

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 December 2005 (29.12.2005)

PCT

(10) International Publication Number
WO 2005/122782 A1

(51) International Patent Classification⁷: **A23G 3/30**

(21) International Application Number:
PCT/KR2005/001921

(22) International Filing Date: 21 June 2005 (21.06.2005)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
10-2004-0046298 21 June 2004 (21.06.2004) KR
10-2005-0023322 21 March 2005 (21.03.2005) KR

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(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KM, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM,
PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM,
SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN,
YU, 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, HU, IE, IS, IT, LT, LU, MC, NL, 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
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

*For two-letter codes and other abbreviations, refer to the "Guidance
Notes on Codes and Abbreviations" appearing at the beginning
of each regular issue of the PCT Gazette.*

(54) Title: GUM COMPRISING A LARGE AMOUNT OF VITAMIN C

(57) Abstract: The present invention relates to gum including a large amount of vitamin C, and a method for preparing the same.

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Description

GUM COMPRISING A LARGE AMOUNT OF VITAMIN C

Technical Field

- [1] The present invention relates to gum including a large amount of vitamin C.

Background Art

- [2] Generally, a vitamin C product is often and easily found in a general life.
- [3] The reason is why vitamin C has been known as "good to health".
- [4] Since 1980, U.S.A. Health Authorities settles has advised to set and keep the recommended vitamin C intake to prevent diseases caused by deficiency in vitamins because vitamin C may not be naturally synthesized in the body. Actually, NIH's Dr. Mark Levine, etc. announced that it is good for the health to directly intake vitamin C, which is one of 13 essential nutrients, from fruits and vegetables and take them about 5 times a day. Also, a young generation, an old generation and patients who may not directly take fruits and vegetables due to troubles in food intake, absorption or bioavailability, or persons who may not frequently intake other fruits and vegetables and who hate the fruits and vegetables have taken vitamin C in a form of a tablet, or increasing numbers of persons indirectly have taken vitamin C from beverages, foods, etc. Especially, vitamin C-related products are recently lacking in dispensaries with fads of vitamin C.
- [5] Most of the general vitamin C products are medicine formulations commercially available from the dispensaries, which may be easily purchased without a prescription because they are classified into a general medicine. As a medicine, the vitamin C product mainly includes a powder type, tablets, etc.
- [6] However, such a product has disadvantages that the patients often feel a globus sensation on the neck, and that auxiliary means such as water are needed to take the products. In addition, vitamin C-including beverages actively come out in the markets with fads of vitamin C in the recent years, but they also may have a problem that it is difficult to carry to take them and store them.

Disclosure of Invention

Technical Problem

- [7] Accordingly, the present invention is designed to solve the problems of the prior art, and therefore it is an object of the present invention to provide gum including a large amount of vitamin C.
- [8] It is an object of the present invention to provide a method for preparing the gum including a large amount of vitamin C.

Technical Solution

- [9] In order to accomplish the above object, the present invention provides vitamin C-including gum composition including 20 - 30 % by weight of a gum base including talc as a filler and 1 - 55 % by weight (w/w) of vitamin C, based on total weight of the composition.
- [10] In the present invention, the gum composition preferably further includes 0 - 10 % part by weight of maltitol syrup, 0 - 20 % part by weight of isomaltitol, 10 - 75 % part by weight of xylitol or erythritol, 0.01 - 0.2 % part by weight of sucralose, 0 - 1.0 % part by weight of glycerine, and 0.5 - 2.0 % part by weight of a spicery, and more preferably further includes a coating material.
- [11] The coating material of the gum composition according to the present invention is preferably selected from the group consisting of arabic gum and gelatine.
- [12] In the present invention, the gum composition preferably includes 10 - 55 % by weight (w/w) of vitamin C.
- [13] Also, vitamin C of the present invention is preferably selected from the group consisting of ascorbic acid, sodium salt of ascorbic acid and calcium salt of ascorbic acid.
- [14] Also, the present invention provides a method for preparing vitamin C-including gum, including:
- [15] a) mixing 15 - 30 % part by weight of a talc-including gum base, 0 - 10 % part by weight of maltitol syrup, 0 - 20 % part by weight of isomaltitol, and 10 - 75 % part by weight of xylitol or erythritol;
- [16] b) adding, stirring and mixing 1 - 55 % part by weight of ascorbic acid after adding isomaltitol in the step (a), or in the further next step; and
- [17] c) adding, stirring and mixing 0.01 - 0.2 % part by weight of sucralose, 0 - 1.0 % part by weight of glycerine, and 0.5 - 2.0 % part by weight of spicery after the step (b).
- [18] The preparing method of the present invention preferably further includes a coating process after the step (c), and the coating process is preferably composed of first and second coating steps. Also, the stirring time is preferably maintained for 10 - 30 minutes.
- [19] In addition, the present invention provides gum including a large amount of Vitamin C prepared by the preparing method.

