

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
14 January 2010 (14.01.2010)

PCT

(10) International Publication Number  
**WO 2010/005297 A1**

(51) International Patent Classification:

A23C 11/04 (2006.01) A23F 3/30 (2006.01)  
A23F 5/40 (2006.01) A23G 1/56 (2006.01)

(21) International Application Number:

PCT/NL2009/050347

(22) International Filing Date:

16 June 2009 (16.06.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

08158351.0 16 June 2008 (16.06.2008) EP

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(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: FOAMING COMPOSITION

(57) Abstract: The invention pertains to a foaming composition for beverages, which comprises fats, carbohydrates and proteins. The protein content, on a dry weight basis, is between 3 and 9%, and comprises a whey protein and casein, with a whey protein to casein weight ratio between 0.4 and 1.0. The fat content is preferably 20-45 % on a dry weight basis.



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## Foaming composition

[0001] The present invention pertains to a foaming composition for use in beverages such as coffee drinks of the cappuccino type.

### *Background*

5 [0002] Instant powders that upon dissolution produce foaming beverages are well known. Usually these powders are a dry mix of a soluble beverage powder and a soluble foamer. The soluble foamer contains vacuoles that contain gas which, upon dissolution of the powder, produce foam. Upon the addition of (hot) water or milk, a beverage is formed, which has a foam on its upper surface. Such soluble foamers are  
10 often combined with coffee powders, coffee or tea extracts, chocolate powders or instant soup powder and are thus suitable for preparing ready-to-drink beverages such as cappuccino. Over the years, an increasing demand for these types of dry, particulate soluble foamers has led to the development of various types of soluble foamers.

[0003] EP 0885566 (Nestlé) discloses a cappuccino foamer containing, on a dry  
15 weight basis, 10-30% (20-25%) non-fat milk solids, 5-20% (10-15%) sweet whey, 5-25% (10-20%) of (vegetable) fat and 30-70% (40-50%) of carbohydrate sweetener, and further flavours and the like. According to the examples of in EP 0885566, a whey protein to casein weight ratio of about 0.4 is used.

[0004] US 6,168,819 (Kraft) discloses a cappuccino foamer containing, on a dry  
20 weight basis, 3-30% (10-15%) whey protein, 5-50% (25-35%) fat, 20-92% (30-55%) of carbohydrates (carrier), and further optional emulsifiers, surfactants etc. The whey protein is denatured for 40-90% (60-75%).

[0005] US 6,129,943 (Kraft) discloses a dry cappuccino foamer containing, on a dry  
25 weight basis, 1-30% (10-20%) whey protein, 0-30 (10-15%) fat, 20-90% (50-70%) of gasified carbohydrates (carrier).

[0006] EP 813815 (Kraft) describes a foaming creamer containing 20-40% (10-20%)  
milk protein, 5-60 (15-25%) fat, 10-75% (30-55%) of carbohydrates (carrier).

[0007] WO 03/041506 describes a low-fat, high-protein whitener.

[0008] The prior art foaming compositions have a drawback in that they use relatively  
30 expensive ingredients rendering large scale production less economically attractive.

[0009] It is therefore an object of the present invention to provide a foaming composition which can be produced more cost-effectively than the prior art compositions, while maintaining or possibly improving foam characteristics.

*Summary of the invention*

**[0010]** It was found that a composition having excellent foaming performance can be provided by lowering the protein level to well below 10 %, on a dry weight basis, while using a specific whey protein to casein weight ratio. This finding is contrary to current  
5 assumptions that high protein levels of well above 10% are essential for obtaining sufficient foam height and stability.

*Detailed description*

**[0011]** Thus the invention pertains to a foaming composition for hot and cold beverages and other liquid or semi-liquid food products, such as coffee, cocoa, milk,  
10 tea, soup and sauces, comprising, on a dry weight basis, fats, carbohydrates and proteins, characterised by a protein content, on a dry weight basis, of between 3 and 9%, and a whey protein to casein weight ratio between 0.4 and 1.0.

