INTELLECTUAL PROPERTY OFFICE OF SINGAPORE
PATENT AGENTS QUALIFYING EXAMINATION 2017

PAPER C: INFRINGEMENT AND VALIDITY OF SINGAPORE PATENT
26 October 2017, Thursday
1330 – 1730 hrs

Maximum Time: 4 Hours (includes reading time) Maximum Marks: 100

INTELLECTUAL PROPERTY OFFICE OF SINGAPORE

INSTRUCTIONS TO CANDIDATES

1. This Paper consists of 26 pages, including this cover page and 1 blank page.

2. Write your answers in English. Answers in any other language will not be marked.

3. Only your answers and/or drawings to the question(s) written in the Answer Booklet(s) provided by the Examination Secretariat will be considered.

4. Marks are awarded more for the points selected for discussion and reasoning displayed than for conclusions reached.

5. Information provided in the question(s) may be obtained from actual situations or modified therefrom for the purpose of this examination. You should accept the facts given in the papers, without relying on your personal / specialized knowledge.

6. Advise the client on infringement and validity of relevant patent(s), and on the other questions asked by client. Your advice can be in the form of notes or a letter to the client but in either case you must provide the reasons for your advice.

To be continued

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7. The documents provided in the question are:

(a) Letter from your Client including questions and notes (2 pages);
(b) Document A: SG Patent No. 556101 (10 pages);
(c) Document B: Sweeter Together Technical Information (3 pages);
(d) Document C: SG Patent No. 547812 (4 pages);
(e) Document D: Journal of Sweeties (4 pages).

End

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Letter from your Client (1/2)

Dear Patent Attorney

As you may know, we are a Singapore manufacturer of confectionery and we released our newest confectionery products into the Singapore market to great commercial acclaim under our "Sweeter Together" brand seven months ago. So you can imagine our surprise when our stockists complained that they had been contacted by a Chinese company in October to say that our stockists were infringing this Chinese company's patent by selling our product!

Well, I must say that my initial reaction was to just tell our stockists to continue selling and ignore the Chinese company, but my partner Gerald insisted that I contact our lawyer who recommended I contact you as her firm has little experience in dealing with patent matters.

The Chinese company has just sent nasty letters to our stockists, threatening them that they will be sued for patent infringement if they continue to sell our product. I am really upset by this company's attitude, as all our stockists have done is buy our product for sale in Singapore. As many of our stockists are small businesses, I'd like to help them stop this harassment if I can. Is there anything we can do against the Chinese company in this regard?

In their latest letter to our stockists, the Chinese company provided a copy of their Singapore patent (Document A), which has been granted for the last five years. I attach a copy of it for your review, along with technical documents (Document B) for our products. From what I can see, the Chinese company does not actually sell or import any products into the Singapore market at all, so I find it very hard to believe that they can simply block people from selling our product. Furthermore, from my technical people, we acknowledge that we use the same sweetener bases as that claimed in the patent (Document A), but then, these sweetener bases are already so well known, and clearly the Chinese company cannot claim that they had invented these.

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Letter from your Client (2/2)

I shall be coming to your office tomorrow to discuss and I'd like your comments on what actions are open to us and our stockists. However, we'd like to reach an amicable settlement if at all possible.

Yours faithfully
Tomasina Tan

Instructions

You have conducted a search for relevant prior art and have found one Singapore patent (Document C), as well as a technical publication from the Journal of Sweeties (Document D). Please prepare notes and discussion points for your meeting with your client, including details on which claims you deem to be infringed and which claims you think are invalid. Your notes should also seek to answer the client's questions.

The priority claim of Document A appears valid and this Singapore patent is in force.

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Document A: SG Patent No. 556101 (1/10)

CONFECTIONERY PRODUCT

Priority Date: 14 February 2007 from CN 12784561.8
Filing Date: 13 February 2008
Grant Date: 5 June 2012

Field of the Invention

The present invention relates to a confectionery product (or simply a confection), and more particularly to a confectionery product having a multi-layer structure adapted for providing multiple different taste profiles and mouth feelings.

Background of the Invention

It is well known that sugar carries contributory effects to many diseases, such as diabetes, hypertension, coronary heart disease, arterial sclerosis and dental caries etc. Given this, more and more people prefer sugar-reduced or sugar-free products. Indeed, for those who suffer from the foregoing illustrated diseases, it is important for them to reduce their intake of conventional confectionery products which are entirely made of sugar (i.e. sucrose, glucose and/or fructose).

Unfortunately, the variety of sugar-free and sugar-reduced confectionery products on the market are still limited and are not sufficient to meet the various demands for different tastes and flavours required by consumers. For example, some sugar-free confectionery products, such as sugar-free hard candies that are made of sugar substitutes, normally lack a suitable taste profile resulting in low consumer demand.

