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<p>(21) International Application Number: PCT/US98/11234 (22) International Filing Date: 1 June 1998 (01.06.98) (30) Priority Data: 60/048,106 30 May 1997 (30.05.97) US (71)(72) Applicant and Inventor: BROSHI, Oded [US/IL]; Ashkenazi Street 37, 69864 Tel Aviv (IL). (74) Agents: DIPPERT, William, H. et al.; Cowan, Liebowitz & Latman, P.C., 1133 Avenue of the Americas, New York, NY 10036-6799 (US).</p>		<p>(81) Designated States: AU, CA, CN, JP, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i></p>
<p>(54) Title: AN EDIBLE, PLEASANT TASTING, BUBBLE MAKING COMPOSITION</p>		
<p>(57) Abstract</p> <p>A pleasant tasting, non-toxic, aqueous-based, bubble-making solution consists essentially of (a) a suitable surfactant(s), the taste of which can be attenuated or masked sufficiently to make the solution reasonable pleasant tasting, (b) a bubble stabilizer(s) functionally compatible with the surfactants(s), (c) one or more taste agents including a sweetener and flavor agents, and (d) stabilizing and preserving agents suitable for attenuating the formation of bacteria which would adversely affect the bubble-making characteristics of the solution.</p>		

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AN EDIBLE, PLEASANT TASTING, BUBBLE MAKING COMPOSITION

FIELD OF THE INVENTION

The present invention generally relates to bubble making compositions and specifically to a non-toxic, pleasant tasting, bubble making solution suitable for use by children who frequently place the bubbles on their tongues or otherwise try to drink the solution.

BACKGROUND OF THE INVENTION

For hundreds of years children have amused themselves by blowing an air stream through a ring which has been previously dipped in a soapy solution in order to create one or more individual lighter-than-air bubbles.

It is known that the dipping of the ring in such a solution creates a thin film composed of water and surfactant molecules stretched like a membrane on the ring. When a stream of bubbles is formed and detaches from the ring, such bubbles can float in the air for a period of time, which time is a function of temperature gradient, size of bubble, etc.

A major problem, however, with the prior art bubble forming solutions is that they use as their active ingredients substances which are toxic, irritant or non-edible surfactants, such as linear alkyl benzene sulfonates (LABS). These toxic materials which are used in toys for children of early ages (from two years old and upward), often come in contact with the lips of the children who blow bubbles through the wet ring, which they often place adjacent to their lips. There is also contact with the children's facial skin, eyes and hands.

Obviously this close contact with a potentially harmful material is undesirable. Similarly, young children who do not know better are often observed chasing the bubbles which they have created and trying to catch them with their mouths.

An additional potential hazard of such bubble solutions is that very young children, when left unattended with a bottle containing a liquid, are often inclined to try to drink such a liquid, if only out of childish curiosity.

5 Furthermore, the soapy materials used for bubble-forming solutions are irritants, which often get in the eyes of the children using such solutions.

10 It has, therefore, become apparent that there exists a need for an improved formulation for a bubble solution for use by small children. It is imperative that such a formulation be in accordance with the food regulations of the U.S. (F.D.A. regulations for permitted materials in the food industry) and of other countries, otherwise it would not be possible to put such a product on the market as an edible
15 bubble solution.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide for a bubble making solution which can be safely employed in toys
20 for use by small children to produce large durable bubbles.

It is also an object of the present invention to provide for a bubble solution which can be safely employed in toys for use by small children which is non-toxic.

25 It is a further object of the present invention to provide for a bubble solution which can be safely employed in toys for use by small children and others which solution is non-irritant to the user.

30 It is a still further object of the present invention to provide for a bubble solution which can be safely employed in toys for use by small children and others which is edible.

It is yet another object of the present invention to provide for a bubble solution which can be safely employed in toys for use by small children and others that is edible and

sweet-tasting and that can be classified as a confectionery product.

It is a still further object of the present invention to provide a bubble making solution which can be employed in a large variety of bubble making devices such as bubble pipes and bubble- blowing rings.

It is a yet further object of the present invention to provide a bubble making solution having the above characteristics which is both time and temperature stable.

These and other objects of the present invention will become more apparent from the discussion below.