**[0012]** The low protein content is an important characteristic of the composition of the invention. Preferably, the protein content, on a dry weight basis, is at least 4%,  
15 and/or up to 8%, more preferably at least 4.5% or even at least 5%, and/or up to 7% protein.

**[0013]** The protein component of the composition consists at least partly of milk protein, in particular for at least 60%, more in particular for at least 80%. The remainder can be other animal protein, e.g. egg protein, or vegetable protein, such as  
20 soy protein. The total milk protein content, on dry weight basis, is preferably at least 3%, more preferably at least 4 %, most preferably at least 4.5%, up to e.g. 8 %, or especially up to 7%.

**[0014]** It is preferred, for good foaming characteristics, that the milk protein comprises a certain level of casein. Preferably, the proportion of casein in the milk  
25 protein component of the composition of the invention is lower than in total milk protein, which is in the order of 77 % (whey protein to casein ratio of about 0.29). Total milk protein is defined herein as being substantially equivalent to skim milk (powder), also referred to as skim milk solids. Specifically, the whey protein to casein weight ratio in the foaming composition of the invention is between 0.4 and 1.0, more  
30 specifically at least 0.5, especially at least 0.6, up to preferably 0.95, more preferably to 0.9. Best results are obtained with a whey protein to casein weight ratio of between 0.7 and 0.85.

**[0015]** In a preferred embodiment, the composition of the invention may comprise skim milk solids and whey protein concentrate (WPC). Preferably, the whey protein  
35 concentrate has a protein content of more than 20 wt. %, preferably more than 25 % (w/w). Whey protein concentrates or isolates having high protein content may be used

but are not especially required. Therefore, preferred WPC's have a protein content of lower than 90 wt. %. Most preferred WPC's comprise WPC 30, WPC 35, WPC 60, WPC 80 or mixtures thereof.

5 **[0016]** In another preferred embodiment, the composition of the invention comprises less than 15 % (w/w), but preferably more than 7.0 % (w/w) skim milk solids drawn to the total dry weight of the composition of the invention.

**[0017]** In a preferred embodiment leading to optimum foaming results, the solubility index of at least the milk protein of the foaming composition, as determined by the NSI (Nitrogen Solubility Index: ISO 15323 - IDF 173:2002) at the pH of the foaming  
10 composition, is high. Preferably the NSI is 70 or higher, more preferably 80 or higher. NSI is measured at pH 7.3 in a 10 % w/w solution of the foaming composition.

**[0018]** Another relevant factor in the foaming composition of the invention is the level of lactose. Too high lactose levels may cause solubility problems due to limited solubility of lactose. The lactose level should preferably be lower than found in whey.  
15 Preferably, the whey protein to lactose weight ratio is at least 0.2, more preferably at least 0.24, most preferably at least 0.27, up to e.g. 0.5, preferably up to 0.4, most preferably up to 0.36. In absolute terms, the lactose level of the foaming composition, on a dry weight basis, is less than 10%, preferably between 5 and 9%.

**[0019]** In addition to or instead of lactose, the foaming composition contains other  
20 carbohydrates. Preferably the other carbohydrates at least partly have a sweetening effect, but may also serve as a bulking agent. Thus, the carbohydrates preferably comprise one or more of fructose, glucose, sucrose and short-chain fructans. Alternatively, the carbohydrates are digestible or non-digestible non-sweet carbohydrates, which are used in combination with an artificial (non-carbohydrate)  
25 sweetener. Further carbohydrates can be maltose, maltodextrins, or mixtures thereof with glucose, inulin, oligofructose or further carbohydrates having a stabilising effect. Especially preferred is a carbohydrate composition comprising glucose syrup having a DE (dextrose equivalent) of at least 20 up to e.g. 50, especially of from 30 to 40. The lactose to total carbohydrate weight ratio is preferably below 0.25, in particular  
30 between 0.10 and 0.20, more preferably 0.12 to 0.18. The level of glucose and glucose oligomers (= glucose syrup) is preferably between 20 and 60 wt.%, more preferably 35-55 wt.% of the foaming composition. The total carbohydrate content, i.e. including any lactose, is preferably between 25 and 70 wt.% (dry) of the foaming composition, more preferably 30-65, most preferably 40-60 wt.%.

