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(54) Title: NON-FROZEN COATED AERATED CONFECTIONERY

(57) Abstract: The present invention is related to specific coated non-frozen aerated confectionery, which are fortified with specific nutrients. More particularly it relates to non-frozen aerated confectionery, such as a marshmallow.



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Non-Frozen Coated Aerated Confectionery

The present invention is related to specific coated non-frozen aerated confectionery, which are fortified with specific nutrients. More particularly it relates to non-frozen
5 aerated confectionery, such as a marshmallow.

For a healthy diet is very important to eat a sufficient amount of specific nutrients, especially dietary ingredients, such as vitamins, carotenoids, minerals as well as prebiotics and probiotics.

10

In nature these specific nutrients can be found in many sources. Some of these sources are not palatable.

While usually adult consumers have less problems to eat the desired amount of
15 these specific nutrients, it may be difficult for children to consume them.

There are many dietary supplements on the market (usually in the form of pills or powder), which contain any of these specific nutrients. However, some consumers are less likely to eat such products.

Another possibility is to incorporate such specific nutrients in a kind of sweets, which
20 are also very attractive for children.

A well-known product form are gummy bears or jelly babies.

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Parents often give their children gummy vitamins because they are the only type of vitamins that their kids will take. It is easy to understand why, since many "gummies" are like candy. In fact, one gummy vitamin is i.e. made with "Jolly Rancher Sour" flavors.

- 5 The problems with gummy bears or jelly babies are that due to the way how they are made, especially the heat, which is needed causes problems in view of the specific nutrients. Usually these specific nutrients are not heat stable. To overcome that issue, it is nowadays necessary to overdose these specific nutrients so that the concentration in the final product is as it should be (as indicated on the package).

10

The goal of the present invention was to find a way (or a product form), which allows to deliver a form for the specific nutrients, which are also accepted by kids.

- 15 We found that a new form of non-frozen coated aerated confectioneries is obtainable by a process, which is less harmful for the specific nutrients so that higher overages are not necessary. These non-frozen aerated confectioneries are nevertheless more stable.

Furthermore, these new non-frozen coated aerated confectioneries can have a higher load of the specific nutrients in comparison to for example gummies.

- 20 In addition, the specific non-frozen coated aerated confectioneries have less sugar per serving while deliver the same level of vitamins and minerals than gummies.

The new non-frozen coated aerated confectioneries have many valuable advantages.

25

The present invention relates to a non-frozen coated confection (CC), consisting of

(a) an aerated core and

(b) a shell coating the core,

wherein the core is fortified by at least one specific nutrient.

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Preferably the confection according to the invention does not comprise any chocolate (not in the core and not in the shell). This means the confection is free of any chocolate.

5

Therefore, the present invention relates to a non-frozen coated confection (CC1), which is coated confection (CC), which does not comprise any chocolate.

Aerated confections can be classified into two sub-groups, grained and non-grained
10 candies. Grained candies are made from supersaturated sucrose solution while non-grained candies are made from unsaturated sucrose solutions. The basic composition for marshmallows of all kinds includes water, a disaccharide sugar such as sucrose, a monosaccharide sugar such as dextrose or corn syrup, and a whipping agent such as gelatin. Suitable flavor and coloring materials may also be
15 incorporated into the basic composition. Among the many formulas that are known for marshmallow production are those found in the following: "Candy Making as a Science and as an Art," by Claude D. Barnett, Don Gussow Publications, Inc., New York, 1960, pp. 99-103; "An Encyclopedia of Candy and Ice Cream Making," by Simon I. Leon, Chemical Publishing Company, New York, 1969, pp. 294-304, and,
20 "A Textbook on Candy Making," by Alfred E. Leighton, The Manufacturing Confectioner Publishing Company, Oak Park, Ill., 1952, pp. 55-58. See-also, for example, U.S. Pat. No. 3,607,309, issued Sep. 21, 1961 to E. S. Olney et al, and U.S. Pat. No. 2,847,311, issued Aug. 12, 1958 to Alexander J. Doumak. Soft marshmallow or "long grain" marshmallow has an elastic and chewy consistency
25 and is the type usually associated with the term "marshmallow". Sugar ratios are so regulated so that crystallization of the sugars or "graining" does not take place within a reasonable period of time. To accomplish this reduction in the tendency to crystallize, corn syrup of various dextrose equivalents ("DE") have been employed to inhibit the onset of crystallization.

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The non-frozen coated confection according to the present invention consists of a core and a shell.

The core of the non-frozen coated confection according to the present invention is aerated. A preferred core is kind of a marshmallow.

