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(71) Applicant (for all designated States except US): **FIRMENICH SA** [CH/CH]; 1, route des Jeunes, P. O. Box 239, CH-1211 Geneva 8 (CH).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BAAKLINI, Joseph** [LB/US]; 48 Stratford Avenue, Ewing, NJ 08618 (US).
SKIFF, Ronald Harry [US/US]; 28 Marlin Drive, Whippany, NJ 07981 (US).

(74) Agent: **DALE, Gavin**; Firmenich SA, 1, route des Jeunes, P. O. Box 239, CH-1211 Geneva 8 (CH).

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(54) Title: MOUTHFEEL ENHANCING COMPONENT

(57) Abstract: A mouthfeel enhancing component for a foodstuff or beverage is prepared by washing an edible liquid oil with an alcoholic agent for a sufficient time and at a temperature sufficient to form light and heavy phases wherein the heavy phase contains a mouthfeel enhancing component; and recovering the heavy phase for use as the mouthfeel enhancing component.

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MOUTHFEEL ENHANCING COMPONENT

TECHNICAL FIELD

5 The present invention relates to a mouthfeel enhancing component for a foodstuff or beverage and to a method for making the same. The component has particular utility as a flavour improver in ingestible products, particularly in foodstuffs, and especially in beverages sweetened with other than natural sugar, e.g., artificial sweeteners, as the component masks the taste of such sweeteners.

10

BACKGROUND AND PRIOR ART

Sugar is the most commonly used sweetener and the taste of sugar is what people all over the world expect from a sweet product. Sugar imparts sweetness to the product but in addition to that, it provides a mouthfeel and an aftertaste which is pleasant. Attempts have been made to analyze the components affecting the taste and texture of sugar, but the complexity of the system is so great that no clear picture of the active components has been obtained.

20 Sugar has a high caloric value and a cariogenic impact on the teeth. This has encouraged the development of artificial or non-sucrose sweeteners as sugar replacements in food technology, especially in diet and low-calorie foods and beverages. These artificial sweeteners are either essentially calorie-free, which are often referred to as low-calorie or intense sweeteners, or they have a significantly reduced calorie content. Examples of low-calorie sweeteners, which are used in beverages and other ingestible products, are 25 saccharin, aspartame, potassium acesulfame, sucralose, alitame, and cyclamate. Other new sweeteners are being developed, for example tagatose and trehalose.

These low-calorie sweeteners, however, lack the bulk needed for many products in which they are used. For this reason, it is known in the art to include various additives in combination with the artificial sweetener in an attempt to provide bulk and improve texture and mouthfeel. For example, various polyols such as xylitol, sorbitol, lactitol, maltitol, mannitol, erythritol and hydrogenated starch hydrolysates have been used for this purpose.

In addition, many non-sucrose sweeteners and especially artificial sweeteners have the disadvantage that their taste when added to food products is different from that of sugar. Modification of the taste of these sweeteners closer to that of sugar or to a form that is otherwise more palatable to consumers would thus be desirable. For this reason, food and beverage manufacturers have been using blends instead of single sweeteners in reduced-calorie beverages, as such blends can improve the properties of such beverage products. By creating new blends of sweeteners or modifying the proportions of sweeteners in current blends, manufacturers can optimize the sweetening compositions for specific types and flavours of beverages. However, these remain insufficient for providing the desired taste and mouthfeel properties in many foodstuffs and beverages.

As product manufacturers remain interested in masking the aftertaste and in providing more mouthfeel for artificially sweetened and low calorie beverages, research is being conducted for ways of reducing the sugar content in current products without changing the taste and mouthfeel attributed by sugar and high fructose corn syrup. The present invention seeks to address these needs and/or to provide an additive that can achieve the desired results.

SUMMARY OF THE INVENTION

Accordingly, the present invention provides a method of making a mouthfeel enhancing component for a foodstuff or beverage which comprises washing an edible liquid oil with an alcoholic agent for a sufficient time and at a temperature sufficient to form light and heavy phases wherein the heavy phase contains a mouthfeel enhancing component; and recovering the heavy phase for use as the mouthfeel enhancing component.

The invention also provides a mouthfeel enhancing component in the form of a clear liquid produced by the methods disclosed herein.

