of the residue under reduced pressure (b.p. 151-154 °C / 1 mm) gave N-(2,4-dimethylpentan-3-yl)-3-methylbenzamide (II) in good yield and high purity (>95% purity).

Analysis data: compound of Formula (I)

<sup>13</sup>C-NMR (100 MHz, CDCl<sub>3</sub>): 19.9 (CH<sub>3</sub>); 19.9 (CH<sub>3</sub>); 19.9 (CH<sub>3</sub>); 19.9 (CH<sub>3</sub>); 21.4 (CH<sub>3</sub>); 31.1 (CH); 31.1 (CH); 66.2 (CH); 127.3 (CH); 127.3 (CH); 129.1 (CH); 129.1 (CH); 131.2 (C); 141.6 (C); 167.1 (C=O) ppm.

Analysis data: compound of Formula (II)

$^{13}\text{C}$ -NMR (100 MHz,  $\text{CDCl}_3$ ): 19.9 ( $\text{CH}_3$ ); 19.9 ( $\text{CH}_3$ ); 19.9 ( $\text{CH}_3$ ); 19.9 ( $\text{CH}_3$ ); 20.9 ( $\text{CH}_3$ ); 31.1 ( $\text{CH}$ ); 31.1 ( $\text{CH}$ ); 66.1 ( $\text{CH}$ ); 124.5 ( $\text{CH}$ ); 128.6 ( $\text{CH}$ ); 131.4 ( $\text{CH}$ ); 132.4 ( $\text{CH}$ ); 134.2 ( $\text{C}$ ); 138.5 ( $\text{C}$ ); 167.2 ( $\text{C}=\text{O}$ ) ppm.

- 5    Synthesis Example 2: Reaction of toluoyl chloride and 2,4-dimethylpentan-3-amine in pyridine as solvent

To a stirred and cooled (about 0°C) solution of 1 mol of p-toluoyl chloride or m-toluoyl chloride in 300 ml of pyridine are 2 mol of 2,4-dimethylpentan-3-amine added slowly. After complete addition the resulting mixture is allowed to warm to approx. 20 °C and stirred at this temperature for additional 2 hours. Subsequently, the reaction mixture is poured onto a mixture of water and ice and the resulting mixture extracted with three 250 ml portions of ethyl acetate. The combined organic phases are washed twice with 1N hydrochloric acid solution, water, and brine. After drying over sodium sulfate and subsequent removal of the organic solvent, the residue is purified via fractionated distillation.

Synthesis Example 3: Reaction of toluoyl chloride and 2,4-dimethylpentan-3-amine

To a stirred and cooled (about 0°C) solution of 0.1 mol of p-toluoyl chloride or m-toluoyl chloride and 0.2 mol triethyl amine in 125 ml of dichloromethane slowly is added a solution of 0.1 mol of 2,4-dimethylpentan-3-amine in 100 ml of dichloromethane. After complete addition the resulting mixture is allowed to slowly warm to approx. 20 °C and stirred at this temperature for additional 60 minutes. Subsequently, the solvent is removed under reduced pressure and the residue diluted with ethyl acetate. The organic layer is washed with 1N hydrochloric acid solution, 1N aqueous NaOH, water, and brine. After drying over magnesium sulfate and subsequent concentration, the residue is purified via fractionated distillation.

Synthesis Example 4: Reaction of toluoyl chloride and 2,4-dimethylpentan-3-amine using potassium hydroxide

To a stirred and cooled (about 0°C) mixture of 300 ml of 10 wt.% potassium hydroxide solution and 2 mol of 2,4-dimethylpentan-3-amine slowly 1 mol of p-toluoyl chloride or m-toluoyl chloride are added. After complete addition the resulting reaction mixture is allowed to warm to approx. 20 °C and stirred at this temperature for additional 6 hours. Subsequently, the reaction mixture is poured onto ice and the resulting mixture

extracted three times with 250 ml portions of methyl tert.-butyl ether. The combined organic phases are then washed with 1N hydrochloric acid solution, water, and brine. After drying over magnesium sulfate and subsequent removal of the organic solvent, the residue is purified via fractionated distillation.

5    Synthesis Example 5: Reaction of methyl benzoic acid and 2,4-dimethylpentan-3-amine using carbodiimide

To a stirred and cooled (about 0°C) solution of 0.2 mol p-toluic acid or m-toluic acid in 300 ml dichloromethane and 0.3 mol of dicyclohexylcarbodiimide (DCC) or diisopropylcarbodiimide (DIC) are 0.25 mol of 2,4-dimethylpentan-3-amine added  
10    slowly. After complete addition the resulting mixture was allowed to warm to approx. 20 °C and stirred at this temperature for additional 6 hours. The urea that precipitated is removed by filtration through a Büchner funnel, and the filtrate washed with two portions of 1N hydrochloric acid solution, two portions of sodium bicarbonate solution, water, and brine. After drying over sodium sulfate and subsequent removal of the organic solvent,  
15    the residue is purified via fractionated distillation.

Compound (YY) may be produced analogously to the compounds of Formulae (I) and (II) according to the present invention by starting from ortho-toluoyl chloride or ortho-methyl benzoic acid.

Sensory Test 1: Individual compound of Formulae (I) and (II)

20    An expert panel (8 panelists) evaluated the sensory properties of the compounds of Formulae (I) and (II). The compounds of Formulae (I) and (II) were each first dissolved in ethanol and then added in the corresponding amount in water. The aqueous solutions were evaluated by sipping the corresponding solution, holding it in the mouth for 10 seconds, and then spitting it out.

25    The sensory effects observed by the expert panel for compound (I) are present in the following table.

Compound (I)	Description of sensory effects
2 ppm	Weakly umami
20 ppm	Umami, hydrolyzed vegetable protein, weakly cooling

2 ppm + 0.05 wt.% MSG	Umami, meaty, mouthfeel, phosphate
20 ppm + 0.05 wt.% MSG	Umami, meaty, weakly cooling, accumulating

The description “accumulating” means that the flavor perception gradually (further) increases a few seconds after taking the solution into the mouth, often even some time after the solution has been spit out.

- 5 The sensory effects observed by the expert panel for compound (II) are present in the following table.

Compound (II)	Description of sensory effects
2 ppm	Weakly umami
20 ppm	Umami (accumulating), weakly cooling, amino acid
2 ppm + 0.05 wt.% MSG	Immediately distinct umami, mouthfeel
20 ppm + 0.05 wt.% MSG	Strong umami, meaty, weakly cooling, faintly sour, long-lasting

#### Sensory Test 2: Compounds of Formulae (I) and (II) in beef broth (bouillon)

- 10 A group of 16 trained panelists was instructed to evaluate the taste of a broth (bouillon) containing 0.5 wt.% of beef extract (Ref-beef) according to eight different descriptors in several repetitions. In a next step, these panelists were asked to rate said reference beef broth “Ref-beef” (presented at each testing session as a reference) against the following three different compositions consisting of “Ref-beef” and additionally a specific amount of the respective to be tested substance:

- 15 “Beef-I” = “Ref-beef” + 20 ppm of the compound of Formula (I),

“Beef-II” = “Ref-beef” + 20 ppm of the compound of Formula (II),

“Beef-MSG” = “Ref-beef” + 500 ppm (0.05 wt.%) of MSG

“Beef-MSG” was used as a positive umami standard.

The panelists judged the strength / intensity of the eight different descriptors in each case by awarding scores on a scale of from 0 (not corresponding to descriptor) to 6 (very strong). The results are present in the following table. All data are the averaged values for the group of 16 trained panelists for the respective scores for each descriptor.