Summary of the Invention

A main object of the present invention is to provide a confectionery product for assistance in protecting the health of a consumer, by helping reduce their consumption of sugar (sucrose,

glucose and/or fructose). The current invention comprises an integrated body portion including multiple distinct regions that respectively provide different taste profiles and mouth feelings to attract consumers.

To obtain the object of the present invention, the present invention provides a confectionery product comprising an integrated body portion, which includes at least two distinct regions, wherein different regions of said distinct regions respectively contain different sweetener bases, either one region of said distinct regions contains a sweetener base that is different from that contained in an adjacent region or adjacent regions, or at least one region of said distinct region respectively and essentially contains different sugar-free sweetener bases. Sugar-free sweetener bases may be selected from one or more of a group consisting of isomalt, xylitol, mannitol, lactitol, maltitol and sorbitol. It will be appreciated that sugar (sucrose, glucose and/or fructose) and the sugar-free sweetener bases listed herein are sweetener bases, which are sweet-tasting substances that are generally recognised as safe for human consumption.

Because the confectionery product in according to the invention comprises at least two distinct regions, which respectively contain different sweetener bases, at least one region respectively and essentially contain sugar free sweetener bases, and different sweeteners respectively have different chemical and physical properties leading to different mouth feelings and taste profiles, so that the confectionery product of the invention is capable of providing multiple different taste profiles and mouth feelings to attract people.

Another object of the present invention is to provide a confectionery product having multiple distinct regions, which are respectively and selectively added with different plant extracts and flavours combinations to improve the taste and the nutrition value of the confectionery product.

A further object of the present invention is to provide a confectionery product having multiple distinct regions, which respectively have different sizes of crystal grains, each two adjacent

regions having distinct crystal grain sizes, so as to increase the variety of mouth feelings of the product.

Other objects, advantages and novel features of the invention will become more apparent from the following detailed description.

Drawings

Figure 1 depicts an embodiment of the current invention.
Figure 2 depicts a further embodiment of the current invention.

Detailed Description of the Preferred Embodiment

All ratios and percentages are by weight of finished confectionery product unless otherwise indicated. It will be appreciated that numerical values provided herein may be subject to variation, based upon the accuracy of the measurements taken and/or the rounding of values.

A confectionery product for health protection purpose according to the present invention generally comprises an integrated body portion including at least two distinct regions, which respectively contain different sweetener bases, where each region contains less than 20% by weight of plant extracts, and less than 2% by weight of flavours and colorants. The confectionery product may further comprise moisture and other additives. At least one of the regions of said distinct regions respectively and essentially contains a sugar-free sweetener base, which may be selected from a group consisting of isomalt, xylitol, mannitol, lactitol, maltitol and sorbitol.

A main feature of the present invention is that one sweetener base contained in one region of said distinct regions is different from that contained in an adjacent region or regions of said distinct regions, i.e. each two adjacent regions of said distinct regions contain different sweetener bases.

Document A: SG Patent No. 556101 (4/10)

For example, a first region of said distinct regions contains a lactitol base, a second region adjacent to the first region contains a maltitol base. In another example, a first region may contain sucrose, a second region adjacent to the first region may contain xylitol and a third region adjacent to the second region but not adjacent to the first region may contain sorbitol. Because different sweeteners respectively have different chemical and physical properties leading to relative different taste profiles and mouth feelings, therefore, multiple regions combined in one body portion and respectively containing different sweetener produce variously distinctive taste profiles and mouth feelings. It will be appreciated that a similar effect may be achieved where one of the regions contains two sweetener bases, while the other contains only one that is different to the other two.

It is known in the food industry that some sweetener bases, such as isomalt, xylitol, mannitol, lactitol, maltitol and sorbitol, are suitable sugar substitutes. Additionally, it is known that these sugar substitutes cause varying levels of “cooling” in the mouth of a consumer, which is not an effect that can be caused by sugar. These different cooling effects lead to relatively distinct mouth feelings of temperature, whereby different cooling effects are obtained depending on the sugar-free sweetener base/bases that are in contact with the consumer’s mouth at any one time. When different sweetener bases are combined together, distinct mouth feelings of temperature are obtained, especially when there is a difference in the level of cooling that is achieved. Suitable examples include sucrose (sugar) with isomalt and sucrose with xylitol. Surprisingly the most pronounced effect is achieved when isomalt and xylitol are combined.