Best Mode for Carrying Out the Invention

- [20] If a product is prepared with the said mixing ratio in the present invention, materials are quantified and then added to a mixer. In order to reduce a working time, the mixer is operated after a hard gum base is kept at 40 - 60 °C to be softened. A first process is then completed by mixing the materials such as maltitol syrup, isomaltitol, xylitol or erythritol, ascorbic acid, sucralose, glycerine, emulsifier, spicery, pigment, etc, and the

mixture is molded with a spiral blade. The molded product is aged at 20 - 25 °C for at least 12 hours, the aged product may be coated at 20 °C or less using various eatable materials to improve marketability and a visual effect of the product, prevent vitamin C from being denatured by light, and also increase its favor. At this time, the coating is preferably 20 - 40 % by weight (w/w), based on total weight of the gum. That is to say, amount of the added coating material preferably ranges from 20 g to 40 g, based on 100 g of total weight of the gum. The eatable material used in the coating is preferably sugar, xylitol, chocolate, etc. and most preferably xylitol.

[21] A preparing method of the present invention is carried out in the same manner as in conventional gum products, but consideration is taken into the two following requirements so as to include an excess of vitamin C.

[22] First, it is important to select a suitable gum base.

[23] Choosing and applying the wrong gum base may cause a globus sensation and a softening phenomenon due to a large amount of vitamin C upon chewing the gum.

[24] Generally, talc and calcium carbonate, which are used as the filler of the gum base, have some critical functions for the gum. An exemplary function is to aid a teeth-grinding action to show an effect of brushing the teeth.

[25] It is important to select a talc-including gum base to include an excess of the vitamin C and simultaneously maintain the cool taste of vitamin C and characteristics as gum.

[26] Second, it is important to shorten a mixing time of an excess of the vitamin C and to choose an addition step of the vitamin C.

[27] A product including an excess of the vitamin C may be denatured by heat and light. Accordingly, it is preferred to shorten a producing time of the product and to choose the addition step for a rapid dissolution of vitamin C from the gum.

[28] Accordingly, a stirring time is controlled depending on a mixing amount, and preferably about 10 - 30 minutes, Vitamin C is preferably added 5 - 10 minutes before the mixing is completed, and spicery may be added 2 - 3 minutes before the mixing is completed so as to enhance a favor. Also, a molding time is preferably about 5 - 20 minutes, depending on the mixing amount.

[29] The method for preparing vitamin C gum of the present invention is preferably prepared under conditions such as addition order, mixing ratio and mixing temperature, as listed in the following Table 1.

[30] Table 1

Addition order	Name	Mixing ratio (%)	Mixing temperature
1	Gum base	15 - 30	20 - 50
2	Maltitol syrup	0 - 10	20 - 50
3	Isomaltitol	0 - 20	20 - 50
4	Xylitol or erythritol	10 - 75	20 - 50
5	Sucralose	0.01 - 0.2	20 - 40
6	Glycerine	0.0 - 1.0	20 - 40
7	Ascorbic acid	1 - 55	20 - 40
8	Spicery	0.5 - 2.0	20 - 40
9	10% pigment solution	0.0 - 0.05	20 - 40
10	Others (food additives and functional materials)	0.0 - 5	20 - 40