SUMMARY OF THE INVENTION

A pleasant tasting, non-toxic, aqueous-based, bubble-making solution consists essentially of

(a) a suitable surfactant(s), the taste of which can be attenuated or masked sufficiently to make the solution reasonably pleasant tasting,

(b) a bubble stabilizer(s) functionally compatible with the surfactant(s),

(c) one or more taste agents including a sweetener and flavor agents, and

(d) stabilizing and preserving agents suitable for attenuating the formation of bacteria which would adversely affect the bubble-making characteristics of the solution.

DETAILED DESCRIPTION OF THE INVENTION

As will be realized, the size and the duration of a bubble formed will be determined by the amount of surfactant incorporated into the solution and the relationship thereof with the other ingredients. Thus, greater amounts of surfactant will result in larger, longer lasting bubbles. On the other hand, the amount of surfactant used should be

limited because of the bitter taste of the surfactant, and also to comply with health authority regulations in various countries.

In a preferred embodiment of the invention the
5 surfactant for use in the edible bubble solution will be one or more edible surfactants. Such surfactants can, for example, be selected from the group consisting of sucrose esters of fatty acids such as sucrose laurate (SL) (i.e., sucrose ester of lauric acid), sucrose miristate (SM),
10 sucrose caprate (SC) and sucrose coprylate (SCLT). Not all sucrose esters of fatty acids contain the right qualities for producing bubbles. For example, sucrose stearate, although neutral in flavor, cannot create bubbles.

It has been found that the above edible surfactants
15 provide the characteristics of taste which can be enhanced by sweetening agents, acceptable toxicity at functionally useful concentrations, and functionally suitable bubble making characteristics when employed with a functionally compatible bubble stabilizer.

20 The alkyl aryl sulfonates produce suitable bubbles but are excessively bitter and are toxic at the concentrations necessary to produce desirable bubble characteristics. Other bubble making surfactants such as soaps, sodium stearates and sodium oleates are irritating to the eyes, bad tasting,
25 rancid, have a pH level of around 9 and are time and temperature unstable and incompatible with most artificial flavorings and sweetening agents.

Generally speaking, the edible surfactants can be present at an amount of from about 0.1 to 60% w/w (i.e.,
30 percent by weight based upon the total weight of the solution). The practical upper limit being (a) the percentage at which the taste of the bubble solution becomes wholly unacceptable and cannot be overcome by sweetening and flavoring or (b) the percentage which exceeds the toxicity
35 limits.

The range for the edible surfactants SL, SC, SM, SCLT is from about 0.25 or 0.3 to 10% w/w (about 0.25 or 0.3 to 10 grams in 100 grams of distilled water). Most preferably the range should be from about 0.25 to 3% w/w. It should be
5 mentioned, however, that in certain countries such as Japan the maximum level of sucrose esters of fatty acids (SEFA) in food allowed by the health authorities is 1% w/w. One more factor which limits the amount of SEFA in such a solution is bitterness. For example, an amount of SL higher than 0.5 %
10 w/w will be too bitter tasting and will not be masked by any strong sweetener due to the fact that the taste buds (receptors) responsible for bitterness in the mouth and on the tongue are situated in a different location than the taste buds responsible for sweetness. For this reason, the
15 SEFA of high-foaming capacity and strong bitterness such as the SL ought to be combined with SEFA or lesser foaming capacity but with more subtle taste such as SM.

Another feature of the SEFA is that they have different eutectic points, referred to sometimes as "cloud points",
20 that allow different SEFA to reach their best foaming capacity at different temperatures.

This factor also calls for a precise balance between different SEFA which would be able to produce bubbles in the range of between about 7 to 40 degrees celsius, which is
25 roughly the range were children play with bubbles.

A second component of the solution is a viscosity-increasing and bubble-stabilizing agent, selected from a group of edible polymers consisting of sugars, polysaccharides, polysaccharide derivatives, proteins and
30 glycerin. Useful polysaccharide derivatives include, for example, starch, gelatine, carboxy methyl cellulose, ethyl methyl cellulose, cream of tartar, hydroxy propyl methyl cellulose, carrageenan gum, sodium alginate, xanthan gum, guar gum, gum arabic, and locus bean gum. This agent will be
35 present in an amount sufficiently to increase viscosity and

stabilize bubbles preferably at an amount of from about 0.01 to 1% w/w.

Most preferably, the viscosity-increasing and bubble-stabilizing agent will be present at an amount of from about
5 0.01 to 0.5% w/w.