Said distinct regions may further respectively and selectively contain less than 20% by weight of plant extracts, such as bitter melon extract, chrysanthemum extract, honeysuckle extract, Luo Han Guo extract etc. Said plant extract or combination of plant extracts can be added into one region or multiple regions of said distinct regions, so as to improve the nutrition and taste profiles of the confectionery product. For example, extracts of bitter melon, chrysanthemum and honeysuckle have a benefit for "clearing heat" such as one might experience on a hot smoggy day, the extract of Luo Han Guo has a benefit for moistening

Document A: SG Patent No. 556101 (5/10)

and cooling the lungs, and is used for coughs. Said distinct regions may further respectively and selectively also contain less than 2% by weight of flavours, for example, green tea flavour, honeysuckle flavour, jasmine flavour, mint flavour and the like. The flavours are added to adjust the taste profiles and mouth feelings of said distinct regions of the confectionery product. For example, adding of honeysuckle flavour increases characteristic taste and smell of the confectionery product, and adding of mint flavours increases the cooling effect of the confectionery product.

Likewise, said flavours can be added into one region or multiple regions of said distinct regions, the taste profiles and mouth feelings of the confectionery product is thus improved.

Other additives, such as coolants, colorants, tea powders, vitamin etc., can be added into one region or multiple regions of said distinct regions. The addition of a coolant will increase the cooling effect of the confectionery product, while colorants can be selectively added into said distinct regions, so as to improve the aesthetic aspect of the confectionery product to attract consumers. Tea powders, vitamins and other additives may improve nutrition and taste profiles of the confectionery product. In addition, the composition may also contain additional components that are distinct and separate from the regions, which mainly contain a sweetener base. Such additional components can include nuts, cocoa fat, unsweetened edible gels (e.g. jellies), and the like.

Preferably, the sweetener bases may be crystallized into a small grain size by a proper treatment process, so as to produce a final confectionery product with different textures caused by crystal grains of different sizes in adjacent regions. There are many types of treatment processes known in the art to cause different textures to be introduced. For example, crystal seeds can be added and mixed into a molten or saturated solution of a sweetener base to help grow crystals of the desired size. Different sizes of crystal grains and different fineness of texture of the sweetener bases provide different mouth feeling of smoothness and fineness. Again, it has been surprisingly found that confectionery products that contain a xylitol region and an isomalt region (not necessarily adjacent to each other) with different grain sizes, results in a confectionery product that has enhanced mouth feeling

in comparison to all other combinations of sweetener bases (though other sweetener bases may be included in the complete composition).

An embodiment of the above principles is provided in the hard candy of Figure 1, whose manufacture is described in Example 1 below. The hard candy 100 comprises two distinct regions, where the first 110 and the second 120 regions are of approximately equal size. The first region 110 is substantially constructed of the sweetener base isomalt and includes green tea extract and flavourings. The second region 120 is mainly made from the sweetener base xylitol, but also contains vanilla flavouring and a blue colourant. The crystal grains of the first region 110 are also substantially bigger than those in the second region 120. The different regions 110, 120 have different mouth feelings and taste profiles due to the different chemical and physical properties of the different sweetener bases respectively contained in the first 110 and second 120 regions. The first region 110 also has a characteristic taste profile and nutrient value that is different from that of the second region 120 by adding plant extracts into the first region 110. The first and second regions 110, 120 also contain different flavours, which also increases the taste distinction between the two regions 110, 120. A colourant was added to the second region 120 to improve the aesthetic appearance of the hard candy 100 in order to attract consumers.

The confectionery product according to the present invention may comprise more than two regions. For example, the confectionery products may include three regions (see Figure 2) consisting of two xylitol based regions (210) and one isomalt based region (220) sandwiched there-between, or alternatively, containing three different sweetener bases, for example, isomalt base, xylitol base and sorbitol base, or alternatively, any other combinations of three different sweetener bases. As such, the confectionery product of the invention can be formed with a multi-layer structure which may be formed in a stacked structure, or alternatively may be formed in a structure having multiple continuous coatings enclosing around a central core. Yet further alternatives include having a main component layer containing inclusions of any shape of a different sweetener base (or bases) uniformly or non-

Document A: SG Patent No. 556101 (7/10)

uniformly distributed within the main component layer. Such products having distinct regions may be formed by forming each region individually and combining them together while at least some are still semi-fluid to form an integrated body using the processes described below.

Overall, the present invention provides a confectionery product having a multi-layer structure, which comprises multiple distinct regions, each two adjacent regions respectively containing different sweetener bases. Different sweeteners respectively have different mouth feeling and taste profiles due to their different chemical and physical properties, therefore said distinct regions of the confectionery product provided multiple different taste profiles and mouth feelings to attract consumers.

The present invention will now be illustrated by the following examples, which are provided by the way of exemplification only and are not intended to limit the scope of the invention.