[31] In the Table 1, addition time of ascorbic acid may be varied. If a product is prepared with the said mixing ratio, materials are quantified and then added to a mixer. In order to reduce a working time, the mixer is operated after a hard gum base is kept at 40 - 60 °C to be softened. Subsequently, a first process is then completed by mixing the materials such as maltitol syrup, isomaltitol, xylitol or erythritol, ascorbic acid, sucralose, glycerine, emulsifier, spicery, pigment, etc., and the mixture is molded with a spiral blade. The molded product is aged at 20 - 25 °C for at least 12 hours, the aged product may be coated at 20 °C or less using various eatable materials to improve marketability and a visual effect of the product, prevent vitamin C from being denatured by light, and also increase its favor.

[32] First coating may be carried out prior to this main coating to increase a conservative force of the vitamin C, as well as to prevent moisture absorption during its distribution. Arabic gum or gelatin is preferably used in the first coating. It is more preferred to mainly use 3 - 5 % of arabic gum and 100 - 130 Brom (viscosity of gelatin) of gelatin. The first coating was carried out by covering a coating layer with gel state, followed by the main coating by drying with warm wind.

[33] The preparing method of the present invention is carried out in the same manner as in conventional gum products, but it is important to shorten a producing time of the product considering its denaturation by heat and light since the product includes an excess of vitamin C.

[34] Accordingly, a stirring time is controlled depending on a mixing amount, and preferably about 10 - 30 minutes. Vitamin C is preferably added 5 - 10 minutes before the mixing is completed because denaturation of vitamin C may be prevented by reducing frictional heat and exposure to light and vitamin C may be easily taken due to its rapid dissolution upon chewing the gum. And spicery may be added 2 - 3 minutes before the mixing is completed so as to enhance a favor. Also, a molding time is preferably about 5 - 20 minutes, depending on the mixing amount.

Mode for the Invention

[35] Example 1: A method for preparing gum including 500 lbf vitamin C per a gum

[36] Example 1-1: Preparation of vitamin C gum

[37] (1) 25 g of a gum base including pre-heated talc was added to a mixer at 40 °C, and stirred for about 4 minutes. Then 5 g of syrup (maltitol solution) pre-heated at 40 °C was added, and stirred for about 4 minutes, and then 8 g of isomaltitol and 32.7 g of xylitol were added to the mixture, respectively, and stirred for about 4 minutes.

[38] (2) Temperature of the mixer was kept below 50 °C before vitamin C was added, and then 0.1 g of sucralose, 0.5 g of glycerine and 27.5 g of vitamin C were sequentially added to the mixture of the step (1), and thoroughly stirred for about 5 minutes. 1.2 g of spicery was then added, mixed and stirred for about 2 minutes.

[39] After such a process was completed, the mixture was fed into the molding process and molded into a desired product, and the molded product was aged at 20 °C for at least 12 hours.

[40] Example 1-2: Gum coating

[41] (1) First coating

[42] First coating is intended to increase a conservative force of the vitamin C, as well as to prevent moisture absorption during its distribution. Arabic gum solution or gelatin was used as the coating material.

[43] After mixing of the Example 1-1 was completed, the resultant mixture was molded into 1.0 - 1.9 g of a desired shape per a gum. The first coating was then carried out at amount of 0.3 %, based on the weight of the gum molded out of 5 % arabic gum solution or 120 Brom of gelatin.

[44] (2) Main coating

[45] A coating solution consisting of 68 % of xylitol, 5 % of arabic gum and 27 % purified water was prepared for a coating process.

[46] The aged product was put into a coating pen at 20 °C or less, and coated by dispersing the coating solution to include 0.792 of gylitol and 0.058 g of arabic gum in 2 g of a gum mix per a gum. Finally, a brightening process was completed to make a product using shellac, carnauba wax, etc. as a brightening agent.