35 **[0020]** The foaming composition according to the invention further contains fats, preferably vegetable fats. Preferred examples of fat types comprise soy, palm or coconut oil. Especially preferred are so-called lauric fats, i.e. fats having a relatively

high level of C12 and C14 fatty acids, mostly more than 40 wt. %. Suitable examples are coconut oil, palm kernel oil, and hardened coconut or palm kernel oil, and fractionated, non-hydrogenated coconut or palm kernel oil, or mixtures thereof. The fat level, on a dry weight basis of the foaming composition, is preferably at least 15 %, more preferably a least 20%, most preferably at least 25% or even at least 28%, up to e.g. 60%, preferably up to 50%, more preferably up to 45%, most preferably up to 40%. In a preferred embodiment, the proportion of lauric fats is at least 50% of the fat component. On fatty acid basis, the proportion of medium-chain fatty acids (C<sub>8</sub>-C<sub>14</sub>) is preferably at least 35% (w/w), up to e.g. 98%, more preferably between 45 and 95%, most preferably between 55 and 90 % (w/w). The proportion of C<sub>12</sub> and C<sub>14</sub> fatty acids is preferably between 30 and 80%, more preferably between 40 and 75%. The level of unsaturated fatty acids is preferably below 50%, more preferably below 30% (w/w). The level of trans fatty acids should be low, preferably lower than 1% of the fat component.

**[0021]** The foaming composition can further contain minor (<10%) components, such as salts or other minerals, in particular buffering salts, e.g. dipotassium phosphate or disodium phosphate, or free flowing agents, like tricalcium phosphate or silicon dioxide. Preferably the amount of dipotassium phosphate and/or disodium phosphate in the foaming composition is between 0.1 % and 5.0 %, more preferably between 0.3 % and 4.0 %, more preferably between 1.5 % and 3.0 %, all on w/w basis.

**[0022]** The foaming composition preferably has a tapped bulk density of between 100 and 400 g/L, preferably between 150 and 300 g/L, more preferably between 180 and 250 g/L. The foaming composition has a pH value of 6.8 or higher, preferably 7.0 or higher, more preferably 7.2 or higher, up to pH 7.5, preferably up to 7.4, more preferably up to 7.3.

**[0023]** The invention further relates to a process of preparing a dry foaming composition, comprising mixing fats, carbohydrates and proteins in an aqueous medium in such a manner that, on a dry weight basis, a protein content of between 3 and 9 %, and a whey protein to casein ratio of between 0.4 and 1.0 is obtained; homogenising, introducing a gas in the mixture and drying it. The foaming composition can be prepared following methods known to the skilled person. In general the components as detailed above are mixed, homogenised and heated, followed by introducing a gas such as nitrogen or carbon dioxide into the liquid composition and then spray-drying. In a preferred embodiment, at least one of the proteins used as defined above is added to the mixture in liquid form. In a preferred embodiment, the at least one protein is skim milk solids and is added as a liquid skim milk protein concentrate; more preferred, the liquid skim milk protein concentrate has a solids content of 20 – 55 % w/w, most preferred between 30 – 40 % wt/wt.

[0024] The bulk density of the dry foaming composition can be controlled by adjusting the pressure of the injected gas before the spray drying step.

[0025] The invention also pertains to an instant beverage composition comprising the foaming composition described above, together with one or more of:

- 5       - a thickener and/or stabiliser, e.g. carboxymethyl cellulose, hydroxypropyl methyl cellulose, carrageenan, xanthan gum, in amounts of 0.1 – 0.8 wt. %; to impart viscosity or mouthfeel;
- one or more additional carbohydrates, e.g. maltodextrins, sucrose in amounts of 20 – 50 wt %; for additional sweetening;
- 10      - milk proteins, e.g. skim milk powders in amounts of 5 – 20 wt %; for better mouthfeel and additional whitening power;
- flavours; e.g. vanilla, chocolate, cinnamon powder, cardamom powder, chai flavour; salt (NaCl), Q.S.;
- vegetable and/or animal extracts or powders, e.g. coffee extract, cocoa powder, 15      tea extract; or savoury powders, e.g. bouillon, soup powders and/or meat extract powders, depending on the final application;

all weight percentages being on dry weight basis. Likewise, the invention pertains to a process for producing such a beverage composition by mixing the foaming composition described before with one or more of the above ingredients, preferably at least 20      composting the vegetable and animal extract.