Example 1

A hard candy having:

a first region containing 47.45% by weight of isomalt, 0.10% by weight of plant extract of green tea, and 0.75% by weight of green tea flavour; and

a second region containing 48.05% by weight of xylitol, 0.65% by weight of vanilla flavour, 0.10% by weight of blue colorant, and 2.90% by weight of moisture and other additives.

The hard candy was formed by the following steps:

1) first in a melting step, isomalt and xylitol are separately melted to be prepared as base materials;
2) second in a mixing step, plant extracts and flavours etc are respectively added in and mixed with the isomalt base, and the xylitol base;
3) third in a forming step, firstly, a first region is formed with the isomalt base, then a second region is formed with the xylitol base and integrated with the first region on an upper/outer surface of the first region;

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4) fourth in a cooling and crystallizing step, after a period of time, the bases of the first and second regions being formed in sequence are cooled and crystallized synchronously, and finally solidified to be a hard candy.

The second region was treated by adding crystal seeds of xylitol to promote the growth of small crystal grain size, thereby the finenesses of the first and second regions are varied, so as to improve the mouth feeling.

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CLAIMS:

1) A confectionery product comprising an integrated body portion, which comprises at least two distinct regions, where said distinct regions respectively contain sweetener bases, wherein
    a. adjacent regions respectively contain different sweetener bases,
    b. at least one region of the sweetener bases substantially contains a sugar free sweetener base.

2) The confectionery product as claimed in Claim 1, wherein a first region of said distinct regions contains an isomalt base, a second region of said distinct regions contains a xylitol base and the second region is adjacent to the first region.

3) The confectionery product as claimed in Claim 1 or Claim 2, wherein any two adjacent regions have different crystal grain sizes, typically wherein the crystal grain sizes of all the regions are distinct.

4) The confectionery product as claimed in any one of Claims 1 to 3, wherein each of said distinct regions contains less than about 20% by weight of plant extracts, and less than 2% by weight of flavours and colorants.

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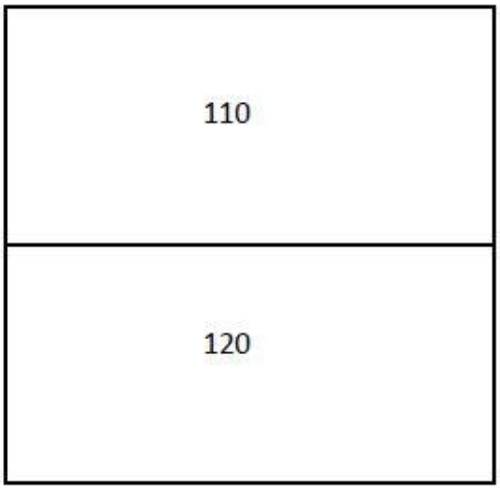
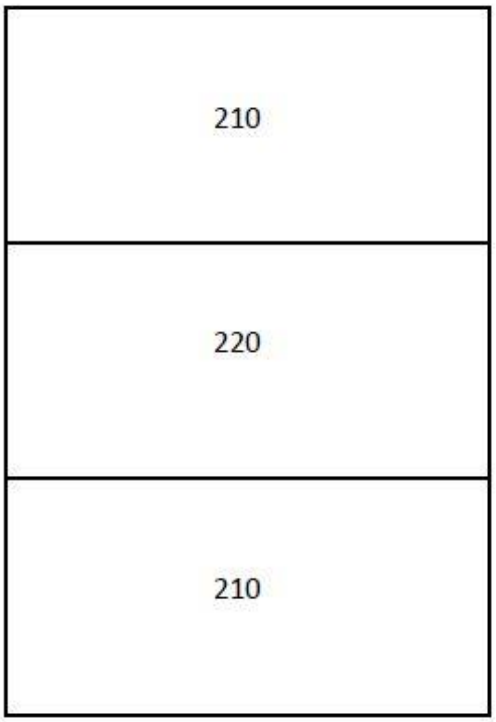
100