[47] Table 2

Name	Mixing amount	2.850 g per a gum
Gum base	25 g	0.50 g (500 mg)
Maltitol syrup	5 g	0.10 g (100 mg)
Isomaltitol	8 g	0.16 g (160 mg)
Xylitol	32.7 g	1.446 g (1,446 mg)
Ascorbic acid	27.5 g	0.550 g (550 mg)
Sucralose	0.1 g	0.002 g (2 mg)
Glycerine	0.5 g	0.010 g (10 mg)
Spicery	1.2 g	0.024 g (24 mg)
Arabic gum		0.058 g (58 mg)
Total	100 g	

[48] Example 2-5: A method for preparing gums including 25 □50 □250 □and 1,000 □ of vitamin C per a gum

[49] The vitamin C-including gum was prepared by using the same materials and weights as in the Example 1, except that instead of the amount of ascorbic acid added in the process of the Example 1, each of the gum having 2.5 g (Example 2: 25 □ of vitamin C), 5 g (Example 3: 50 □ of vitamin C), 12.5 g (Example 4: 250 □ of vitamin C), 50 g (Example 4: 1,000 □ of vitamin C) of ascorbic acid were prepared by adding or subtracting contents of xylitol, based on a total 100.0 g of the gum.

[50] Comparative example 1-5

[51] The gums including 25 □ (Comparative example 1), 50 □ (Comparative example 2), 250 □ (Comparative example 3), 500 □ (Comparative example 4) and 1,000 □ (Comparative example 5) of vitamin C were prepared by using the same materials and weights as in the Examples 1 to 4, except that calcium carbonate was used instead of talc as the gum base.

[52] [Experimental example 1]

[53] Physical properties (Hardness and Texture) of the gum were investigated by allowing 8 clinical participants to chew each of the gums prepared according to the Examples 1 to 5 and the Comparative examples 1 to 5 for 5 minutes, 10 minutes and 20 minutes, respectively. Level of the hardness is represented by 1 to 10 as relative values, as follows; 1: Very hard, 2 to 4: Hard, 5 to 7: Mean, 8 and 9: Soft, and 10: Very soft. Level of texture is represented by 1 to 10 as relative values, as follows; 1: Very hard, 2 to 4: Hard, 5 to 7: Mean, 8 and 9: Flabby, and 10: Softened. In the both case, the mean values were calculated by adding all scores of the 8 participants, followed by dividing the sum by 8.

[54] Table 3

Comparison of physical properties of Gum with different fillers											
	Time (min)	Examples					Comparative examples				
		1	2	3	4	5	1	2	3	4	5
Hardness	5	5.0	3.5	3.7	4.3	5.7	9.6	6.1	6.7	9.3	9.7
	10	6.0	4.2	4.5	5.2	6.3	9.9	7.0	7.5	9.5	10.0
	20	7.0	5.0	5.5	6.0	7.3	9.8	7.5	8.0	9.6	10.0
Texture	5	6.0	4.0	4.5	5.0	6.3	9.5	6.5	7.0	9.7	10.0
	10	6.5	5.0	5.5	5.9	6.6	9.8	7.0	7.5	9.7	10.0
	20	7.0	5.5	6.0	6.5	7.0	9.9	7.5	8.0	9.8	10.0

[55] As seen from the Table 3, it is revealed that it is not suitable as a gum because the gum is very flabby and softened if it has a large amount, especially less than 250 mg of vitamin C when the different fillers were used instead of talc in the gum base.

[56] Examples 6 and 7

[57] In the Example 6, the vitamin C gum was prepared under the same conditions as in the Example 1, except that the stirring times in the processes were set to 2 minutes, 2 minutes, 2 minutes, 2 minutes and 1 minute, which are a halves of the stirring time of Example 1, respectively.

[58] In the Example 7, the vitamin C gum was prepared under the same conditions as in the Example 1, except that, the stirring times in the processes were set to 6 minutes, 6 minutes, 6 minutes, 6 minutes and 3 minutes, which are 1.5 times of the stirring time of Example 1, respectively.

[59] Comparative examples 6 and 7

[60] In the Comparative example 6, the vitamin C gum was prepared under the same conditions as in the Example 1, except that the stirring times in the processes were set to 1 minute, 1 minute, 1 minute, 1 minute and 30 seconds, which are a halves of the stirring time of Example 1, respectively.