- 5 The core comprises usually (and preferably and next to the specific nutrients) the following of four ingredients:
- (i) sugar and/or sugar substitute,
 - (ii) water,
 - (iii) air, and
 - 10 (iv) at least one whipping agent/aerator (usually a protein).

The sugar used in the aerated core of the confection according to the present invention can be any usually used sugar such as sucrose, corn syrup (glucose syrup) and/or invert sugar.

- 15 The aerated core comprises usually between 50 - 90 wt-%, based on the total weight of the core, of at least one sugar. Preferably the at least one sugar is chosen from the group consisting of sucrose, corn syrup (glucose syrup) and invert sugar.

- 20 The aerated core comprises water. The amount (in weight %, based on the total weight of the core) of water in the core is usually low. During the process of production of the aerated core, most of the water, which is used is evaporated. The aerated usually comprises up to 20 wt-%, based on the total weight of the core, of water.

- 25 The marshmallow is a foam, consisting of an aqueous continuous phase and a gaseous dispersed phase (in other words, a liquid with gas bubbles spread throughout). In addition to be a foam, this also makes marshmallows an "aerated" confection because it is made up to of 50 % (by volume) air.

- 5 -

The whipping agent/aerator (iv) used to produce the marshmallow core is usually and preferably a protein (or a mixture of proteins). Preferred proteins are albumen (egg whites) and gelatin.

Albumen is a mixture of proteins found in egg whites and is utilized for its capacity
5 to create foams.

Gelatin is made up of collagen, a structural protein derived from animal skin, connective tissue, and bones.

The aerated core usually comprises between 1 - 5 wt-%, based on the total weight of the core, of at least one whipping agent/aerator. Preferably the whipping
10 agent/aerator is a protein. More preferably are albumen (egg whites) and/or gelatin.

The essential feature of the aerated core of the non-frozen coated confection according to the present invention is the presence of at least one specific nutrient.

The amount of specific nutrient can vary depending what specific nutrient (or mixture
15 of specific nutrients) is used. Preferably the specific nutrients used in the aerated core of the non-frozen coated confection according to the present invention are dietary ingredients (such as vitamins, carotenoids, minerals) as well as prebiotics and probiotics.

Usually the aerated core of the non-frozen coated confection according to the
20 present invention comprises an amount of 2 – 30 wt-%, based on the total weight of the core, of at least one specific nutrient (Preferably of dietary ingredients (such as vitamins, carotenoids, minerals) as well as prebiotics and probiotics).

The aerated core of the non-frozen coated confection according to the present
25 invention can comprises additional ingredients, such as flavors, acids, colors, starches, etc. The amount of these (non-essential for the invention) ingredients can vary.

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The non-frozen coated confection according to the present invention has a shell coating. This coating (layer) covers usually the aerated core in total.

The shell coating is usually (and preferably) a sugar coating. These coatings are well-known in the prior art.

- 5 Any known process (as used in the food or pharma industry can be used).

The thickness of the coating is usually up to 2mm. Preferably (and ideally) the coating covers the aerated core equally.

The shell coating can comprise next to the sugar coating additional ingredients like colors, flavors, etc.

10

The ratio (regarding the weight) of the core and the shell of the non-frozen coated confection according to the present invention is from 1:0.5 to 1:2. This ratio depends strongly on the fluffiness of the core. The more air is in the core the more the ratio shifts to the shell.

15

The shell coating of the core should have such a hardness formed that it can be eaten easily by children (as well as adults).

The overall size as well as the shape of one non-frozen coated confection can vary.

- 20 A usual and common form is sphere-like. The size (the longest diameter) of such a sphere is usually from 0.5cm- 3 cm.

But the shape can also be like a drum or any other form, which is appealing to be consumed.

- 25 The process of production of the non-frozen coated confection with an aerated core is usually the following

- (1) the aerated core is produced and then
- (2) the aerated core is coated (by a sugar coating).

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Process of production of the aerated core

The aerated cores can be produced according to well-known process. A suitable way is the following:

- 5 (I) Gelatin is added to water and heated in with water bath (~50 °C). Allow at least 40 mins for hydration.
- (II) In another pot, heat corn syrup with water and granulated sugar to 108 °C.
- (III) Pour cooked syrup into Hobart mixing bowl, then set mixer speed at
10 medium using the whisk for mixing.
- (IV) Add hydrated gelatin from step (I) and mix it. Slowly add the following: Egg Albumin, Malic acid, Tapioca starch, powdered sugar. Mix for a few minutes then add the at least one specific nutrient (in case more than one is added that can happen one after the other or in a mixture). Temperature
15 is about 50 °C.
- (V) Finally add flavor (if needed) and mix for another few mins. Form core marshmallows with target serving size after cooling down to room temperature.