The invention further provides an edible product comprising a foodstuff or beverage that contains a mouthfeel enhancing amount of the mouthfeel enhancing component disclosed herein.

In a further aspect, the invention provides a method of masking or ameliorating the taste or aftertaste of an artificially flavoured foodstuff, which comprises including one of the mouthfeel enhancing components disclosed herein in or upon the foodstuff in an amount effective to at least partially mask or ameliorate the taste or aftertaste of the artificial
5 sweetener in the foodstuff.

In yet another aspect, the invention provides the use of one of the mouthfeel enhancing components disclosed herein in or upon the foodstuff in an amount effective to at least partially mask or ameliorate the taste or aftertaste of the artificial sweetener in the
10 foodstuff.

DETAILED DESCRIPTION

The present invention relates to treating an edible oil via a special process to obtain the
15 mouthfeel enhancing component from the oil.

Suitable edible liquid oils from which the mouthfeel enhancing component can be obtained include vegetable oil, corn oil, soy oil, olive oil, canola oil, palm oil, Neobee or mixtures thereof. Palm oil is particularly preferred due to its greater stability as well as
20 that of the resulting mouthfeel enhancing component.

The alcoholic agent used to wash the oil comprises one or more C2-C20 alcohols that have one to three hydroxyl groups. Particularly preferred are combinations of such alcohols that are sequentially or simultaneously mixed with the oil. Even more
25 preferably, the alcoholic agent comprises one alcohol having one hydroxyl group, one alcohol having two hydroxyl groups and one alcohol having three hydroxyl groups.

To obtain the desired extraction, the sufficient temperature is 15°C to 30°C and the time is between 10 and 90 minutes. The heavy phase is advantageously recovered by
30 separating it from the light phase. Preferably, this separation is conducted by decanting the light phase from the heavy phase at 0°C or less for 6 to 12 hours. For example, the washing can be conducted by contacting the palm oil with ethanol for 10 to 30 minutes, propylene glycol for 20 to 50 minutes and glycerin for 20 to 50 minutes, with the relative

amount of propylene glycol and glycerin being between 1:2-5 and the amount of ethanol is about the same as the amount of propylene glycol.

5 The mouthfeel enhancing component produced according to these methods is particularly suitable for use in edible products and is present in an amount effective to produce the desired mouthfeel enhancing characteristics.

10 Thus, in the context of the present invention, an "effective amount" of the mouthfeel enhancer/flavour improver denotes an amount which, when included in an ingestible product, improves the organoleptic characteristics, and generally, the mouthfeel and taste of the product, in a detectable and more desirable way compared to products that do not contain the component. The effective amount varies according to ingestible product and the route of production of the mouthfeel enhancer/flavour improver. As examples, the amount is typically in the order of 50 to 20'000 ppm (0.005 to 2%), more preferably
15 10'000 ppm or less (1% or less), even more preferably in the order of 100 to 10'000ppm (0.01 to 1%) and most preferably in the order of 200 to 5'000ppm (0.02 to 0.5%), based on the total amount of the ingestible product. The skilled artisan can determine the most preferred amount to use in their specific application by conducting routine testing.

20 Similarly, when the mouthfeel enhancer is present in edible products containing an artificial sweetener, the "effective amount" is that which at least partially masks or ameliorates the taste or aftertaste of the artificial sweetener. This is generally in an amount of between about 0.005 to 2%, more preferably 1% or less, even more preferably between about 0.01 to 1%, most preferably between about 0.02 to 0.5%, based on the
25 total weight of the ingestible product.

The mouthfeel enhancing component is preferably a clear fluid. This provides the advantage that it can be used as an additive without causing discoloration or with minimal visible detection. This renders it particularly suitable for use in beverages. Of course,
30 this does not exclude its use in other foodstuffs as well.

If the mouthfeel enhancing component is not in the form of a clear liquid, conventional filtering or other steps can be used to obtain a clear solution.