Figure 1



200

Figure 2



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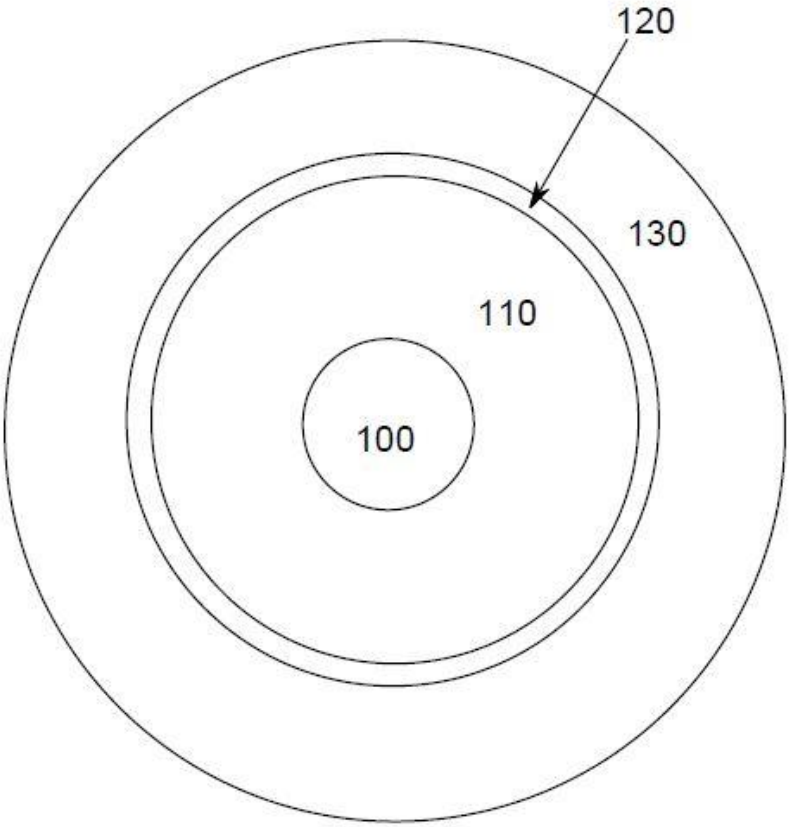
Document B: Sweeter Together Technical Information (1/3)

The Alpha Gobstopper

As shown in Figure 1, our revolutionary Gobstopper combines a core of sugar-free bubble gum with layers of flavoured sugars and sugar-substitutes. The bubble gum core 100 is a conventional bubble gum and may contain any suitable bubble gum flavour. This core is encased within a layer of sucrose (sugar) 110, which is in turn encased within a very thin layer of unsweetened agar-agar 120, which is yet again encased within a layer of xylitol 130.

Figure 1



The product is formed by coating a bubble gum ball with a layer of a molten sugar (e.g. sucrose), which is then placed into a saturated agar-agar solution close to setting and then with molten xylitol, each component (unless otherwise stated) contains additional ingredients as mentioned in Table 1 below. Between each coating there is a period of time for the molten layer that has been applied to semi-cool before the next layer is applied.

Document B: Sweeter Together Technical Information (2/3)

Layer	Ingredients by percentage weight
100	Bubble gum base 99%; 0.1% bubble gum flavour; 0.9% stabiliser
110	92% sucrose; 7% green tea extract; 1% green colouring
120	100% unsweetened agar-agar
130	78.6% xylitol; 20.4% cinnamon extract; 1% red colouring

Table 1

The resulting cooled product is a hard candy with bubble gum at its centre. Our research has shown that careful control of the crystal sizes in the layers of sugar and sugar-substitutes is important for this product as the best consumer experience is obtained when all layers mainly constructed from a sweetener have the same crystal size. It appears that the consumers prefer to gauge how far they are through the gobstopper by the use of plant extracts/flavourings and the agar-agar. In addition, the use of cinnamon in the outer layer is quite spicy, so we decided to make use of xylitol for this outer layer because it provides a cooling effect that acts as a counter to the cinnamon heat.

The Beta-Cooler Pyramid

The Beta-Cooler Pyramid is intended to provide a range of different cooling effects in the mouth of a consumer all at the same time, at least initially. As shown in Figure 2 in cross-section, the pyramid has four layers of varying size that are formed into a hard body in the form of a pyramid. The base layer of the pyramid is sorbitol 200, the second layer is isomalt 210, the third layer is a thin layer of sorbitol 220 and the fourth/peak layer is xylitol 230.

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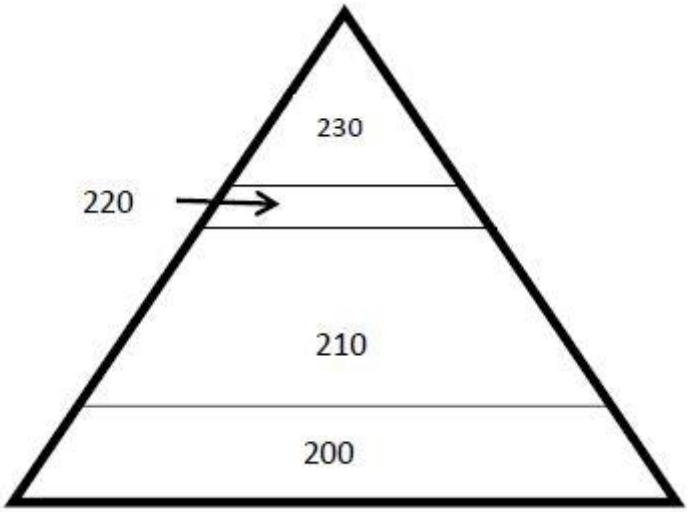
Document B: Sweeter Together Technical Information (3/3)

Figure 2



The product is formed by layering the molten components into a pyramid-shaped mould starting from the peak and working down to the base. Given the different conditions that each layer finds itself in, each layer provides a unique crystal size. Table 2 lists the ingredients for each layer.