<b>Descriptor</b>	<b>Ref-Beef</b>	<b>Beef-I (20 ppm (I))</b>	<b>Beef-II (20 ppm (II))</b>	<b>Beef-MSG (500 ppm MSG)</b>
Mouthfeel	3.7	5.0	4.5	4.7
Salty	2.3	2.5	2.5	2.6
Meaty	4.2	4.9	4.6	5.4
Mouth-watering	3.2	4.7	4.1	4.2
Roasty	3.5	3.9	3.8	4.1
Sweet	1.1	1.9	1.7	2.4
Sour	2.9	3.1	3.1	2.8
Long-lastingness	3.3	5.3	4.2	4.3

5

#### Application Example 1: Spray-dried powders

<b>Ingredient</b>	<b>A wt. %</b>	<b>B wt. %</b>	<b>C wt. %</b>	<b>D wt. %</b>
Compound of Formula (I)	2	-	5	5
Compound of Formula (II)	-	3	5	3
Maltodextrin	98	-	90	-
Maltodextrin and gum Arabic (10 : 1)	-	97	-	Ad 100
Sodium chloride	-	-	-	5

The constituents are dissolved in a mixture of ethanol and demineralized water and subsequently spray-dried to give a powder.

10

#### Application Example 2: Semi-finished products

Part	Ingredient	Preparation A	Preparation B	Preparation C
A	Compound of Formula (I)	0.02 g	-	0.035 g
	Compound of Formula (II)	-	0.04 g	0.060 g
	Sodium chloride	15 g	15 g	13 g
B	Yellow mustard seed flour	5 g	4 g	3.5 g
	Mustard flavor	0.1 g	-	0.1 g
	Wasabi flavor	-	0.1 g	0.1 g

- The wasabi flavor and the mustard flavor each also contained an effective amount of allyl isothiocyanate. Part A is added to 300 ml of water and dissolved while stirring. The solution is further diluted with water to 1000 g and then freeze-dried. The resulting freeze-dried product is mixed with yellow mustard seed flour and the flavor(s) from part B and prepared to form a condiment.

#### Application Example 3: Reaction flavors

Ingredient	Preparation A [g]	Preparation B [g]	Preparation C [g]
L-alanine	41.0	41.0	41.0
L-aspartic acid	123.0	120.0	114.0
Succinic acid	4.7	4.2	4.7
Calcium chloride dihydrate	7.0	7.0	7.0
L-cysteine•HCl monohydrate	11	10	11
Dipotassium phosphate	6.0	7.0	6.0
Fructose, ground	1.0	3.0	6.0
L-isoleucine	1.6	-	1.0
Potassium chloride	228.0	230.0	180.0
L-leucine	1.6	1.6	1.6
L-lysine•HCl	3.6	3.6	3.6
Magnesium chloride hexahydrate	19.0	19.0	19.0
Maltodextrin	49.0	56.0	36.0
L-phenylalanine	2.0	2.0	2.0
L-proline	74.0	84.0	80.0
L-serine	6.5	6.5	6.0

L-threonine	3.0	3.0	3.0
L-valine	9.0	9.0	8.0
Water	Ad 1000 g	Ad 1000 g	Ad 1000 g
Compound of Formula (I), 20 wt.% solution in ethanol	11.0	9.0	-
Compound of Formula (II), 20 wt.% solution in ethanol	-	6.5	-
Preparation D of Application Example 1	-	-	95.0

All components are mixed at 40 °C and subsequently heated at 85 °C for 10 minutes. After cooling to 40 °C, the pH is adjusted to a value of about 5 using potassium hydroxide solution.

5 Application Example 4: Hot-spicy leek-type instant cream soups

<b>Ingredient</b>	<b>Preparation A</b>	<b>Preparation B</b>	<b>Preparation C</b>
Potato starch	20.00 g	20.00 g	20.00 g
Fat powder	Ad 100 g	Ad 100 g	Ad 100 g
Lactose	20.00 g	20.00 g	20.00 g
Maltodextrin	14.724 g	14.715 g	14.69 g
Sodium chloride	8.00 g	8.00 g	8.00 g
Spinach powder	2.00 g	2.00 g	2.00 g
Green leek powder, flavored	2.00 g	2.00 g	2.00 g
Citric acid, powder	0.30 g	0.30 g	0.30 g
Hardened vegetable fat	3.00 g	3.00 g	3.00 g
Freeze-dried leek	1.00 g	1.00 g	1.00 g
Chicken flavor, spray-dried	1.00 g	1.00 g	1.00 g
„Hot chili“-type seasoning powder	2.00 g	2.00 g	2.00 g
„Fried onion“-type seasoning mixture	0.60 g	0.60 g	0.60 g
„Vegetable broth“-type yeast powder	0.30 g	0.30 g	0.30 g
Curcuma extract (turmeric)	0.070 g	0.070 g	0.070 g
Compound of Formula (I)	0.025 g	-	0.030 g
Compound of Formula (II)	-	0.035 g	0.025 g

The „Hot chili“-type seasoning powder contained 0.35 wt% of capsaicin, dihydrocapsaicin, and nordihydrocapsaicin in a ratio of 7 : 2 : 1 by weight.

100 ml of hot water are poured onto 5 g of each of the powder mixtures in order to obtain a ready-to-eat hot-spicy leek-type cream soup.

5 Application Example 5: Instant chicken soups with noodles

<b>Ingredient</b>	<b>Preparation A</b>	<b>Preparation B</b>	<b>Preparation C</b>	<b>Preparation D</b>
Starch	16.00 g	16.00 g	16.00 g	16.00 g
Sodium chloride	7.00 g	7.00 g	5.00 g	7.00 g
Saccharose, refined	3.20 g	3.20 g	3.20 g	3.20 g
Sodium glutamate (MSG)	0.025 g	-	-	-
Sodium inosinate / sodium guanylate (1:1)	0.60 g	0.80 g	-	-
Acid-hydrolyzed plant protein	8.00 g	8.00 g	8.00 g	8.00 g
Fat powder	2.00 g	2.00 g	2.00 g	2.00 g
Vegetable fat, spray- dried	1.00 g	1.00 g	1.00 g	1.00 g
Freeze-dried chicken, in pieces	2.00 g	2.00 g	2.00 g	2.00 g
Soup noodles	Ad 100 g	Ad 100 g	Ad 100 g	Ad 100 g
Maltodextrin	15.354 g	15.345 g	14.12 g	14.12 g
Chinese vegetables, freeze-dried	4.60 g	4.60 g	4.60 g	4.60 g
Chicken flavor	8.00 g	8.00 g	8.00 g	8.00 g
Riboflavin (colorant)	0.040 g	0.040 g	0.040 g	0.040 g
Compound of Formula (I)	0.011 g	0.065 g	0.025 g	-
Compound of Formula (II)	0.013 g	-	0.010 g	-
Preparation C of Application Example 2	-	-	2.20 g	-
Preparation B of	-	-	-	2.15 g



Application Example 3				
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4.7 g of each of the powder mixtures A, B, C and D are each boiled separately for 10 minutes in 100 ml of water in order to obtain a ready-to-eat soup.

Application Example 6: Pepper-type seasoning mixtures

<b>Ingredient</b>	<b>Preparation A</b>	<b>Preparation B</b>	<b>Preparation C</b>
Milk protein	0.80 g	0.80 g	0.80 g
Carob flour	2.00 g	2.00 g	2.00 g
Corn starch	Ad 100 g	Ad 100 g	Ad 100 g
Sodium chloride	14.00 g	14.00 g	14.00 g
Paprika powder	13.00 g	13.00 g	13.00 g
Tomato powder	13.00 g	13.00 g	13.00 g
Saccharose	4.00 g	4.00 g	4.00 g
Garlic powder	0.50 g	0.50 g	0.50 g
Hardened vegetable fat	8.00 g	8.00 g	8.00 g
Fat powder	11.00 g	11.00 g	11.00 g
Beetroot and paprika food colorants	2.00 g	2.00 g	2.00 g
Mixed peppers flavor	2.00 g	2.00 g	2.00 g
“Herb de Provence“ spice mixture	1.20 g	1.20 g	1.20 g
Tomato flavor	0.40 g	0.40 g	0.40 g
Black pepper extract (containing piperine and chavicine)	0.10 g	0.15 g	0.20 g
Compound of Formula (I)	-	0.13 g	0.25 g
Compound of Formula (II)	0.07 g	-	0.15 g

5

Each 100 g of a mixture of equal amounts of diced chicken and pork meat are seasoned uniformly with 2.5 g of each of the preparations A, B and C and then pan-fried.