[0026] The product and the process of the invention result in beverages having an attractive and tasteful foam layer. The beverages can be hot beverages such as coffee, especially of the cappuccino type, cocoa, milk, tea, soup, or cold beverages such as ice cappuccino, milk shake, cold soups, but also semi-liquid products such as sauces. The 25      foam layer is stable for at least 30 minutes up to several hours.

### Example 1

1.1 kg Skim milk powder was dissolved in 3.9 kg water of 50°C, and 6.24 kg glucose syrup (72 % solids, DE value of 35, Syral, France) and 0.52 kg of WPC 35 (Lacprodan 35, ARLA FOODS, Denmark) was added. 3.39 kg coconut oil (GR GH 30-40, 30      Unimills, The Netherlands) was added. The mixture was heated to 60°C. Finally 0.2 kg dipotassium phosphate was added. The final mixture was heated for 10 minutes at 80°C, homogenised in a double-stage homogeniser at 150 bar and 30 bar, respectively. Nitrogen gas was injected into the emulsion and the mixture was spray-dried to obtain a powder having a tapped bulk density of 200 g/L. Total protein content was 6.0 % and 35      the whey protein to casein ratio was 0.8. Total carbohydrate content was 54 % (w/w) and the total lipid content was 36 %. The whey protein to lactose weight ratio was 0.33.

**Example 2**

To 30.5 kg Skim milk concentrate (36 % solids), 18 litres of water, 62.4 kg glucose syrup (72 % solids, DE value of 35, Syral) and 5.19 kg of WPC 35 (Lacprodan 35) was added. 33.5 kg coconut oil (GR GH 30-40) was added. The mixture was heated to 5 60°C. Finally 2.0 kg dipotassium phosphate was added. The final mixture was heated for 10 minutes at 85°C, homogenised at 150/30 bar. Nitrogen gas was injected into the emulsion and the mixture was spray dried to obtain a powder having a tapped bulk density of 210 g/L. Total protein content was 6.0 % and the whey protein to casein ratio was 0.8.

10 **Example 3**

To 27.03 kg Skim milk concentrate (36 % solids), 25 litres of water, 64.5 kg glucose syrup (72 % solids, DE value of 35, Syral) and 3.69 kg of WPC 35 (Lacprodan 35) was added. 35.05 kg coconut oil (GR GH 30-40) was added. The mixture was heated to 60°C. Finally 2.0 kg dipotassium phosphate was added. The final mixture was heated 15 for 10 minutes at 85°C, homogenised at 150/30 bar. Nitrogen gas was injected into the emulsion and the mixture was spray dried to obtain a powder having a tapped bulk density of 210 g/L. Total protein content was 5.0 % and the whey protein to casein ratio was 0.7.

***Comparative example***

20 In a similar experiment as above (nr. 2), a dry foaming composition was made having a low protein content but a whey protein to casein ratio of > 1.

To 22.2 kg Skim milk concentrate (36 % solids), 38 litres of water, 62.0 kg glucose syrup (72 % solids, DE value of 35, Syral, France) and 8.57 kg of WPC 35 (Lacprodan 35, ARLA FOODS, Denmark) was added. 33.7 Kg coconut oil (GR GH 30-40, 25 Unimills, the Netherlands) was added. The mixture was heated to 60°C. Finally 2.0 kg dipotassium phosphate was added. The final mixture was heated for 10 minutes at 85°C, homogenised at 150/30 Bar. Nitrogen gas was injected into the emulsion and the mixture was spray dried to obtain a powder having a tapped bulk density of 220 g/L. Total protein content was 6.0 % and the whey protein to casein ratio was 1.53.