Layer	Ingredients by percentage weight
200	95% sorbitol; 4% wintergreen melon extract; 1% yellow colouring
210	84% isomalt; 15% bubble gum flavouring; 1% red colouring
220	95% sorbitol, 4% green tea extract; 1% green colouring
230	99% xylitol; 0.5% vanilla flavouring; 1% blue colouring

Table 2

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Document C: SG Patent No. 547812 (1/4)

SG Patent No. 547812 Filing Date: 10 February 2008

Priority Date: 10 February 2007 Publication Date: 10 August 2008

Sweetener Composition

While asking people to stop eating sweets would be the healthiest approach, this has proved difficult to do. Many companies are researching reduced-sugar and sugar-substituted products. However, sugar-substituted products suffer from a prolonged aftertaste, which is not pleasant. There is currently no way to remedy this unpleasant aftertaste.

Surprisingly, the addition of a defoaming agent to at least one part of a composition comprising a sugar substitute results in almost complete removal of this after taste. We show herein that the use of a deforming agent results in a 90% reduction in the aftertaste period for such compositions. Thus, in an aspect of the current invention, there is provided a sugar-free sweetening composition that comprises a defoaming agent.

The term “sugar” relates to a natural sugar substance, which includes sucrose, glucose and fructose. The terms “sugar-free” and “sugar-substitute” when used herein refers to a substance that is low or free of calories and is not a natural sugar. Such sugar-free materials include xylitol, sorbitol, mannitol, lactitol, and maltitol.

The term “defoaming agent” as used herein refers to an agent that reduces and/or hinders the formation of a foam. That is, a defoaming agent may reduce a foam that has already formed or hinder the development of foam. Alternatively, the defoaming agent both reduces a foam that has already formed and hinders the formation of any further foam. Any suitable defoaming agent may be used, provided that it has been recognised by the United States Food and Drug Administration as being generally recognised as safe. Examples of such defoaming agents can be found in the United States Food and Drug Administration homepage (http://www/fda.gov).

Document C: SG Patent No. 547812 (2/4)

A further aspect relates to a product for human and/or animal consumption that comprises the sweetener composition hereinbefore defined. Typically, the product may be a food product, a beverage product, a pharmaceutical product, a nutritional product, a sports product, or a cosmetic product. It will be appreciated that the amount of the sweetener composition of the invention present in a food product, a beverage product, a pharmaceutical product, a nutritional product, a sports product, or a cosmetic product, will depend upon the type and amount of sweetener present in the sweetener composition and the desired sweetness of the food or beverage product.

When the product is a food product, the product may be selected from the group consisting of a confectionery product, a dessert product, a cereal product, baked goods, frozen dairy products, meats, dairy products, condiments, snack bars, soups, dressings, mixes, prepared foods, baby foods, diet preparations, syrups, food coatings, dried fruit, sauces, gravies, and jams/jellies. When the sweetener composition hereinbefore defined is applied to any of the food product listed above, it may be applied as a coating or frosting formed on the surface of the product. This coating may be useful to improve the flavour of the food product as well as its shelf life.

It will be appreciated that the composition of the current invention may only need to be a small portion of the entire composition as discussed below in the example. This is because the composition may only need to become effective towards the end of consumption of the product, where the product is designed for prolonged mouth exposure, such as in a hard candy or boiled sweet.

Example

A confectionery product according to Figure 1 was prepared by forming a core ball 160 made of xylitol, and at the same time forming four further balls 140 also made from xylitol. To the part-cooled core was added a molten bulk material 120 made from sorbitol by a rolling process. During the rolling process, the four balls 140 (part-cooled) were added so that they are present at different depths of the bulk material 120. The resulting ball is cooled

Document C: SG Patent No. 547812 (3/4)

to form a boiled sweet. Additional materials present in the balls and bulk material are listed in Table 1.