Application Example 7: Seasoning mixtures for chips

<b>Ingredient</b>	<b>Seasoning A</b>	<b>Seasoning B</b>	<b>Seasoning C</b>
Sodium glutamate	2.00 g	2.00 g	–

Cheese powder	10.00 g	10.00 g	10.00 g
Garlic powder	2.00 g	2.00 g	2.00 g
Whey powder	Ad 100 g	Ad 100 g	Ad 100 g
Seasoning extract oil	0.20 g	0.20 g	0.20 g
Paprika powder	9.80 g	9.80 g	9.80 g
Sodium chloride	21.00 g	21.00 g	21.00 g
Tomato powder	9.00 g	9.00 g	9.00 g
Dry flavor	2.50 g	2.50 g	2.50 g
Silicon dioxide	0.02 g	0.02 g	0.02 g
Vegetable oil	0.02 g	0.02 g	0.02 g
Onion powder	3.00 g	3.00 g	3.00 g
Cream flavor concentrate	0.03 g	0.03 g	0.03 g
Cheese flavor	0.03 g	0.03 g	0.03 g
Tomato flavor concentrate	0.04 g	0.04 g	0.04 g
Compound of Formula (I)	0.021 g	-	0.08 g
Compound of Formula (II)	0.010 g	0.041 g	-
Preparation C from Application Example 6	-	-	2.20 g

Of the seasonings A, B and C, 5 g each are sprinkled separately onto 95 g of potato chips.

- 5 Of the seasonings A, B and C, 7 g each are spread separately and evenly onto 93 g of corn tortilla chips.

Application Example 8: Brown gravy mixtures

<b>Ingredient</b>	<b>Mixture A</b>	<b>Mixture B</b>	<b>Mixture C</b>
Corn starch	Ad 100 g	Ad 100 g	Ad 100 g
Maltodextrin (18 DE) (ex tapioca)	33.10 g	33.10 g	33.10 g
Sodium chloride	6.00 g	6.00 g	6.00 g
Caramel colour, spray-dried	5.00 g	5.00 g	5.00 g
Yeast extract powder	3.00 g	3.00 g	3.00 g
Sodium glutamate (MSG)	1.30 g	—	—
Sugar (sucrose)	0.50 g	0.50 g	0.50 g
Fat powder	5.00 g	5.00 g	5.00 g
Tomato powder	3.00 g	3.00 g	3.00 g

Natural vegetable extract	1.00 g	1.00 g	1.00 g
Onion extract	0.30 g	0.30 g	0.30 g
Black pepper extract	0.10 g	0.10 g	0.10 g
Dry flavor	1.00 g	1.00 g	1.00 g
Compound of Formula (I)	0.008 g	-	0.020 g
Compound of Formula (II)	-	0.024 g	-
Preparation A of Application Example 3	-	-	0.30 g

Each 1000 ml of hot water are poured onto 90 g of the respective gravy mixture which was stirred vigorously using an egg whisk.

Application Example 9: Sugar-free chewing gums

Part	Ingredient	Preparation A % by weight	Preparation B % by weight
A	Chewing gum base	31.00	30.00
B	Sorbitol, powdered	Ad 100	Ad 100
	Isomalt (Palatinit <sup>®</sup> )	9.50	9.00
	Xylitol	2.00	2.00
	Mannitol	3.00	3.00
	Aspartam <sup>®</sup>	0.10	0.10
	Acesulfam <sup>®</sup> K	0.10	0.10
	Acacia gum emulsifier	0.30	0.30
C	Sorbitol, 70 % in water	14.00	14.00
	Glycerol	1.00	1.00
D	Cool cinammon flavor (essentially consisting of cinnamaldehyde (>60%), vanillin, eugenol, caryophyllene, menthyl acetate, linalool, menthol (16%), menthone (6%), menthyl lactate (5%), and WS-3)	0.92	1.25
	Compound of Formula (I)	0.0009	0.0011
	Compound of Formula (II)	-	0.0011

Parts A to D are mixed and kneaded intensively. The raw material can for example be processed in the form of strips, chiclets or pellets to form ready-to-use chewing gums.

Application Example 10: Roasted shrimp ginger flavors

<b>Ingredient</b>	<b>Preparation A % by weight</b>	<b>Preparation B % by weight</b>
2-Acetylpyrazine	0.22	0.26
2-Methylbutanal	0.40	0.50
Dimethyl sulfide	1.30	1.20
Dimethyl disulfide	0.60	0.70
Dimethyl trisulfide	1.50	1.30
Isopropyl methyl disulfide	0.15	0.15
4-Methylphenol	0.10	0.10
Safranal	0.10	-
5E/Z,8Z,11Z-tetradecatrien-2-one	0.08	-
1-Pyrroline	3.30	2.90
Pyridine	1.30	1.25
2-Methylpyridine	0.20	0.30
3-Methylpyridine	0.60	0.55
N-(2-Methylbutyl)pyrrolidone	0.60	0.60
3-Methyl-N-(2-methylbutylidene)butanamine	6.30	4.90
2-Methyl-N-(2-methylbutylidene)butanamine	4.50	5.60
2-Nonanone	0.90	0.80
2-Ethyl-3,5-dimethylpyrazine	0.40	0.50
2,5-Dimethylpyrazine	0.90	1.15
2,3,5-Trimethylpyrazine	2.80	1.90
[6]-Paradol	0.25	-
[8]-Gingerdione	-	0.10
Ginger extract	-	0.25
Jambu oleoresin	0.17	-
Zingerone	0.30	0.45

Propylene glycol	Ad 100	Ad 100
Compound of Formula (I)	0.90	-
Compound of Formula (II)	-	1.85

Application Example 11: Fried potato flavors

<b>Ingredient</b>	<b>Flavor A parts by weight</b>	<b>Flavor B parts by weight</b>
Methanethiol	380	480
Methional	320	320
2,3-Butanedione	190	190
2-Methylpropanal	1250	1550
2-Methylbutanal	2100	2900
3-Methylbutanal	800	800
(E)-2-Nonenal	30	30
(E,E)-2,4-Decadienal	2000	2400
(E,Z)-2,4-Decadienal	125	125
2-Ethyl-3,5-dimethylpyrazin	25	23
3-Ethyl-2,5-dimethylpyrazin	15	14
2,3-Diethyl-5-methylpyrazin	20	20
Spilanthol	25	-
Black pepper extract	-	15
3-Isobutyl-2-methoxypyrazin	10	5

5 All ingredients of Flavor A are dissolved in sunflower oil such that the final amount of Flavor A in sunflower oil was 26 ppm. Thereto, the compound of Formula (I) is added in amount of 12 ppm. The resulting flavored sunflower oil is used together with corn oil to prepare a mayonnaise (which can also be used e.g. as dip for crackers). The final amount of Flavor A in said mayonnaise is about 15 ppm, the amount of the compound of Formula (I) 7 ppm.

10 All ingredients of Flavor B are dissolved in soybean oil such that the final amount of Flavor B in soybean oil is 22 ppm. Thereto, the compound of Formula (II) is added in amount of 12 ppm. The resulting flavored soybean oil is used in combination with olive

oil to prepare a margarine spread. The final amount of Flavor B in said margarine spread is about 9 ppm, the amount of the compound of Formula (I) 5 ppm.