20 *Shell coating (sugar coating) of the aerated core*

The shell coating (sugar coating) of the aerated cores (which are produced as disclosed above) can be produced according to well-known process. A suitable way is the following:

- 25 (A) Gumming. Add 10 g of gumming solution slowly in the pan. Gently stir marshmallows to avoid sticking. Turn on air flow to dry the core.
- (B) Soft panning. Turn off air flow. Add 7-10 g of syrup each time and wait for distribution of syrup. Add powder sugar until the center feels dry. Repeat the process 5 to 10 times.

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- (C) Hard panning. Add 7-10 g of syrup each time and wait for distribution of syrup. Turn on air flow to dry the core and turn off when the core is dry. Repeat the process 50 to 60 times.
- 5 (D) Hard panning with TiO₂. Add 7-10 g of syrup with TiO₂ each time and wait for distribution of syrup. Turn on air flow to dry the core and turn off when the core is dry. Repeat the process 5-15 times.
- 10 (E) Hard panning with color and flavor. Add 7-10 g of syrup with color and flavor each time and wait for distribution of syrup. Turn on air flow to dry the core and turn off when the core is dry. Repeat the process 10-20 times. For the last layer, reduce air flow to get smooth surface.
- (F) Put coated marshmallows on a tray and dry overnight.
- (G) Add 1 g of wax and polish for 20 mins in the pan with gentle tumbling.

The following Examples serve to illustrate the invention.

15

Examples

All the following examples are made in analogy to the process as described in the description.

5

Example 1: Aerated confection fortified with vitamins as dietary ingredients

In the aerated confection a premix of the following composition is used (Table 1)

10 **Table 1:** *Formulation of Premix*

Ingredient	potency	quantity	Unit of quantity	BOM g/kg
IODINE	0.01	88	MCG	36.667
ZINC	0.4	5.5	MG	57.292
VITAMIN E	0.5	50	IU	416.667
VITAMIN B6	0.2739	2.08	MG	31.642
BIOTIN	0.01	97.5	MCG	40.625
VITAMIN A	250	2,800.00	IU	46.667
VITAMIN D3	100	1,400.00	IU	58.333
VITAMIN B12	0.01	15	MCG	6.25
VITAMIN C	1	42	MG	175.967
FOLIC ACID	0.1	480	MCG	20
PANTOTHENIC ACID	0.91	24	MG	109.89

Table 2: *Formulation of aerated core with premix of table 1*

Ingredients	Amount [wt-%]	Amount [g]
MVM premix of table 1	11.42	180.00
Malic Acid	0.35	5.50
Egg Albumin	0.48	7.50
Sugar	31.72	500.05
Corn Syrup	13.10	206.50
Gelatin	1.44	22.70
Tapioca Starch	0.44	7.00
Powdered Sugar	40.21	633.91
Nat. Strawberry Flavor	0.86	13.50

5 (The composition comprises about 5 wt-% of water)

Table 3: *Alternative formulation of aerated core with premix of table 1*

Ingredients	Amount [wt-%]	Amount [g]
MVM premix of table 1	17.68	240.00
Malic Acid	0.21	4.40
Egg Albumin	0.29	6.00
Sugar	19.03	400.04
Corn Syrup	7.86	165.20
Gelatin	0.86	18.16
Tapioca Starch	0.27	5.60
Powdered Sugar	24.12	507.13
Nat. Strawberry Flavor	0.51	10.80

(The composition comprises about 5 wt-% of water)

- 5 **Table 4:** *Aerated sugar coated confection fortified with vitamins as dietary ingredients (Core of Table 2)*

	Ingredients	Amount [g] (before drying)
	Marshmallow core of table 2	500.6
Soft panning	Syrup	24.7
	powder sugar	70.7
Hard panning	Syrup	195.1
	Syrup with TiO ₂	48.8
	Syrup with Color and Flavor	101.2
Polishing	wax	0.6
	Total amount	941.1

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Table 5: *Aerated sugar coated confection fortified with vitamins as dietary ingredients (Core of Table 3)*

	Ingredients	Amount [g] (before drying)
	Marshmallow core of table 3	342.3
Soft panning	Syrup	42.7
	10 x powder sugar	116.0
Hard panning	Syrup	176.5
	Syrup with TiO ₂	38.5
	Syrup with Color and Flavor	66.0
Polishing	wax	0.5
	Total amount	782.0