Material	**Ingredients by percentage weight**
160 and 140 (x4)	98% xylitol; 1.5% flavouring; 0.5% deforming agent
120	95% sorbitol, 4% vanilla flavouring; 1% colouring

Table 1

As a consumer sucks on the sugar-free confectionery, the xylitol balls 140 and, eventually, 160 are exposed to the mouth. These balls contain a defoaming agent and so cleanse the pallet of the aftertaste associated with sugar-substituted confections. A conventional sugar-substituted confection made of isomalt was tested by a panel of users and had an average aftertaste of around 90 seconds. The confection of the Example had an average aftertaste of around 8 seconds when tested by the same panel, as long as at least one of balls 140 or 160 were exposed when the confection was removed from the mouth, which is acceptable to a consumer.

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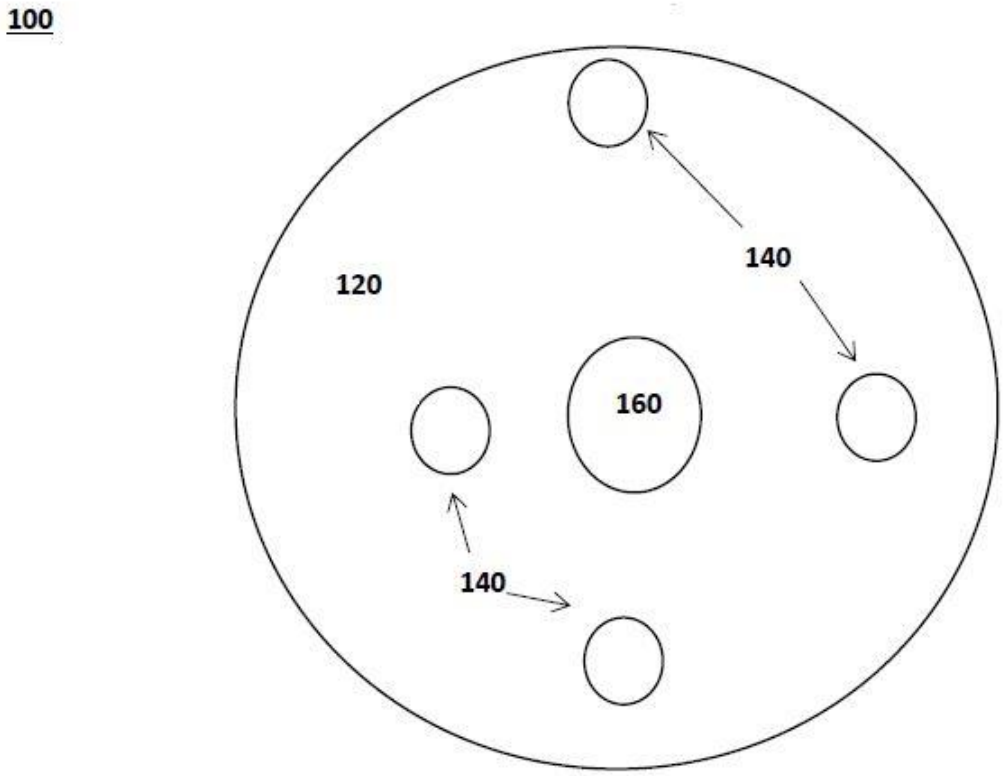

Figure 1

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Document D: Journal of Sweeties (1/4)

Journal of Sweeties

Published on 25 January 2000

Novel Composite Sweets

For some time, there has been a debate on obesity and the over consumption of calories. As such, there is talk of new governmental regulations being introduced that will limit the amount of sugar (e.g. sucrose, glucose or fructose) that one can add to any food products. If this occurs, it obviously results in problems for our industry (and this journal), as we are primarily focussed on making new an enjoyable confectionery products for consumers.

To that end, we have been focussed on finding solutions that either reduce the total amount of sugar within the product (by sugar we mean a natural sugar like sucrose, glucose or fructose) or entirely replace it with a sugar-free alternative. Suitable sugar-free alternatives include isomalt, xylitol, mannitol, lactitol, maltitol and sorbitol. We now share two products developed in our labs with the industry, which we think are really exciting.

The first product as depicted in Figure 1 seals a hazelnut 1 within a sugar-free outer layer 2, which can be made from mannitol or lactitol. What we have found is that the addition of a small layer of sorbitol 3 onto part of the mannitol/lactitol outer layer results in an improved consumption experience when one gets to the nut. It is not clear to us why this is the case, but we speculate that it may be something to do with the differing aftertaste effects achieved by the presence of one of mannitol/lactitol in combination with sorbitol. We have also found that each of the sugar-free layers can be conveniently flavoured with one of strawberry extract and vanilla extract (such that a strawberry and vanilla taste is effected in the mouth) and may also contain a small amount of a colouring.