**Example 4**

**Foam testing** of compositions of Examples 1-3 and Comparative Example.

**Ingredients:**

Foaming ingredient, 15 grams

5 Powdered sugar, 5 grams

Hot coffee from a coffee machine ( $80\pm 1^\circ\text{C}$ ), 100 ml.

**Apparatus and tools**

10 Measuring spindle with a diameter of 5,6 cm and 6 holes with and diameter of 5 mm evenly distributed over the spindle base, and 1 mm from the outside diameter of the spindle base.

Beaker of 250 ml, HM, Ø 5,8 cm

Ruler, 1 mm scale

**Method**

15 Weigh the foamer and powdered sugar in the 250 ml beaker. Cover the beaker with a tissue and blend the content thoroughly. Add 100 ml of hot coffee and stir with a spoon until the foamer is dissolved.

20 Place the beaker on the laboratory lift and raise the beaker till the spindle is 1-2 cm above the foam layer. After 5 minutes, allowing the foam layer to develop and stabilise, further raise the beaker to the spindle bringing the spindle into contact with the foam surface, just allowing the foam to penetrate into the holes of the spindle. Measure the foam height with the ruler between the bottom of the spindle and the borderline between coffee and foam layer in the beaker; the foam height reported in mm. The results are presented in Table 1.

*Table 1. Summary of the results*

	Example 1	Example 2	Example 3	Compar. Example
Protein content (%) of foaming composition	6.0	6.0	5.0	6.0
Whey protein/casein ratio	0.8	0.8	0.7	1.53
Foam height after 5 minutes (mm)	15	14	14	11
Foam characteristics	Fine, stable foam	Fine, stable foam	Fine, stable foam	Coarse foam
Taste etc.	Creamy, milky	Creamy, milky	Creamy, milky	Watery taste



**Example 5:** Instant Hot Cappuccino

Composition:		Wt. %
	• Powder according ex. 2	50.00
	• Powdered sugar	20.00
5	• Instant espresso powder	16.00
	• Skim milk powder	6.00
	• Maltodextrin Maldex 120 (Amylum)	7.07
	• HMC Walocel HM100 (Wolff Cellulosics, DE)	0.50
	• Salt	0.40
10	• Vanilla Flavour SN755795 (IFF, NL)	0.03

Mix the dry ingredients, empty 12.5 gram powder mix into a large cup. Pour 120 ml hot water into the cup and stir to dissolve the powder.

**Example 6:** Instant Hot Chocolate

Composition:		wt. %
15	• Powder according to ex. 2	35.01
	• Powdered sugar	31.00
	• Skim milk powder	15.00
	• Maltodextrin Maldex 120.(Amylum)	10.00
	• Cocoa powder DP 70 20-22% (Gerkens Cacao bv, Cargill, NL)	8.00
20	• Carrageenan Genuvisco CSM-2 (Danisco, DK)	0.30
	• Xanthan gum Grindsted 80 (Danisco, DK)	0.30
	• Salt	0.30
	• Chocolate flavour SN 755796	0.065
	• Vanilla flavour SN 755795 (IFF, NL)	0.025

25 Mix the dry ingredients, empty 25 gram powder into a large cup or mug; pour 120 ml hot water in the cup or mug while stirring to dissolve the powder.

**Example 7: Instant Hot Tea**

Composition:		Wt. %
	• Powder according ex. 2	50.00
	• Powdered sugar	26.60
5	• Maltodextrin 120 (Amylum)	12.44
	• Skim milk powder	7.25
	• Instant black tea (Finleys Tea Solutions, GB)	2.00
	• Cinnamon powder	0.65
	• CMC Walocel CRT 2000PA07.(Wolff Cellulosics, DE)	0.50
10	• Salt	0.30
	• Cardamom powder	0.20
	• Chai Powder flavour (SN 755792 IFF, NL)	0.06

15 Mix the dry ingredients; use 15.0 grams of this powder in a large cup or tea glass,  
pour 120 ml hot water into the cup or glass while stirring to dissolve the powder  
mix.