Application Example 12: Beef strips with fajita marinade

5 A fajita marinade in dry form is prepared using maltodextrin, sodium chloride, black pepper, smoked chipotle peppers, parsley, cilantro, onion powder, garlic powder, sodium phosphate, modified corn starch, modified tapioca starch, vinegar, dextrose, hydroxypropyl methylcellulose, lime juice, citric acid, lime oil, "smoky-Mex-Flavor", yeast extract, sesame oil, soybean oil, and silicon dioxide.

10 The "smoky-Mex-Flavor" contained gamma-decalactone, 4-methylguaiacol, 4-ethylguaiacol, 4-vinylguaiacol, (E)-isoeugenol, acetovanillone, syringol, syringaldehyde, 4-acetosyringol, 4-acetosyringone, eugenol, cinnamaldehyde, anisole, thymol, acetoin, 2-butanone, 2-tridecanone, 12-methyl-tridecanal, (2E,6Z)-nonadienal, and (E,E)-2,4-decadienal, and 2.9% of the compound of Formula (I).

15 Freshly cut beef strips are pan-fried in peanut oil, then 18 g of fajita marinade in dry form and 125 ml of water are added thereto and the resulting mixture cooked further to the desired degree.

Application Example 13: Onion Flavor

20 An onion flavoring mixture with leek aspects is prepared by mixing 2-trans-hexenal (0.26%), hexanal (0.15%), 3-cis-hexenol (1.45%), diallyl disulfide (5% solution in vegetable oil) (0.12%), leek oil (0.21%), allyl isothiocyanate (0.42%), methyl propyl disulfide (0.51%), foetida oil (0.65%), dimethyl trisulfide (1.28%), dipropyl disulfide (2.06%), dipropyl trisulfide (5.13%), propylene glycol (8.50%), onion oil (9.60%), the compound of Formula (I) (2.84%) and triacetin (ad 100%).

25 The following basic recipe for the production of crackers was used: wheat flour (Ad 100%), baking powder (1.25%), vegetable fat (6.35%), maltose syrup (2.25%), emulsifier (1.50%), ammonium bicarbonate (1.7%), dried skimmed milk powder (1.35%), fresh baker's yeast (0.6%), table salt (0.52%), and water (22.2%).

30 This onion flavor are added in amounts of 0.25%, 0.5%, 0.75% and 1% respectively to said basic recipe and the four different dough batches subsequently are formed as round crackers baked in an oven to give crackers having varying intensities of onion flavor.

Preferred snack articles according to the present invention are savory snacks, such as potato, rice or corn crisps, extrudates, popcorn, pretzels, and dough products baked in fat or in the oven. The application of a flavoring mixture according to the present invention to a snack article can be carried out by way of seasoning, sprayed-on oil  
5 slurry, fatty filling or dough flavoring.

Application Example 14: Garlic flavor

A garlic flavoring mixture according to the present invention is prepared by mixing garlic oil (8.20 g), diallyl sulfide (0.32 g), diallyl disulfide (0.09 g), allyl isothiocyanate (1.03 g), allyl mercaptan (0.10 g), the compound of Formula (I) (1.63 g) and vegetable triglyceride  
10 (ad 500 g).

Application Example 15: Shiitake flavor

A shiitake flavoring mixture according to the present invention is prepared by mixing 3,5-dimethyl-2-ethylpyrazine (0.09%), 2,6-dimethylpyrazine (0.14%), 1% methylthiopropanol in propylene glycol (0.17%), 2,5-dimethylpyrazine (0.16%), 3-octanol (0.45%),  
15 methylfurfuryl disulfide (0.45%), 0.1% o-cresol in triacetin (0.73%), diisopropyl trisulfide (1.24%), 2-hydroxy-3-methyl-cyclopent-2-enone (1.37%), 1-octen-3-ol (1.50%), dimethyl trisulfide (2.23%), 10% 2,3,5-trithiahexane in triacetin (4.55%), the compound of Formula (I) (3.08%), the compound of Formula (II) (0.46%) and vegetable oil (a mixture of sunflower oil, olive oil and canola oil (ratio by volume: 60 : 30 : 10) (Ad 100%).

20 Application Example 16: Cat food supplement for daily use

A cat food supplement is produced essentially consisting of kelp (*Ascophyllum nodosum* and *Laminaria digitata*), flaxseed, bee pollen complex (bee pollen, spirulina), hydrolyzed whitefish, chondroitin sulfate, glucosamine sulfate, methylsulfonyl methane, garlic, lecithin, catnip, dried fermentation products of several different microorganisms,  
25 *Lactobacillus acidophilus*, *Bifidobacterium longum*, protease, amylase, cellulase, lipase, vitamin A, vitamin B2, vitamin B3, vitamin B6, vitamin B12, calcium ascorbate, vitamin D, vitamin E, more than 30 different minerals (including calcium, potassium, magnesium, iron, iodine, selenium and zinc), and flavor (including the compound of Formula (I) in an amount of 56 ppm, based on the total weight of the cat food  
30 supplement).

Nutritional values: proteins: 9.0 %, fat: 2.3%, natural fibers: 5.0%, total ash (minerals): 26%, moisture: 9%, carbohydrates 46.8%, iodine 800 ppm, iron 625 ppm, selenium 0.3

ppm, zinc 14 ppm.

Distribution of the most relevant amino acids (indicated in wt.% of the total amount of amino acids present): alanine 5.5, lysine 4.6, arginine 5.5, methionine 1.4, aspartic acid 10.8, phenylalanine 3.5, cystine 1.6, cysteine 2.2, proline 6.7, hydroxyproline 3.8, glycine 6.0, serine 5.1, glutamic acid 12.4, threonine 4.9, histidine 1.5, tryptophan 2.0, isoleucine 3.5, tyrosine 3.6, leucine 5.3, valine 3.6.

Daily dosage: about 1.5 - 2 g of this cat food supplement are sprinkled on or mixed with the dry or wet cat food.

#### 10 Application Example 17: Dry cat food

A dry cat food product is manufactured from chicken, chicken products, chicken liver, corn, wheat, corn flour (gluten-free), chicken liver flavor (including the compound of Formula (I) in an amount of 17 ppm, based on the total weight of the dry cat food product), vegetable oil, fish oil, vitamin A, vitamin E, vitamin K, vitamin C, biotin (vitamin H), folic acid, calcium, copper, zinc, iodine, taurine, and proline.

Nutritional values: proteins: 31%, natural fatty oil: 12%, natural fibers: 2.5%, total ash (minerals): 6.5%, moisture: 8%, taurine 1000 mg/kg, vitamin A: 15000 IU/kg, vitamin D: 1500 IU/kg, vitamin E 100 IU/kg

This dry cat food product contains vitamins, minerals, omega-3 fatty acids, omega-6 fatty acids, and taurine for a fully balanced nutrition to meet the daily needs of adult cats (weighing about 1 kg or more).

#### Application Example 18: Creamy-spicy chicken soup

A creamy-spicy chicken soup in dry form is prepared using the following ingredients: whey protein, maltodextrin, milk protein, potato flakes, corn starch, evaporated cane juice, non fat milk, corn powder, corn flakes, butter powder, chicken, whey, onion powder, parsley leaves, yeast extract, garlic powder, safflower oil, black pepper, salt, curry Madras powder, further spices, gamma-amino butyric acid, esters of fatty acids, cellulose, creamy-spicy chicken flavor (comprising an effective amount of the compound of Formula (I)), guar gum, tricalcium phosphate, magnesium oxide, alfalfa (Medicago sativa), soy lecithin, magnesium stearate, yucca root powder, magnesium citrate, silicon dioxide, vitamin A, vitamin B5, vitamin B2, vitamin B3, vitamin B6, vitamin B9, vitamin B12, vitamin C, vitamin D3, vitamin E (mixed tocopherols), vitamin H, thiamine



hydrochloride, manganese chelate, copper chelate, iodine chelate, selenomethionine, chromium amino acid chelate, molybdenum amino acid chelate, zinc oxide, alpha amylase, lactase, cellulase, lipase, protease, and papain.