[61] In the Comparative example 7, the vitamin C gum was prepared under the same conditions as in the Example 1, except that the stirring times in the processes were set to 10 minutes, 10 minutes, 10 minutes, 10 minutes and 5 minutes, which are 2 times of the stirring time of Example 1, respectively.

[62] [Experimental example 2]

[63] A sour taste, a sugar content, fragrance and physical properties (Hardness and Chewiness) of the gum were investigated by allowing 8 clinical participants to chew each of the gums prepared in the Examples 1, 6 and 7, and each of the gums prepared according to the Comparative examples 6 and 7 for 5 minutes, 10 minutes and 20 minutes, respectively.

[64] Table 4

Comparison of physical properties by different stirring time						
	Time (min)	Examples			Comparative examples	
		1	6	7	6	7
Sour taste	5	3.1	2.6	3.5	2.0	5.0
	10	5.5	5.0	6.5	6.0	8.0
	20	9.0	9.0	9.1	9.0	9.0
Fragrance	5	4.1	3.5	5.0	3.0	6.0
	10	8.0	7.6	8.0	7.0	9.0
	20	9.0	9.1	9.0	9.0	9.0
Sugar content	5	5.1	5.0	5.5	5.0	5.1
	10	8.0	8.1	8.5	7.5	7.9
	20	9.0	9.1	9.0	9.0	9.1
Hardness	5	5.1	4.6	5.0	4.5	6.9
	10	6.0	5.5	6.0	5.6	7.7
	20	7.1	6.5	7.0	6.6	8.5
Texture	5	6.0	5.5	6.1	5.5	7.5
	10	6.6	6.0	6.5	6.0	8.1
	20	7.1	6.5	7.0	6.6	8.6

[65] In the Table 4, the intensity of sour taste is represented by 1 to 10 as relative values, as follows; 1: Very sour, 2 to 5: Sour, 6 to 8: Mean, and 9 and 10: Not sour.

[66] The intensity of fragrance is represented by 1 to 10 as relative values, as follows; 1: Very strongly fragrant, 2 to 5: Strongly fragrant, 6 to 8: Mean, and 9 and 10: Not fragrant.

[67] The sugar content is represented by 1 to 10 as relative values, as follows; 1: Very delicious, 2 to 5: Slightly delicious, 6 to 8: Mean, and 9 and 10: Not delicious.

[68] Also, level of the hardness is represented by 1 to 10 as relative values, as follows; 1: Very hard, 2 to 4: Hard, 5 to 7: Mean, 8 and 9: soft, and 10: Very soft.

[69] In addition, the texture is represented by 1 to 10 as relative values, as follows; 1: Very hard, 2 to 4: Hard, 5 to 7: Mean, 8 and 9: Flabby, and 10: Softened.

[70] The values of the Table 4 are calculated as the means of the 8 clinical participants.

[71] As seen from the Table 4, it was revealed that unfavorable effects on the persistence of fragrance, the hardness or the texture may be caused if the stirring time is extremely short or long, as in the Comparative examples.

[72] Example 8: Preparation of vitamin C gum including sodium salt of ascorbic acid and calcium salt of ascorbic acid

[73] Vitamin C gum was prepared according to the same entire process as in the Example 1, except that it has a total content of ascorbic acid consisting of 17.88 g of ascorbic acid, 4.12 g of sodium ascorbate, 5.5 g of calcium ascorbate.

[74] [Experimental example 3]

[75] A sour taste, a sugar content, fragrance and preference to the gum were investigated by allowing 8 clinical participants to chew each of the gums prepared in the Examples 1 and 8 for 5 minutes, 10 minutes and 20 minutes, respectively.

[76] In the Table 4, the intensity of sour taste is represented by 1 to 10 as relative values, as follows; 1: Very sour, 2 to 5: Sour, 6 to 8: Mean, and 9 and 10: Not sour.

[77] The intensity of fragrance is represented by 1 to 10 as relative values, as follows; 1: Very strongly fragrant, 2 to 5: Strongly fragrant, 6 to 8: Mean, and 9 and 10: Not fragrant.