**Claims**

1. A foaming composition for beverages, comprising, on a dry weight basis, fats, carbohydrates and proteins, characterised by a protein content, on a dry weight basis, of between 3 and 9%, and a whey protein to casein weight ratio between 0.4 and 1.0.
2. A foaming composition according to claim 1, containing, on a dry weight basis, between 5 and 7% protein.
3. A foaming composition according to claim 1 or 2, wherein the whey protein to casein weight ratio is between 0.6 and 0.9.
4. A foaming composition according to any one of claims 1-3, containing, on a dry weight basis, between 20 and 45% of fats.
5. A foaming composition according to 4, wherein said fats comprise, on a dry weight basis of all fatty acids, between 30 and 80% of C<sub>12</sub> and C<sub>14</sub> fatty acids.
6. A foaming composition according to any one of claims 1-5, containing, on a dry weight basis, between 25 and 70% of carbohydrates.
7. A foaming composition according to any one of claims 1-6, wherein the whey protein to lactose weight ratio is at least 0.24, preferably between 0.27 and 0.36.
8. A foaming composition according to any one of claims 1-7, containing, on a dry weight basis, less than 10% lactose, preferably between 5 and 9%.
9. A foaming composition according to any one of claims 1-8, having a bulk density of between 100 and 400 g/l.
10. An instant beverage composition comprising the foaming composition according to any one of claims 1-8, together with one or more of:
  - a thickener;
  - a stabiliser;
  - flavours;
  - a vegetable extract or vegetable powder.

11. A process of producing a foaming composition for use in beverages, comprising:
  - mixing fats, carbohydrates and proteins in an aqueous medium in such a manner that, on a dry weight basis, a protein content of between 3 and 9 %, and a whey protein to casein ratio of between 0.4 and 1.0 is obtained;
  - homogenising;
  - introducing a gas in the mixture and
  - drying.
12. A process according to claim 11, wherein at least a part of said proteins are introduced in said mixing step in a liquid form having a dry solids content of 20-55 % (w/w).
13. A process of producing an instant beverage composition comprising mixing the foaming composition according to any one of claims 1-8 with a vegetable and/or animal extract or powder and one or more of:
  - a thickener;
  - a stabiliser;
  - flavours.
14. A process according to claim 13, wherein the vegetable and/or animal extract or powder is selected from coffee extract, cocoa powder, tea extract and savoury powders.

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/NL2009/050347

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. A23C11/04      A23F5/40      A23F3/30      A23G1/56

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)  
A23C A23F A23G

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, WPI Data, FSTA

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 885 566 A (NESTLE SA [CH]) 23 December 1998 (1998-12-23) cited in the application page 2, line 28 - line 50 page 3, line 2 - line 56	10, 13, 14
A	claims 1-10; examples 1,2	1-9, 11, 12
A	----- WO 00/44238 A (NESTLE SA [CH]; CHMIEL OLIVER [CH]; FURRER MARC [CH]; MAIER HANSPETER) 3 August 2000 (2000-08-03) page 1, line 34 - page 2, line 32 page 4, line 9 - page 6, line 34 claims 1-10; examples 1,4 -----	1-14
-/--		

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

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Date of the actual completion of the international search

30 September 2009

Date of mailing of the international search report

12/10/2009

Name and mailing address of the ISA/

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## INTERNATIONAL SEARCH REPORT

International application No

PCT/NL2009/050347

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 0 154 192 A (NESTLE SA [CH]) 11 September 1985 (1985-09-11) page 1, line 30 - page 3, line 32  page 4, line 12 - page 5, line 11; examples 5,6	10,13,14  1-9,11, 12
A	----- WO 2006/022540 A (FRIESLAND BRANDS BV [NL]; RIEGMAN RIEGMAN EDWIN AART [NL]) 2 March 2006 (2006-03-02) page 9, line 11 - page 11, line 18 page 13, line 3 - page 13, line 21; claims 1-21; examples 1,4	1-12
A	----- US 6 129 943 A (ZELLER BARY LYN [US] ET AL) 10 October 2000 (2000-10-10) cited in the application column 2, line 38 - column 3, line 4 claims 1-21; examples 1,4,5	1-12
A	----- WO 03/041506 A (MARS INC [US]; CHARMAN ELIZABETH [GB]) 22 May 2003 (2003-05-22) cited in the application example 1	1-12