The mouthfeel enhancer can preferably be used in essentially any diet (artificially sweetened) or low calorie (containing sugar and or high fructose corn syrup less than 6 Brix) beverages to mimic the mouthfeel perception of conventional fully sugar based beverages (i.e., those having a Brix that is typically between 9 and 12). When used for this purpose, the invention provides a number of advantages, namely the body of diet and low calorie beverages can be improved to essentially match that of conventional sugar based beverages, the mouth coating of diet and low calorie beverages can be improved to match the perception of conventional sugar based beverages, the viscosity perception of such diet and low calorie beverages is increased, and the after taste of the artificial sweetener is minimized or preferably is suppressed.

The mouthfeel enhancing component is made by a relatively simple but counterintuitive process. Rather than trying to conduct a comprehensive extraction of one substance from another, it has been unexpectedly found that simple washing of an edible oil with an alcoholic agent is all that is needed to obtain the component. Moreover, the component is usually obtained as a clear solution, which facilitates its addition to a wide variety of foodstuffs or beverages without being visibly detectable.

The washing is conducted by simply mixing the oil and agent in a suitable vessel or container and then allowing the mixture to stand for a period of time. Stirring or light agitation can be used if desired to assure contact of the agent and the oil, but this is not critical. Certainly, turbulent mixing is not required although it can be used if desired. The temperature is not critical and generally, room temperature (i.e. 20 to 25°C) is adequate. The time of contact can also vary, with between 10 and 90 minutes being adequate in most cases. When multiple alcoholic agents are used, each can be in contact with the oil for a period of time (e.g., 10 to 50 minutes each) or they can be mixed together and then placed in contact with the oil for the same period of time. Heating is not necessary but it does not detract from the process. If desired, some heating can be applied with stirring to reduce the contact time between the oil and agent, but again this is neither mandatory nor particularly desirable. These variables can be selected based on routine testing, if desired or necessary, but simple contact at room temperature with very little stirring is more than sufficient to form the desired component.

The alcoholic agent can be one or more C2-C20 alcohols that have one to three hydroxyl groups. The invention is operable with a single agent, such as a C2 to C8 aliphatic alcohol, but it has been found that the use of a combination of agents leads to more desirable components. For example, the combination of a C2 to C8 aliphatic alcohol with
5 a C3 to C8 diol or triol leads to superior mouthfeel enhancing components. The most preferred alcoholic agent is the combination of a C2 to C8 aliphatic alcohol, a C3 to C8 diol and a C3 to C10 triol.

Another variable that is not critical is the relative amount of each component to be
10 contacted and mixed in the vessel. When one alcoholic component is to be used, the relative amount of oil and agent can vary between 20 and 80% of each. When two alcoholic agents are used, the relative amount for each agent can be between one-third to four times as much of the agent by weight compared to the weight of the oil. Furthermore, when three alcoholic agents are to be used, the relative amounts will be
15 between one-half and four times as much as the weight of the oil (for each agent), and preferably between six times and three times as much as the weight of the oil. Of course, there are a myriad of combinations of such agents and amounts that could be used and a skilled artisan can conduct routine tests to determine which ones are best for any particular oil. The examples herein also illustrate certain preferred combinations of such
20 alcohols that can be sequentially or simultaneously mixed with the oil.

After the washing is completed, the vessel will contain two phases, a heavy phase that comprises the mouthfeel enhancing component and a light phase that is free of this component. The mouthfeel enhancing component can then be obtained from the vessel in
25 any one of a variety of ways. The simplest is by decanting the vessel. Generally, this decanting is conducted at a relatively low temperature (around -10 to 0°C) over an extended period of about 8 to 10 hours. Other conventional phase separation techniques can be used, if desired.

30 A highly preferred washing is conducted by contacting palm oil with three alcoholic agents, including ethanol or other alcohols, such C3 or C4 alcohols, for 10 to 30 minutes, propylene glycol or other diols, such as C4 to C6 diols for 20 to 50 minutes and glycerin or other triols, such as C3 to C6 triols for 20 to 50 minutes. The relative amount of propylene glycol and glycerin is between 1:2-5 and the amount of ethanol is about the

same as the amount of propylene glycol. This mouthfeel enhancing component has been found to impart the best organoleptic properties to artificially sweetened beverages.