Optionally, a polysaccharide derivative component comprising one or more ingredients selected from the group consisting of guar gum, locust bean gum, xanthan gum, sodium alginate and gum arabic could be present at an amount of from
10 about 0 to about 20% w/w, most preferably in an amount of from about 0.01 to about 0.5% w/w.

While the above edible surfactants are considerably less bitter tasting than commonly employed alkyl aryl benzene sulfonates, it nevertheless needs a taste-enhancing agent to
15 make it pleasant tasting. Since the above edible surfactants are bitter in taste, the most effective way to produce a pleasant taste would be to use a sweetening agent. Among the suitable sweetening agents are naturally occurring sugars such as dextrose as well as synthetic sweeteners such as
20 acesulfame, aspartame, cyclamic acid and its sodium and calcium salts, saccharin and its sodium and calcium salts, tautamin and neohesperidin. The concentration of the sweetening agent is a function of the amount needed to achieve the desired level of taste. This, in turn, is a
25 function of the concentration of the surfactant.

While in the present invention the preferred embodiment employs polysaccharides and sugars as viscosity agents and sugars and aspartame as sweetening agents, it has been found that polysaccharides, sugars and aspartame may support the
30 development of bacteria such as pseudomonas, which, while harmless in small quantities to humans, virtually destroys the bubble-making capabilities of the composition over a short period of time. Accordingly, it is necessary to employ a preservative in quantities just sufficient to attenuate the
35 formation of bacteria and fungi to the degree necessary.

This, in turn, is a function of the preservative selected. In the preferred embodiment of the present invention, benzoic acid or potassium sorbate is employed in quantities just sufficient to achieve the desired level of attenuation of
5 bacteria development. The levels are from about 0.6 to 1.6% w/w of benzoic acid or potassium sorbate. As an anti-fungi agent, the preferred material is methyl paraben.

While the invention now will be described in connection with certain preferred embodiments in the following examples
10 so that aspects thereof may be more fully understood and appreciated, it is not intended to limit the invention to these particular embodiments. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the scope of the
15 invention as defined by the appended claims. Thus, the following examples which include preferred embodiments will serve to illustrate the practice of this invention. It being understood that the particulars shown are by way of example and for purposes of illustrative discussion of preferred
20 embodiments of the present invention only and are presented in the cause of providing what is believed to be the most useful and readily understood description of formulation procedures as well as of the principles and conceptual aspects of the invention.

25

E X A M P L E S

Example 1:

A 1% w/w of sucrose miristate (sucrose ester of
miristatic acid) dissolved in water, followed by the addition
30 of 0.3% hydroxypropyl methyl cellulose, 0.15% xanthan gum, 0.5% aspartame, 0.5% dextrose and 0.01% cherry concentrate. Such a solution can produce large bubbles, can be safely eaten and has a sweet taste which is defined only the aspartame, the dextrose and the cherry flavor concentrate.
35 Alas, this solution will produce more than three or four bubbles only in temperatures higher than 30 degrees celsius.

Example 2:

A 1% w/w of sucrose laurate is dissolved in water, followed by addition of 0.3% carboxy methyl cellulose, 0.15% carrageenan gum 0.5% aspartame, 0.5 % dextrose and 0.01% grape concentrate and 1% benzoic acid. Such a solution can produce more than 10 fine and large bubbles in any temperature higher than 4° celsius and can be safely eaten, but it has a bitter aftertaste which is difficult to mask by the sweetening and flavoring agents.

10 Example 3:

A 1% w/w of sucrose caprylate is dissolved in water, followed by addition of 0.2% hydroxy propyl ethyl cellulose, 0.2% xanthan gum, 0.5% saccharin, 0.5% dextrose and 0.01% strawberry concentrate. Such a solution can produce large bubbles and can be safely eaten, but, similar to the sucrose laurate, it has a strong, bitter aftertaste which is difficult to mask.

Example 4:

A 0.5% w/w of sucrose miristate, 0.4% w/w sucrose caprylate, and 0.1% w/w of sucrose laurate is dissolved in water, followed by addition of 0.15% w/w xanthan gum, 0.04% w/w carrageenan gum, 0.5% aspartame, 0.37% dextrose and 0.02% grape concentrate. Such a solution can produce a stream of large bubbles in the relevant temperature range (7-40° celsius and higher), can be safely eaten and has a sweet taste which is defined only by the aspartame, the dextrose and the cherry flavored concentrate.