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2009/050347

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0885566	A	23-12-1998	AT 224144 T 15-10-2002
			AU 733541 B2 17-05-2001
			BR 9802018 A 20-07-1999
			CA 2234043 A1 19-12-1998
			CN 1203749 A 06-01-1999
			DE 69807992 D1 24-10-2002
			DE 69807992 T2 28-05-2003
			DK 0885566 T3 04-11-2002
			ES 2182215 T3 01-03-2003
			HU 9801381 A2 01-02-1999
			ID 20446 A 24-12-1998
			JP 11056233 A 02-03-1999
			MA 24567 A1 31-12-1998
			NO 982682 A 21-12-1998
			NZ 330417 A 29-07-1999
			PL 326859 A1 21-12-1998
			PT 885566 E 28-02-2003
			RU 2201092 C2 27-03-2003
			TW 391862 B 01-06-2000
			ZA 9805330 A 20-12-1999
WO 0044238	A	03-08-2000	AT 278329 T 15-10-2004
			AU 765510 B2 18-09-2003
			AU 2104400 A 18-08-2000
			BR 9917031 A 29-01-2002
			CA 2360646 A1 03-08-2000
			CN 1367651 A 04-09-2002
			DE 69920970 D1 11-11-2004
			DE 69920970 T2 09-03-2006
			ES 2229808 T3 16-04-2005
			HK 1043021 A1 27-05-2005
			HU 0105447 A2 29-05-2002
			ID 30258 A 15-11-2001
			JP 2002537763 T 12-11-2002
			NO 20013631 A 24-07-2001
			NZ 513063 A 28-03-2003
			PL 350091 A1 04-11-2002
			PT 1148789 E 31-01-2005
			UA 73111 C2 15-10-2001
			US 2002018839 A1 14-02-2002
			ZA 200107079 A 26-02-2003
EP 0154192	A	11-09-1985	AU 576552 B2 01-09-1988
			AU 3845685 A 29-08-1985
			CA 1222410 A1 02-06-1987
			DE 3564071 D1 08-09-1988
			ES 8602361 A1 16-03-1986
			GB 2154422 A 11-09-1985
			GR 850401 A1 14-06-1985
			IE 55934 B1 27-02-1991
			IN 163753 A1 05-11-1988
			JP 1648641 C 13-03-1992
			JP 3013857 B 25-02-1991
			JP 60196148 A 04-10-1985
			MX 164783 B 23-09-1992
			NO 850654 A 21-08-1985
			NZ 211046 A 28-10-1988
PH 21353 A 15-10-1987			

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2009/050347

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
EP 0154192	A		PT 79986 A	01-03-1985
			SG 22888 G	30-09-1988
			US 4748040 A	31-05-1988
			US 4746527 A	24-05-1988
			ZA 8500873 A	25-09-1985
<hr/>				
WO 2006022540	A	02-03-2006	AR 050378 A1	18-10-2006
			CN 101048068 A	03-10-2007
			EP 1639899 A1	29-03-2006
			JP 2008510484 T	10-04-2008
<hr/>				
US 6129943	A	10-10-2000	AT 304294 T	15-09-2005
			CA 2311691 A1	22-12-2000
			CN 1305728 A	01-08-2001
			CO 5231175 A1	27-12-2002
			DE 60022583 D1	20-10-2005
			DE 60022583 T2	02-02-2006
			EP 1064850 A2	03-01-2001
			ES 2246813 T3	01-03-2006
			JP 3495690 B2	09-02-2004
			JP 2001017106 A	23-01-2001
			KR 20010066857 A	11-07-2001
			MX PA00005945 A	28-10-2004
<hr/>				
WO 03041506	A	22-05-2003	EP 1443826 A1	11-08-2004
			GB 2381731 A	14-05-2003
			JP 2005508645 T	07-04-2005
			US 2005008752 A1	13-01-2005
<hr/>				