[78] The sugar content is represented by 1 to 10 as relative values, as follows; 1: Very delicious, 2 to 5: Slightly delicious, 6 to 8: Mean, and 9 and 10: Not delicious.

[79] Also, the preference is represented as relative values between 0 (Very bad) to 10 (Very good) (see Table 5).

[80] Table 5

	Time (min)	Example 1	Comparative example 8
Sour taste	5	3.2	4.0
	10	5.4	6.5
	20	8.8	9.0
Fragrance	5	4.1	4.0
	10	8.0	7.8
	20	9.0	9.1
Sugar content	5	5.1	3.9
	10	8.0	6.9
	20	9.0	8.1
Preference	5	7.1	8.6
	10	7.0	8.5
	20	7.1	8.5

[81] As seen from the Table 5, it was revealed that the vitamin C gum prepared in the Example 8 by using sodium salt and calcium salt of ascorbic acid has a reduced sour taste and an increased sugar content, compared to the salt-free gum. Accordingly, it was recognized that the gum vitamin C is in preference to the salt-free gum in Korea since it has an effect of reducing its sour taste.

[82] Example 9: Effect on dissolution of vitamin C depending on its addition step

[83] The vitamin C gums were finally prepared according to the same entire process as in the Example 1, except that vitamin C was added in the step 7 in the Example 1, between the steps 1 and 2 in the Example 9-1, between the steps 2 and 3 in the Example 9-2, between the steps 3 and 4 in the Example 9-3, and between the steps 4 and 5 in the Example 9-4, as in the Table 1. The remaining contents of vitamin C in the gum were measured 5 minutes, 10 minutes and 20 minutes after the three clinical participants was allowed to chew the two finally prepared vitamin C gums (about 3.2 g) per a participant.

[84] L-ascorbic acid was analyzed using HPLC on the YMC-Pack Polyamine II Column (ID 4.6×150 mm; YMC, Japan) at a flow rate of 1.5 mL/min with a mobile-phase solvent including 70 % (v/v) of acetonitrile and 15 mM ammonium dihydrophosphate.

[85] Assuming that the remaining content of the vitamin C after chewing of the vitamin C gum prepared in the Example 1 is set to 0, they are listed as relative values in the Table 6.

[86] Table 6

	Time (min)	Example				
		1	9-1	9-2	9-3	9-4
Relative titration	5	0	39	34	25	19
	10	0	32	27	16	11
	20	0	29	23	10	4

[87] As seen from the Table 6, it was revealed that it is preferred in terms of dissolution of vitamin C to add vitamin C after the steps 3 and 4 in the preparing process of the gum.

[88] [Experimental example 4]

[89] Comparison of denaturation in a vitamin C-including beverage and the gum of the present invention

[90] Preparation of a vitamin C-including beverage

[91] 170 g of fructose, 2 g of citric acid, 0.15 g of maleic acid and 1 g of spicery for beverage were added to 10 g of vitamin C and titered to the total volume with purified water, based on total 1 ℓ of the beverage. The resultant mixture was then stirred to be dissolved thoroughly, filtered through a 200-mesh sieve, put into a 100 ℓ bottle, and then pasteurized at 92 °C for 2 minutes to prepare a beverage including 1 g of vitamin C per a 100 ℓ bottle, which was used as a control group later.

[92] After each of the beverage prepared as the control group and the gum prepared in the Example 1 of the present invention was kept at 25 °C for 30 days, 60 days, 90 days, 120 days from the manufacturing date, quantity of vitamin C present in the beverage and the gum was measured. 2,6-dichloroindophenol oxidation-reduction titration (Burton et al. 1979, J. Assoc. Pub. Analysts 17:105) was used for a quantitative analysis.

[93] As a result of the titration, the remaining amount of the vitamin C present in their products is represented as relative values (%), based on the original amount (100 %) of the vitamin C, and listed in the following Table 7.

[94] Table 7

Time (Day)	Example 1 (Gum)	Control Group (Beverage)
30	99.8 %	99.6 %
60	99.7 %	98.1 %
90	99.1 %	85.2 %
120	98.1 %	89.7 %

[95] As seen in the Table 7, it is revealed that the vitamin C-including gum has a slower

denaturation rate of vitamin C than that of the beverage, the vitamin C having a different duration.