WHAT IS CLAIMED IS:

1. A pleasant-tasting, non-toxic edible bubble-making composition consisting essentially of:

(a) water;

5 (b) at least one surfactant;

(b) at least one bubble stabilizing agent functionally compatible with said surfactant;

10 (c) at least one taste-enhancing agent, selected from the group consisting of edible sweetening agents and edible flavoring agents; and

(d) at least one stabilizing and preserving agent suitable for attenuating the formation of bacteria.

15 2. The composition according to claim 1 wherein said surfactant has a taste that can be attenuated or masked sufficiently to make the solution reasonably pleasant tasting.

20 3. The composition according to claim 1 wherein said surfactant is chosen from the group consisting of sucrose esters of fatty acids such as sucrose laurate, sucrose miristate, sucrose caprate and sucrose coprylate.

4. The composition according to claim 1 wherein said surfactants are present at an amount of from about 0.1 to 60% w/w.

25 5. The composition according to claim 4 wherein said surfactants are present at an amount of from about 0.25 or 0.3 to 10% w/w.

6. The composition according to claim 5 wherein said surfactants are present at an amount of from about 0.25 to 3% w/w.

30 7. The composition according to claim 1 wherein said bubble-stabilizing agent is an edible polymer.

8. The composition according to claim 7 wherein said bubble-stabilizing agent is chosen from the group consisting of sugars, polysaccharides, polysaccharide derivatives, proteins and glycerin.

5 9. The composition according to claim 8 wherein said polysaccharide derivatives is chosen from a group consisting of starch, gelatine, carboxy methyl cellulose, ethyl methyl cellulose, cream of tartar, hydroxy propyl methyl cellulose, carrageenan gum, sodium alginate, xanthan gum, guar gum, gum
10 arabic, and locus bean gum.

10. The composition according to claim 8 wherein said polysaccharide derivative is chosen from the group consisting of guar gum, locust bean gum, xanthan gum, sodium alginate and gum arabic.

15 11. The composition according to claim 8 wherein said polysaccharide derivative is present at an amount of from about 0 to about 20% w/w.

20 12. The composition according to claim 11 wherein said polysaccharide derivative is present at an amount of from about 0.01 to about 0.5% w/w.

13. The composition according to claim 1 wherein said bubble-stabilizing agent is present in an amount of from about 0.01 to 1% w/w.

25 14. The composition according to claim 13 wherein said bubble-stabilizing agent is present in an amount of from about 0.01 to 0.5% w/w.

15. The composition according to claim 1 wherein said edible sweetening agents is chosen from the group consisting of naturally occurring sugars such as dextrose

30 16. The composition according to claim 1 wherein said edible sweetening agents is chosen from the group consisting of synthetic sweeteners such as acesulfame, aspartame, cyclamic acid and its sodium and calcium salts, saccharin and its sodium and calcium salts, tautamin and neohesphidrin.

17. The composition according to claim 1 wherein said stabilizing and preserving agent is chosen from the group consisting of benzoic acid or potassium sorbate.

5 18. The composition according to claim 17 wherein said preserving agent is present in an amount of from about 0.6 to 1.6% w/w.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/11234

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :C11D 1/20

US CL :510/135,470,471,472,473,474; 426/104,564,654,660

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)

U.S. : 510/135,470,471,472,473,474; 426/104,564,654,660

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X --- Y	US 3,328,307 A (SCHMITZ) 27 June 1967 (27-06-67), see entire document.	1,2,4-18 ----- 3
X --- Y	US 4,284,534 A (EHRlich) 18 August 1981 (18-08-81), see entire document.	1,2,4-18 ----- 3
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Y	US 2,893,990 A (HAAS ET AL) 07 July 1959 (07-07-59), see entire	3

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

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INTERNATIONAL SEARCH REPORT

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,248,381 A (NOBILE ET AL) 26 April 1966, see entire document.	3
Y	US 3,231,561 A (BRUNELLE ET AL) 25 January 1966 (25-01-66), see entire document.	3
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A	US 3,630,951 A (NETHERLY ET AL) 28 December 1971 (28-12-71), see entire document.	1-18

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/11234

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2,433,625 A (RASPET) 30 December 1947 (30-12-47), see entire document.	1-18