As noted, the component is highly desirable for addition to flavoured water, juices, soda, pop, coffee, tea, milk-based drinks or other hot or cold beverages. It is particularly useful when the beverage contains an artificial sweetener for the reasons noted herein. In that situation, the mouthfeel enhancing component is preferably present in an effective amount to at least partially mask or ameliorate the taste of the artificial sweetener.

10 **EXAMPLES**

The following examples illustrate preferred mouthfeel enhancing components and how to obtain them. All amounts are on a weight by weight basis unless indicated otherwise.

15 In general, desirable components are obtained by washing a vegetable oil with a preferred alcoholic combination of ethanol, propylene glycol and glycerin as listed in the formulae below.

Example 1

20 In a vessel the stated amount of vegetable oil is mixed with ethanol for 20 minutes. Next, propylene glycol and glycerin are added and the resulting mixture is mixed or stirred for an additional 30 minutes to form a light phase and a heavy phase. The liquid in the vessel is then decanted at 30°C for 8 hours. The heavy phase is then filtered using conventional
25 filtration media (e.g. pre-coated cloth, paper pads or similar filtration media) which would be known to one skilled in the art, to remove residual oil and the resulting clear flavour is used as the mouthfeel enhancer/flavour modifier.

Various formulae were tested and found to provide useful components:

30	FORMULA # 1	Weight (wt. %)
	Olive Oil	20.5%
	Ethanol	15.5%
	Glycerin	50.0%
35	Propylene Glycol	14.0%

	FORMULA # 2	Weight (wt. %)
	Corn Oil	20.5%
	Ethanol	15.5%
5	Glycerin	50.0%
	Propylene Glycol	14.0%

	FORMULA # 3	Weight (wt. %)
	Vegetable Oil	20.5%
10	Ethanol	15.5%
	Glycerin	50.0%
	Propylene Glycol	14.0%

	FORMULA # 4	Weight (wt. %)
15	Neobee M-5	20.5%
	Ethanol	15.5%
	Glycerin	50.0%
	Propylene Glycol	14.0%

20	FORMULA # 5	Weight (wt. %)
	Canola Oil	20.5%
	Ethanol	15.5%
	Glycerin	50.0%
	Propylene Glycol	14.0%

25	FORMULA # 6	Weight (wt. %)
	Palm Oil	20.7%
	Ethanol	12.0%
	Glycerin	14.4%
30	Propylene Glycol	52.9%

	FORMULA # 7	Weight (wt. %)
	Palm Oil	20.7%
	Ethanol	12.0%

	Glycerin	51.7%
	Propylene Glycol	15.6%
	FORMULA # 8	Weight (wt. %)
5	Palm Oil	20.0%
	Ethanol	15.0%
	Glycerin	45.0%
	Propylene Glycol	20.0%
10	FORMULA #9	Weight (wt. %)
	Palm Oil	20.0%
	Ethanol	20.0%
	Glycerin	35.0%
	Propylene Glycol	25.0%
15	FORMULA #10	Weight (wt. %)
	Palm Oil	10.0%
	Ethanol	50.0%
	Glycerin	30.0%
20	Propylene Glycol	10.0%
	FORMULA #11	Weight (wt. %)
	Palm Oil	20.0%
	Ethanol	70.0%
25	Triacetin	10.0%
	FORMULA #12	Weight (wt. %)
	Palm Oil	15.0%
	Ethanol	30.0%
30	Glycerin	45.0%
	Triacetin	10.0%
	FORMULA # 13	Weight (wt. %)
	Palm Oil	5.0%
35	Ethanol	30.0%

Glycerin	40.0%
Propylene Glycol	25.0%

Each of the mouthfeel enhancing components from these formulae was added to an
 5 artificially sweetened (i.e., aspartame) or low calorie (i.e., fructose) beverage. A
 significant improvement in taste and mouthfeel was discerned compared to the same
 beverage without the component.

The component can also be used, as is or in combination with other flavouring
 10 ingredients, in sugar and juice containing beverages to enhance the mouthfeel and taste of
 such beverages.