60 g of said creamy-spicy chicken soup in dry form contain 4.45 g of total fat (saturated fat 1.45 g, monounsaturated fats 2 g; free of trans fats), 29.7 g carbohydrates (4.9 g sugars, 4 g dietary fibers), 20 g proteins, 20 mg cholesterol, 640 mg sodium, 260 mg potassium, vitamin A (50% DV; DV stands for Daily Value), vitamin C (40% DV), calcium (50% DV), iron (20% DV), vitamin D (80% DV), vitamin E (40% DV), thiamin (50% DV), riboflavin (60% DV), niacin (45% DV), vitamin B6 (70% DV), folate (80% DV), vitamin B12 (100% DV), biotin (45% DV), pantothenic Acid (45% DV), phosphorus (30% DV), iodine (40% DV), magnesium (30% DV), zinc (45% DV), selenium (40% DV), copper (35% DV), manganese (70% DV), chromium (80% DV), and molybdenum (60% DV).

Amino acid analysis of 60 g of said creamy-spicy chicken soup in dry form: alanine 697 mg, arginine 309 mg, aspartic acid 1524 mg, cystine/cysteine 298 mg, glutamic acid 2321 mg, glycine 284 mg, histidine 243 mg, hydroxyproline 16 mg, isoleucine 913 mg, leucine 1523 mg, lysine 1382 mg, hydroxylysine 29 mg, methionine 382 mg, phenylalanine 457 mg, proline 864 mg, serine 742 mg, threonine 946 mg, tryptophan 345 mg, tyrosine 398 mg, valine 824 mg, other amino acids about 5500 mg.

60 g of said creamy-spicy chicken soup in dry form are added to 225 ml of pre-heated water and stirred with a fork. After steeping for 2-3 minutes the soup is ready for consumption.

#### Application Example 19: Italian sausage seasoning mix

The following two Italian sausage seasoning mixes (Mix A and Mix B) are prepared.

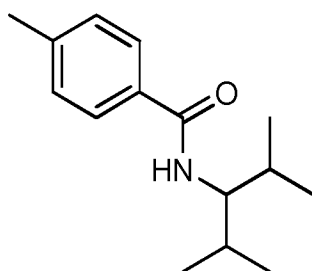
<b>Ingredient</b>	<b>Mix A % by weight</b>	<b>Mix B % by weight</b>
Sicilian sea salt	-	Ad 100
Sodium chloride	Ad 100	-
Sucrose	17.90	17.90
Paprika powder	14.90	14.90
Garlic powder	15.25	13.25
Onion powder	5.00	7.00

Fennel seeds	4.50	4.70
Black pepper, ground	4.75	4.75
Parsley flakes, dried	1.50	1.50
Oregano flakes, dried	0.60	0.60
Anise seed, ground	1.65	1.45
Cayenne pepper, ground	0.60	0.90
Green pepper, ground	0.35	-
MSG	-	0.45
Compound of Formula (I)	0.048	
Compound of Formula (II)	-	0.030

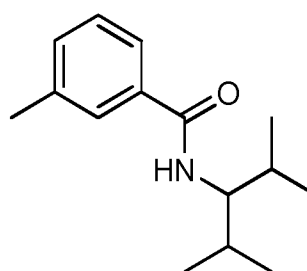
To two separate portions of each 300 g of ground porc (total fat: 20.8%) and 5 g of water, 16.5 g of above Mix A and Mix B are added, homogenized, and the resulting mixtures processed into cooked sausages.

**Claims**

1. Compound of Formula (I) or Formula (II)



(I)



(II)

2. Mixture of compounds comprising, essentially consisting of or consisting of compounds of Formulae (I) and (II) as defined in claim 1, wherein the ratio by weight of the compound of Formula (I) to the compound of Formula (II) preferably is in the range of 98 : 2 to 2 : 98, more preferably in the range of 10 : 1 to 1 : 10.

3. Use of a

- (i) compound of Formula (I) or a compound of Formula (II) as defined in claim 1,
- (ii) mixture of compounds of Formulae (I) and (II) as defined in claims 1 or 2, or
- (iii) a composition comprising one or both compounds of Formulae (I) and (II) as defined in claims 1 or 2,

as food additive, beverage additive, and/or flavoring agent.

4. Use as defined in claim 3 as flavoring agent for

- (i) producing, imparting, or intensifying an umami flavor and/or a physiological cooling effect,

and/or

- (ii) enhancing, intensifying and/or rounding off one or more sensory impressions of one or more other flavoring substances, wherein preferably one, several

or all of the sensory impressions mouthfeel, meaty, roasty, salty, mouth-watering and long-lastingness of said or more other flavoring substances are enhanced, intensified, and/or rounded off.

5. Flavoring mixture comprising

5

(A) a sensorially effective amount of a compound of Formula (I) or (II) as defined in claim 1, or of a mixture as defined in claim 2,

and

10

(B) a sensorially effective amount of one or more, preferably two or more other ingredients selected from the group of substances imparting one or more sensory impressions, preferably substances imparting one or more sensory impressions selected from the group consisting of warming, heating, tingling, numbing, stinging, salivating, sulfurous, alliaceous, pungent, meat, fish, seafood, seaweed, mushroom, aromatic, smoky, tangy, spicy, herbal, savory, and mouthfeel.

15

6. Flavoring mixture according to claim 5, wherein one or more additional ingredients of group (B) are selected from the group consisting of constituents (B-1), (B-2), (B-3), (B-4), (B-5), (B-6), and (B-7)

20

(B-1) substances selected from the group consisting of physiologically warming and/or tingling sensates,

(B-2) aroma molecules imparting one or more sulfurous, alliaceous and/or pungent notes, preferably selected from the group consisting of notes associated with radish, horseradish, wasabi, mustard, onion, garlic, leek, shallot, chive, and cress,

25

preferably selected from the group consisting of sulfur-containing aroma molecules with a molecular weight of less than 300 g/mol, preferably selected from the group consisting of thiols, thioethers, disulfides, trisulfides, thiophenes, thiocyanates, isothiocyanates, thionoesters, thioesters, dithiines, dithianes, dithiazines, pentathiepanes, tetrathianes, dithiolanes, trithiolanes, and S-oxides,

30

(B-3) aroma molecules found in meat or contributing to the aroma of meat, preferably selected from the group consisting of

C4-C12-pyrazines, C5-C12-pyridines, C4-C12-pyrroles, C4-C12-pyrrolines, C4-C10-oxazolines, C4-C10-thiazoles, C4-C10-thiazolines, C3-C8-thiazolidines, C4-C12-furans, C4-C12-furanones, straight- or branched-chain alkanals having a total of 4 to 15 carbon atoms, straight- or branched-chain alkanols having a total of 5 to 10 carbon atoms, C4-C15-ketones, gamma-lactones having an even-number of total carbon atoms in the range of 6 to 12 carbon atoms, delta-lactones having an uneven-number of total carbon atoms in the range of 7 to 13 carbon atoms, C4-C8-alkanoic acids, C6-C15-hydrocarbons, and C16-C30-alkanoic acids having 0 to 5 carbon-carbon-double bonds, and C6-C12-phenols with 1 or 2 hydroxyl groups and 0 to 2 methoxy groups,

(B-4) aroma molecules imparting one or more sensorial impressions selected from the group consisting of thyme, clove, cinnamon, pimento, black pepper, white pepper, red chili, green chili, anise, lemongrass, vanilla, coconut, caramel, coriander, ginger, basil, sweet basil, tarragon, lemon, curry, fenugreek, and lime,

(B-5) amino acids, preferably selected from the group consisting of amino carboxylic acids and amino sulfonic acids, and the physiologically acceptable salts thereof,

(B-6) further flavor enhancers for meaty and/or roasty notes,

and

(B-7) substances selected from the group consisting of beef extract, soy sauce, soy sauce extract, soy protein, yeast extract, autolyzed yeast extract, malt extract, hydrolyzed vegetable protein, whey protein, caseinate, and barley extract.