Example 2: Aerated confection fortified with carotenoids as dietary ingredients

Table 6: *Formulation of aerated confection comprising lutein and zeaxanthin*

5

Ingredients	Amount [g]	Amount [wt-%]
Nat. Zeaxanthin 5% CWS/S-TG (DSM)	4.80	0.24
FloraGLO Lutein 10% CWS/S-TG (DSM)	125.00	6.25
Citric Acid	8.00	0.40
Malic Acid	7.33	0.37
Egg Albumin	10.00	0.50
Sugar	666.73	33.34
Corn Syrup	275.33	13.77
Gelatin	30.26	1.51
Tapioca Starch	9.33	0.47
Powdered Sugar	845.21	42.26
Nat. Strawberry Flavor	18.00	0.90

(The composition comprises about 5 wt-% of water)

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Table 7 *Aerated sugar coated confection fortified with carotenoid as dietary ingredients (Core of Table 6)*

	Ingredients	Amount [g] (before drying)
	core	630.0
Gumming	Gumming solution	10.0
Soft panning	Syrup	64.0
	powder sugar	183.0
Hard panning	Syrup	451.7
	Syrup with TiO ₂	88.0
	Syrup with Color and Flavor	156.9
Polishing	wax	1.0

Claims

1. Non-frozen coated confection consisting of
 - (a) an aerated core and
 - 5 (b) a shell coating the core,wherein the core is fortified by at least one specific nutrient.
2. The non-frozen coated confection according to claim 1, which does not comprise any chocolate.
- 10 3. The non-frozen coated confection according to claim 1 or 2, wherein the core is a marshmallow.
4. The non-frozen coated confection according to any of claims 1 to 3, wherein the
 - 15 core comprises the following ingredients:
 - (i) sugar and/or sugar substitute,
 - (ii) water,
 - (iii) air, and
 - (iv) at least one whipping agent/aerator (usually a protein).
- 20 5. The non-frozen coated confection according to claim 4, wherein the aerated core comprises between 50 - 95 wt-%, based on the total weight of the core, of at least one sugar (Preferably the at least one sugar is chosen from the group consisting of sucrose, corn syrup (glucose syrup) and invert sugar.) or sugar
 - 25 substitute.
6. The non-frozen coated confection according to claim 4, wherein the aerated core comprises up to 20 wt-%, based on the total weight of the core, of water.

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7. The non-frozen coated confection according to claim 4, wherein the aerated core comprises up to of 50 % (by volume) air.
- 5 8. The non-frozen coated confection according to claim 4, wherein the aerated core comprises between 1 - 5 wt-%, based on the total weight of the core, of at least one whipping agent/aerator (Preferably the whipping agent/aerator is a protein. More preferably are albumen (egg whites) and/or gelatin).
- 10 9. The non-frozen coated confection according to any of claims 1 – 8, wherein the aerated core comprises 2 – 30 wt-%, based on the total weight of the core, of at least one specific nutrient (Preferably of dietary ingredients (such as vitamins, carotenoids, minerals) as well as prebiotics and probiotics).
- 15 10. The non-frozen coated confection according to any of claims 1 – 9, wherein the aerated core comprises additional ingredients.
11. The non-frozen coated confection according to any of claims 1 – 10, wherein the shell coating is a sugar and/or sugar substitute coating.
- 20 12. The non-frozen coated confection according to any of claims 1 – 11, wherein the ration (related to the weight) of the core and the shell is from 1:0.05 to 1:2.
13. The non-frozen coated confection according to any of claims 1 – 12, wherein
25 the non-frozen coated confection is sphere-like and has a size from 0.5cm- 3.0 cm.
14. Process of production of the non-frozen coated confection according to any of claims 1 – 13, characterized in that

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- (1) the aerated core is produced and then
- (2) the aerated core is coated (by a sugar coating or sugar substitute coating).

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. A23G3/36 A23G3/44 A23G3/52 A23G3/54 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) 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 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	US 2007/026129 A1 (PANDEY PRAMOD K [US] ET AL) 1 February 2007 (2007-02-01) paragraphs [0018] - [0025]; claims; examples -----	1-14
X	US 2009/214726 A1 (BALLMAN DARRYL J [US] ET AL) 27 August 2009 (2009-08-27) paragraphs [0018] - [0025]; claims -----	1-14
X	WO 00/53024 A1 (GEN MILLS INC [US]; ZIETLOW PHILIP K [US] ET AL.) 14 September 2000 (2000-09-14) page 8, line 20 - page 15, line 26; claims -----	1-14
X	US 4 018 900 A (HAYWARD JAMES R ET AL) 19 April 1977 (1977-04-19) claims; examples ----- -/--	1-14
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 13 December 2019		Date of mailing of the international search report 20/12/2019
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Bondar, Daniela

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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