Industrial Applicability

[96] As seen from the description, gum including a large amount of Vitamin C prepared by using a talc-including gum base has an effect of maintaining an excellent physical property of gum, compared to gum prepared by using the other fillers. Also, it is revealed that the vitamin C gum of the present invention show excellent properties such as persistence of fragrance, or texture if total stirring time ranges from 10 to 30 minutes, and that it shows its excellent preference if it includes some salt of vitamin C, and its excellent dissolution when vitamin C is added after a certain step.

Claims

- [1] Vitamin C-including gum composition comprising 20 - 30 % by weight of a gum base including talc as a filler, and 1 - 55 % by weight (w/w) of vitamin C, based on total weight of the composition.
- [2] The vitamin C-including gum composition according to the claim 1, wherein the gum composition further comprises 0 - 10 % part by weight of maltitol syrup, 0 - 20 % part by weight of isomaltitol, 10 - 75 % part by weight of xylitol or erythritol, 0.01 - 0.2 % part by weight of sucralose, 0 - 1.0 % part by weight of glycerine, and 0.5 - 2.0 % part by weight of a spicery.
- [3] The vitamin C-including gum composition according to the claim 1 or 2, wherein the gum composition further comprises a coating material.
- [4] The vitamin C-including gum composition according to the claim 3, wherein the coating material is selected from the group consisting of arabic gum or gelatin.
- [5] The vitamin C-including gum composition according to the claim 1, wherein the gum composition comprises 10 - 55 % by weight (w/w) of vitamin C.
- [6] The vitamin C-including gum composition according to the claim 1 or 5, wherein the vitamin C is selected from the group consisting of ascorbic acid, sodium salt of ascorbic acid and calcium salt of ascorbic acid.
- [7] A method for preparing vitamin C-including gum, comprising:
a) mixing 15 - 30 % part by weight of a talc-including gum base, 0 - 10 % part by weight of maltitol syrup, 0 - 20 % part by weight of isomaltitol, and 10 - 75 % part by weight of xylitol or erythritol;
b) adding, stirring and mixing 1 - 55 % part by weight of ascorbic acid after adding isomaltitol in the step (a), or in the further next step; and
c) adding, stirring and mixing 0.01 - 0.2 % part by weight of sucralose, 0 - 1.0 % part by weight of glycerine, and 0.5 - 2.0 % part by weight of spicery after the step (b).
- [8] The method for preparing vitamin C-including gum according to the claim 7, wherein the preparing method further comprises a coating process after the step (c).
- [9] The method for preparing vitamin C-including gum according to the claim 8, wherein the coating process is composed of first and second coating steps.
- [10] The method for preparing vitamin C-including gum according to the claim 7, wherein the stirring time is maintained for 10 - 30 minutes.
- [11] Gum including a large amount of Vitamin C, prepared according to any one of

the claims 7 to 10.

A. CLASSIFICATION OF SUBJECT MATTER**IPC7 A23G 3/30**

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)

IPC7 A23G 3/30

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
KOREAN PATENTS AND APPLICATIONS FOR INVENTIONS SINCE 1975Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKIPASS**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,645,535 B2 (MW. Wrigley Jr. Co.) 11 November 2003	1-11
Y	US 4,931,293 A (Warner-Lambert Co.) 5 June 1990	1-11
Y	KR 2000-21992 A (Kim Su Yel) 25 April 2000	1-11
A	KR 2001-37654 A (Bo Rak Co.) 15 May 2001	1-11
A	JP 8-510914 A (Lothus Clok et al.) 19 November 1996	1-11

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search

14 NOVEMBER 2005 (14.11.2005)

Date of mailing of the international search report

15 NOVEMBER 2005 (15.11.2005)

Name and mailing address of the ISA/KR

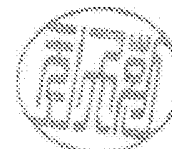
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2005/001921

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JP 8-510914 A	19 November 1996		