7. Flavoring mixture according to claim 6, wherein constituent

- (B-1) comprises or consists of substances selected from the group consisting of spilanthol, alpha-sanshool, alpha-hydroxysanshool, gamma-hydroxysanshool, gamma]hydroxysanshool), gamma-hydroxyisosanshool, gamma-dehydrosanshool, gamma-sanshool, bungeanool, isobungeanool, dihydrobungeanool, tetrahydrobungeanool, trans-pellitorine, cis-pellitorine, 2Z,4Z-decadienoic acid N-isobutylamide, 2Z,4E-decadienoic acid N-isobutylamide, 2E,4E-decadienoic acid N-([2S]-2-methylbutyl)amide, 2E,4E-decadienoic acid N-([2S]-2-methylbutyl)amide, 2E,4E-decadienoic acid N-([2R]-2-methylbutylamide), 2E,4Z-decadienoic acid N-(2-methylbutyl)amide, achilleamide, sarmentine, 2E-decenoic acid N-isobutylamide, 3E-decenoic acid N-isobutylamide, 3E-nonenoic acid N-isobutylamide, 2E,7Z,9E-undeca-2,7,9-trienoic acid N-isobutyl amide, 2E-undeca-2-en-8,10-diynoic acid N-isobutyl amide,
- vanillyl alcohol n-propyl ether, vanillyl alcohol isopropyl ether, vanillyl alcohol n-butyl ether, vanillyl alcohol isobutyl ether, vanillyl alcohol isoamyl ether, vanillyl alcohol n-hexyl ether vanillyl alcohol methyl ether, vanillyl alcohol ethyl ether, gingerols, gingerdiones, shogaols, paradols, zingerone, capsaicin, dihydrocapsaicin, nordihydrocapsaicin, homocapsaicin, homodihydrocapsaicin, nonivamide,
- chavicine, piperine, 1'-acetoxychavicol, 1'-acetoxychavicol acetate, polygodial, warburganal, muzigadial, merulidial, acetylmerulidial, aframodial, cinnamodial, cinnamolide, cinnamosmolide, capsicodendrin, velleral, isovelleral, isoisovelleral, isodrimeninol,
- echinacea extract, jambu oleoresin, ginger oleoresin, ginger extracts, pepper extracts, black pepper extract, red pepper oleoresin, red pepper oil, Japanese pepper extracts, extracts of toothache grass (*Ctenium aromaticum*), extracts of tarragon (*Artemisia dracunculus*), pellitory root extracts (*Anacyclus* spp.), echinacea extracts (*Echinaceae* spp.), extracts of Szechuan pepper (*Zanthoxylum* spp.), *Spilanthes* or *paracress* extracts (*Spilanthes* spp.), extracts of *Acmella* spp., extracts of *Achillea* spp., extracts of *Fagara* species (*Fagara zanthoxyloides*), extracts of *Heliopsis* spp., extracts of *Cissampelos glaberrima*, extracts of *Dinosperma erythrococca*, bark extracts of *Esenbeckia alata*, extracts of

Stauranthus perforatus, and extracts of water pepper (Persicaria hydropiper),

and/or

(B-2) comprises or consists of methanethiol, ethanethiol, propanethiol, isopropylthiol, allyl mercaptan, furfuryl mercaptan, 5-methyl-2-furfurylthiol, dimethyl sulfide, diallyl sulfide, methyl propyl sulfide, methyl isopropyl sulfide, dimethyl disulfide, diethyl sulfide, dipropyl disulfide, diallyl disulfide, allyl propyl disulfide, methyl isopropyl disulfide, methyl propyl disulfide, propyl propenyl disulfide, difurfuryl disulfide, furfuryl methyl disulfide, bis(2-methyl-3-furyl) disulfide, dimethyl trisulfide, diisopropyl trisulfide, dipropyl trisulfide, allyl methyl trisulfide, 2,3,4-trithiahexane, diallyl trisulfide, 2,3,5-trithiahexane, allyl isothiocyanate, phenylethyl isothiocyanate, cyclopropyl isothiocyanate, butyl isothiocyanate, 3-methylthiopropyl isothiocyanate, 4-hydroxybenzyl isothiocyanate, 4-methoxybenzyl isothiocyanate, sulforaphane, methional, 3-(methylthio) hexan-1-ol, 3-mercaptohexan-1-ol, 3-mercaptohexyl acetate, 3-mercaptohexyl butyrate, S-methyl thioacetate, 2-methylthiophene, 2-ethylthiophene, 2-propylthiophene, 2-butylthiophene, 2-hexylthiophene, 2-octylthiophene, 2,5-dimethylthiophene, 2-acetylthiophene, 3-(methylthiomethyl)thiophene, 2-thiophenyl methanethiol, 3-methyl-2-thiophenyl methanethiol, methyl-1,3-dithiolane, 3,5-dimethyl-1,2,4-trithiolane, allicin, ajoene, 3-[(prop-2-ene-1-sulfinyl)sulfanyl]prop-1-ene, 3-vinyl-(4*H*)-1,2-dithiin, 2-vinyl-(4*H*)-1,3-dithiin, syn-propanethial S-oxide, syn-butanethial S-oxide, 2,4,6-trimethyl-perhydro-1,3,5-dithiazine, 2,4,6-trimethyldihydro-4*H*-1,3,5-dithiazine, 2,4,6-triethyldihydro-4*H*-1,3,5-dithiazine, 2-isopropyl-4,6-dimethyldihydro-1,3,5-dithiazine, 4-isopropyl-2,6-dimethyldihydro-1,3,5-dithiazine, 2,4,6-triisobutyl-5,6-dihydro-4*H*-1,3,5-dithiazine, 2-methyl-(3-methylthio)-furan, 2-methylfuran-3-thiol, 2-methyl-3-methylthiofuran, 2-methyltetrahydrofuran-3-thiol, 2,5-dimethylfuran-3-thiol, 2-methyl-3-(methyldisulfanyl)furan, 2-methyl-3-(methyl dithio)furan, 1,4-dithiane, 2,5-dihydroxy-1,4-dithiane, and 2,5-dihydroxy-2,5-dimethyl-1,4-dithiane,