Example 2

15 Typical beverage applications include the following:

A: Diet Cola

	Ingredients	Amounts (wt. %)
	Aspartame	3
20	Potassium Benzoate	2.76
	Caffeine	0.60
	Phosphoric Acid (85%)	2.47
	Caramel color, (sethness DS400)	8.00
	Water	QS to 1000 ml
25	Sample Flavour	Use Level % As Consumed
	Natural Flavour (Cola Type)	0.06
	Mouthfeel Enhancer	0.20

30 B: Flavoured water

	Ingredients	Amounts
	Fructose	4.00 g
	Sucralose	0.01 g
	Citric Acid	0.13 g
35	Water	QS to 100.00 g

Sample Flavour	Use Level % As Consumed
Grapefruit	0.05
Mouthfeel Enhancer	0.20

- 5 As noted, the invention does not require the specific formulations disclosed in the examples, it was found that all ingredients of those formulations were found to be the most desirable. Formula # 7 showed the most mouthfeel enhancement in various beverage applications, while formulae # 1 to 5 experienced some oil oxidation. This can be compensated for somewhat by adding antioxidants such as ascorbates. Palm oil
- 10 showed the most stability during the process and storage and did not require any antioxidants.

CLAIMS

1. A method of making a mouthfeel enhancing component for a foodstuff or beverage which comprises the steps of:
- 5 (i) washing an edible liquid oil with an alcoholic agent for a sufficient time and at a temperature sufficient to form light and heavy phases wherein the heavy phase contains a mouthfeel enhancing component; and
- (ii) recovering the heavy phase for use as the mouthfeel enhancing component.
- 10 2. The method of claim 1, wherein the edible liquid oil is vegetable oil, corn oil, soy oil, olive oil, canola oil, palm oil, Neobee or mixtures thereof.
3. The method of claim 2, wherein the edible liquid oil is palm oil.
- 15 4. The method of claim 1, wherein the alcoholic agent comprises one or more C2-C20 alcohols that have one to three hydroxyl groups.
5. The method of claim 1, wherein the sufficient temperature is 15°C to 30°C and the time is between 10 and 90 minutes.
- 20 6. The method of claim 1, wherein the heavy phase is recovered by separating it from the light phase.
7. The method of claim 6, wherein the separation is conducted by decanting the light
- 25 phase from the heavy phase at 0°C or less for 6 to 12 hours.
8. The method of claim 4, wherein the edible liquid oil is palm oil and the alcoholic agent comprises one alcohol having one hydroxyl group, one alcohol having two hydroxyl groups and one alcohol having three hydroxyl groups.
- 30 9. The method of claim 8, wherein the washing is conducted by contacting the palm oil with ethanol for 10 to 30 minutes, propylene glycol for 20 to 50 minutes and glycerin for 20 to 50 minutes, with the relative amount of propylene glycol and glycerin being

between 1:2-5 and the amount of ethanol is about the same as the amount of propylene glycol.

10. A mouthfeel enhancing component in the form of a clear liquid obtainable by the
5 method of claim 1.

11. An edible product comprising a foodstuff that contains an effective amount of the mouthfeel enhancing component of claim 10.

10 12. The product of claim 11, wherein the foodstuff is a beverage.

13. The product of claim 12 wherein the beverage contains an artificial sweetener and the mouthfeel enhancing component is present in an amount to at least partially mask or ameliorate the taste or aftertaste of the artificial sweetener.

15

14. The product of claim 11, wherein the mouthfeel enhancing component is present in an amount of between about 0.02 to 5% by weight of the foodstuff.

15. A method of masking or ameliorating the taste of an artificially flavoured
20 foodstuff, which comprises including the mouthfeel enhancing component of claim 10 in or upon the foodstuff in an effective amount to at least partially mask or ameliorate the taste or aftertaste of the artificial sweetener in the foodstuff.

16. The method of claim 15, wherein the mouthfeel enhancing component is present
25 in an amount of between about 0.02 to 5% by weight of the foodstuff.

17. Use of the mouthfeel enhancing component of claim 10 in or upon the foodstuff in an amount effective to at least partially mask or ameliorate the taste or aftertaste of the artificial sweetener in the foodstuff.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

INV. A23L1/22 A23L1/221 C11B1/10 A23L1/30 C11B9/02
C11B3/10 C11B3/00

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A23L C11B

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

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

EPO-Internal, FSTA, BIOSIS, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.



See patent family annex.

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 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Popa, Marian

INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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