and/or

- (B-3) comprises or consists of aroma molecules selected from the group consisting of 2-acetyl-1-pyrroline, 2-propionylpyrroline, 2-acetylpyrrole, pyridine, 2-methylpyridine, 3-methylpyridine, 6-acetyl-2,3,4,5-tetrahydropyridine, 2-pentylpyridine, 2-(3-phenylpropyl)pyridine, furfural, 5-hydroxymethylfurfural, 2,5-dimethylfuran, 2-methyl-5-ethylfuran, 2-ethylfuran, 2-propylfuran, 2-butylfuran, 2-pentylfuran, 2-pentenylfuran, 2-acetylfuran, 4-hydroxy-5-methyl-3(2*H*)-furanone, 2,5-dimethyl-4-hydroxy-(2*H*)-furan-3-one, 4,5-dimethyl-3-hydroxy-2(5*H*)-furanone, 2,4-dimethyl-3-oxazoline, 2,4-dimethyl-5-ethyl-3-oxazoline, 2,5-dimethyl-4-ethyl-3-oxazoline, 2,4,5-trimethyl-3-oxazoline, 2-acetyl-2-thiazoline, 2-propionyl-2-thiazoline, 2,4-dimethyl-3-thiazoline, 2,4,5-trimethylthiazoline, 2-isobutyl-4,5-dimethyl-3-thiazoline, 4-methylthiazole, 2-methylthiazole, 2-acetyl-2-thiazole, 2,4,5-trimethylthiazole, 2,4-dimethyl-5-ethylthiazole, 5-hydroxyethyl-4-methylthiazole, 1,3-benzothiazole, 1,3-thiazolidine, 2-methyl-1,3-thiazolidine, 2-isopropyl-1,3-thiazolidine,
- 2-methylpyrazine, 2-ethylpyrazine, 2-propylpyrazine, 2-isopropylpyrazine, 2-methoxypyrazine, 2,3-dimethylpyrazine, 2,5-dimethylpyrazine, 2,6-dimethylpyrazine, 2,3,5-trimethylpyrazine, 2,3,5,6-tetramethylpyrazine, 2-methyl-3-ethylpyrazine, 2-ethyl-3,5-dimethylpyrazine, 2-ethyl-3,6-dimethylpyrazine, 3-ethyl-2,5-dimethylpyrazine, 2,3-diethyl-5-methylpyrazine, 3-isobutyl-2-methoxypyrazine, 3-isopropyl-2-methoxypyrazine, 2-acetylpyrazine, 2-acetyl-3-methylpyrazine, 5-acetyl-2-methylpyrazine, 6-acetyl-2-ethylpyrazine,
- 2-methylpropanal, 2-methylbutanal, 3-methylbutanal, 4-pentenal, (E)-2-nonenal, hexanal, (E)-2-hexenal, 2,4-hexadienal, heptanal, 4-heptenal, octanal, (E)-2-octenal, octadienal, nonanal, (E,E)-2,4-nonadienal, (2*E*,6*Z*)-nonadienal, (E,E)-2,4-decadienal, (E,*Z*)-2,4-decadienal, (E)-2-undecenal, 12-methyl-tridecanal,
- 3-methyl-1-butanol, 1-pentanol, 1-penten-3-ol, 3-cis-hexenol, 3-methyl-2-hexen-1-ol, 1-heptanol, 3-octanol, 1-octene-3-ol,
- 3-hydroxy-2-butanone, 2-butanone, 2,3-butanedione, 2-pentanone, methyl isobutyl ketone, 1-pentene-3-one, 2-hexanone, oct-1-en-3-one, 2,3-octanedione, 2-nonanone, 2-decanone, 4-undecanone, 2-



tridecanone, 3-methylcyclopentanone, 3-methylcyclopentenone, methyl cyclopentenolone, dimethyl cyclopentenolone, ethyl cyclopentenolone,

gamma-hexalactone, gamma-octalactone, gamma-decalactone, gamma-dodecalactone, delta-nonolactone,

5 butyric acid, isobutyric acid, isovaleric acid, pentanoic acid, hexanoic acid, isocaproic acid, heptanoic acid,

4-ethyl-1-methylhexane, 1,1,3-trimethylcyclohexane, naphthalene, alpha-pinene, beta-pinene, 3,6-dimethylundecane,

10 palmitic acid, stearic acid, linoleic acid, vaccenic acid, 11,14-eicosdienoic acid, arachidonic acid, 5,8,11,14,17-eicosapentaenoic acid,

15 phenol, o-cresol, m-cresol, p-cresol, guaiacol, 4-methylguaiacol, 4-ethylguaiacol, 4-propylguaiacol, 4-vinylguaiacol, 1,2-dihydroxybenzene, vanillin, eugenol, (E)-isoeugenol, (Z)-isoeugenol, acetovanillone, 4-(2-propio)-vanillone, 4-(1-propio)-vanillone, syringol, 4-methylsyringol, 4-ethylsyringol, 4-propylsyringol, syringaldehyde, 4-acetosyringol, 4-(2-propio)-syringone, 4-(1-propio)-syringone, 4-(2-propenyl)-syringol, (Z)-4-(1-propenyl)-syringol, (E)-4-(1-propenyl)-syringol, and 4-acetosyringone,

and/or

20 (B-4) comprises or consists of aroma molecules selected from the group consisting of

eugenol, cinnamaldehyde, anisole, anethole, estragole, thymol, carvacrol, vanillin, maltol, ethyl maltol, nerol, citral, citronellal, citronellol, nerolidol, linalool, massoia lactone, sotolon, caryophyllene, alpha-phellandrene, terpinene-4-ol, and gamma-nonolactone,

25 and/or

(B-5) comprises or consists of amino acids selected from the group consisting of arginine, alanine, valine, isoleucine, leucine, methionine, phenylalanine, tyrosine, tryptophan, serine, asparagine, aspartic acid, threonine, cysteine, proline, 4-hydroxyproline, glutamine, lysine, 5-30 hydroxylysine, histidine, anserine, carnosine, S-allylmercaptocysteine, S-

allylcysteine, alliin, taurine, gamma-amino acids, and the physiologically acceptable salts thereof,

and/or

5 (B-6) comprises or consists of the group consisting of sodium lactate, potassium lactate, sodium chloride, potassium chloride, hexametaphosphate salts, sodium and/or potassium salts of tripolyphosphate, tetrasodium pyrophosphate, monosodium glutamate, inosine monophosphate, disodium inosinate, guanosine monophosphate, and disodium guanylate.

10 8. Flavoring mixture according to any of claims 5 to 7, comprising one, two, three or more additional ingredients selected from the group consisting of

(B-8) solid carrier substances selected from the group consisting of chemically modified starches, degraded starches, pectins, glutens, starch hydrolysates, chemically modified celluloses, gums, proteins, silicon  
15 dioxide, cyclodextrins, and milk powders,

and/or

(B-9) food acids, preferably selected from the group consisting of acetic acid, adipic acid, caffeotannic acid, citric acid, iso-citric acid, fumaric acid, galacturonic acid, glucuronic acid, glyceric acid, glycolic acid, lactic acid,  
20 malic acid, oxalic acid, pyruvic acid, quinic acid, shikimic acid, succinic acid, tannic acid, ascorbic acid and tartaric acid, and the physiologically acceptable salts thereof.

9. Flavoring mixture as defined in any one of claims 5 to 8 imparting one or more sensory impressions selected from the group of meat, seafood, fish, seaweed,  
25 mushrooms, and *Allium* species, preferably selected from the group consisting of onion, garlic, leek, shallot, beef, pork, chicken, turkey, duck, goat, lamb, mutton, deer, springbok, catfish, tuna, cod, eel, sword fish, hake, salmon, trout, tilapia, whiting, mussel, scallop, clam shell, shrimp, prawn, squid, crab, button mushroom, brown mushroom, black ear mushroom, shiitake mushroom,  
30 chanterelle mushroom, chestnut mushroom, clamshell mushroom, cloud ear

mushroom, enoki mushroom, eryngii mushroom, gamboni mushroom, maitake mushroom, matsutake mushroom, morels, nameko mushroom, oyster mushroom, porcini mushroom, portobello mushroom, puff ball mushroom, and straw mushroom.

5 10. Composition for oral consumption, comprising

(a) a sensorially effective amount of

- a compound or of a mixture as defined in claim 1 or claim 2,

or

- a flavoring mixture as defined in any one of claims 5 to 9,

10 and

(b) one or more further constituents suitable for oral consumption.

11. Composition as claimed in claim 10, wherein the further constituents suitable for consumption are:

15

- one or more emulsifiers, preferably selected from the group consisting of lecithins, phospholipids, monoacylglycerols, and diacylglycerols,

and/or

20

- one or more vegetable fatty oils, preferably selected from the group consisting of soy oil, olive oil, sunflower oil, safflower oil, corn oil, coconut oil, peanut oil, hazelnut oil, almond oil, walnut oil, palm kernel oil, pumpkin seed oil, canola oil, sesame oil, cottonseed oil, wheat germ oil, linseed oil, and rice bran oil,

and/or

25

- one or more preservatives, preferably selected from the group consisting of benzoic acid, sorbic acid, phosphoric acid, and the physiologically acceptable salts of these acids,

and/or

30

- one or more antioxidants and optionally one or more substances for intensifying the antioxidative effect of said antioxidants,

and/or

- one or more vitamins and the physiologically acceptable salts or esters thereof,

and/or

- one or more essential oils, preferably selected from the group consisting of aniseed oil, basil oil, bergamot oil, curry leaf oil, winter savory oil, summer savory oil, bucco-leaf oil, cardamom oil, lemon oil, coriander oil, costus root oil, cumin oil, dill oil, dillseed oil, tarragon oil, fennel oil, asafoetida oil, ginger oil, garlic oil, onion oil, leek oil, shallot oil, carrot-seed oil, caraway oil, lemongrass oil, distilled lime oil, pressed lime oil, bay-leaf oil, mace oil, marjoram oil, nutmeg oil, myrtle oil, clove leaf oil, clove flower oil, neroli oil, orange oil, origanum oil, parsley leaf oil, parsley seed oil, pepper oil, pimento oil, pine oil, rosemary oil, celery seed oil, tagetes oil, tea-tree oil, thyme oil, verbena oil, juniper oil, hyssop oil, cinnamon leaf oil, cinnamon bark oil,

and/or

- one or more coloring agents.

12. Ready-to-eat product, ready-to-use product, or semifinished product for oral use or oral consumption, comprising a sensorially effective amount of

- a compound or mixture as defined in claim 1 or 2, or
- a flavoring mixture as defined in any one of claims 5 to 9, or
- a composition for oral consumption as defined in claim 10 or 11,

and one or more further ingredients for oral consumption selected from the group consisting of base or bulk materials, additives, excipients, and functional ingredients.

13. Ready-to-eat or ready-to-use product according to claim 12, comprising

- a total amount of the compounds of Formulae (I) and (II) as defined in claim 1 in the range of from 1 ppm to 1000 ppm, preferably of from 2 ppm to 750 ppm,

and preferably no sodium glutamate or a content of from 0.00001 to 2 % by weight, preferably 0.001 to 1 % by weight, more preferably 0.01 % by weight to 0.25 %, in particular 0.025 % by weight to 0.1 % by weight of sodium glutamate,

5 in each case based on the total weight of the product.

14. Semifinished product according to claim 12 comprising

10 - a total amount of the compounds of Formulae (I) and (II) as defined in claim 1 in the range of from 50 ppm to 50000 ppm, preferably of 75 ppm to 25000 ppm,

and preferably no sodium glutamate or a content of from 0.001 to 10 % by weight, preferably 0.01 to 5 % by weight, in particular 0.1 % by weight to 2 % by weight of sodium glutamate,

15

in each case based on the total weight of the semifinished product.

15. Method for imparting or intensifying a sensory effect, in particular for

20 (a) imparting or intensifying an umami flavor and/or a physiological cooling effect,

and/or

25 (b) intensifying one, several or all of the sensory impressions mouthfeel, meaty, roasty, salty, mouth-watering and long-lastingness of other orally consumable constituents, preferably of other orally consumable constituents of (i) a ready-to-use or ready-to-eat product or (ii) a semifinished product for oral use or oral consumption, as defined in any one of claims 12 to 14,

30

including the following step:

35 1.) mixing a sensorially effective amount of a compound or mixture as defined in claim 1 or 2, a flavoring mixture according to any one of claims 5 to 9, or a composition for oral consumption according to claim 10 or 11,

5 with one or more further orally consumable constituents, preferably one or more further orally consumable constituents of (i) a ready-to-eat or ready-to-use product or (ii) a semifinished product, preferably one or more further orally consumable constituents of (i) a ready-to-eat or ready-to-use product or (ii) a semifinished product as defined in any one of claims 12 to 14,

or

10 applying a sensorially effective amount of a compound or mixture as defined in claim 1 or 2, a flavoring mixture according to any one of claims 5 to 9, or a composition for oral consumption according to claim 10 or 11, to (i) a ready-to-eat or ready-to-use product or (ii) a semifinished product, preferably (i) a ready-to-eat or ready-to-use product or (ii) a semifinished  
15 product as defined in any one of claims 12 to 14.

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2013/054254

A. CLASSIFICATION OF SUBJECT MATTER  
INV. A23L1/22 C07C233/65  
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)  
C07C A23L

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, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE REGISTRY [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; 28 February 2005 (2005-02-28), XP002676047, retrieved from STN Database accession no. 838886-18-3 the whole document	1
X	----- DATABASE REGISTRY [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; 11 June 2002 (2002-06-11), XP002676710, retrieved from STN Database accession no. 428480-83-5 the whole document ----- -/-	1



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search

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## INTERNATIONAL SEARCH REPORT

International application No  
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/084506 A1 (TACHDJIAN CATHERINE [US] ET AL) 21 April 2005 (2005-04-21) cited in the application page 1, paragraph 3 - paragraph 7 claim 1 page 73; compound A83 page 96; example 156 -----	1-15
X	US 2006/045953 A1 (TACHDJIAN CATHERINE [US] ET AL) 2 March 2006 (2006-03-02) cited in the application page 1, paragraph 3 - paragraph 8 claim 1 page 78; compound A17 page 89 - page 90; compounds A83, A88 -----	1-15



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2013/054254

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005084506	A1	21-04-2005	AR 046078 A1 23-11-2005
		AU 2004263871 A1 17-02-2005	
		AU 2004285410 A1 12-05-2005	
		AU 2011201468 A1 21-04-2011	
		BR PI0413324 A 10-10-2006	
		BR PI0413347 A 10-10-2006	
		CA 2535036 A1 12-05-2005	
		CA 2535045 A1 17-02-2005	
		CL 20152004 A1 13-05-2005	
		EP 1659881 A2 31-05-2006	
		EP 1660859 A2 31-05-2006	
		IL 173552 A 31-10-2012	
		JP 5036310 B2 26-09-2012	
		JP 5036446 B2 26-09-2012	
		JP 2007330268 A 27-12-2007	
		JP 2007512227 A 17-05-2007	
		JP 2007517493 A 05-07-2007	
		JP 2008013570 A 24-01-2008	
		MX PA06001510 A 04-09-2006	
		NZ 545746 A 30-03-2012	
		NZ 545747 A 25-06-2010	
		NZ 580418 A 30-03-2012	
		RU 2010112728 A 10-10-2011	
		SG 145745 A1 29-09-2008	
		SG 153714 A1 29-07-2009	
		US 2005084506 A1 21-04-2005	
		US 2007104709 A1 10-05-2007	
		US 2008085994 A1 10-04-2008	
		US 2009111834 A1 30-04-2009	
		US 2011294981 A1 01-12-2011	
		US 2012201763 A1 09-08-2012	
		US 2013030059 A1 31-01-2013	
		WO 2005015158 A2 17-02-2005	
		WO 2005041684 A2 12-05-2005	
US 2006045953	A1	02-03-2006	AR 052475 A1 21-03-2007
		AU 2006210387 A1 10-08-2006	
		CA 2596829 A1 10-08-2006	
		CN 101203142 A 18-06-2008	
		EP 1848289 A2 31-10-2007	
		JP 2008530020 A 07-08-2008	
		KR 20070104456 A 25-10-2007	
		US 2006045953 A1 02-03-2006	
		WO 2006084246 A2 10-08-2006	
		ZA 200707483 A 26-11-2008	