To make the product of Figure 1, one first pours a first portion of molten mannitol or lactitol into a mould and allows it to cool very slightly. The cooling is important and it needs to be sufficient to enable a hazelnut to be placed onto the mannitol/lactitol layer and not sink

through it to be exposed on the surface of the sweet. Then a second portion of molten mannitol/lactitol is poured onto the first portion and the hazelnut, such that the hazelnut is entirely covered. Once the unified mannitol/lactitol layer has cooled some more, a portion of molten sorbitol is poured onto the cooling sweet. The entire product is allowed to cool completely and provides a hard candy with an exceptional taste profile in consumer testing. Analysis of the final product appears to show that the grain sizes between the mannitol/lactitol layers and the sorbitol layer are consistent.

The second product is one that we have dubbed the “Vampire Teeth”. This is because with a judicious choice of colourings the product can be provided with a striking visual effect that resembles the teeth of a vampire. This product is shown in Figure 2 in cross-section and in Figure 3 in plan view. In this product, there are two layers of mannitol (10, 20) flavoured with strawberry extract and coloured with a red food colouring positioned on the top and bottom of the sweet. The central portion is rather special, as seen in Figure 3, the sweet before it is consumed presents a striped pattern to a consumer - as a lactitol region 30 coloured with a black food colouring is the only thing presented to the consumer. This lactitol region 30 is flavoured with cream flavourings. As the consumer eats the sweet, the top and bottom layers (10, 20), and especially the middle layer of lactitol (30) dissolve to expose triangular regions (40), which are made from a natural sugar (though there is no reason why they cannot be made from a sugar-free alternative). These triangular regions (40) are coloured white with a white food colouring and contain mint flavouring to really pop in the mouth of the consumer when the other layers dissolve enough to expose these regions. The resulting visual effect is also striking and the novelty value for children has proved to be commercially very successful in the Scottish trial market. Typical amounts of extracts and colourants used in confections are in the range of from 0.1 wt% to 0.5 wt% and this is what we use to flavour and colour the various portions of the second product.

To make the confection in Figures 2 and 3, we first pour molten lactitol into a mould to form the middle layer (30). To this middle layer (30) is then added the bottom layer (20) of mannitol which is poured in molten form onto the layer in the same mould. The resulting intermediate product is flipped out of the mould when it is cooled sufficiently to enable this to

occur and then the triangular regions (40) are formed by pouring molten sugar (sucrose) into the cavities left in the middle layer (30) by the previous mould. Any excess sugar is removed from the top of the middle layer (30), to enable the top layer (10) of mannitol (in molten form) to be poured onto the top of the composite of the middle layer (30) and triangular "teeth" regions (40) to form the final product. Again, the grain sizes between the various regions appear to be consistent.

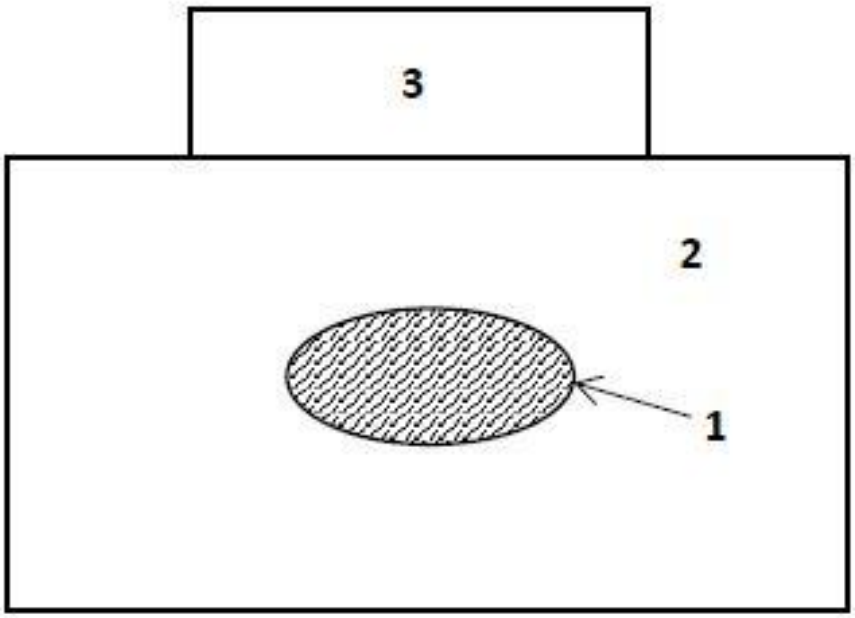

Figure 1

PAPER C: INFRINGEMENT AND VALIDITY OF SINGAPORE PATENT
26 October 2017, Thursday
1330 – 1730 hrs

Maximum Time: 4 Hours (includes reading time) Maximum Marks: 100

Document D: Journal of Sweeties (4/4)

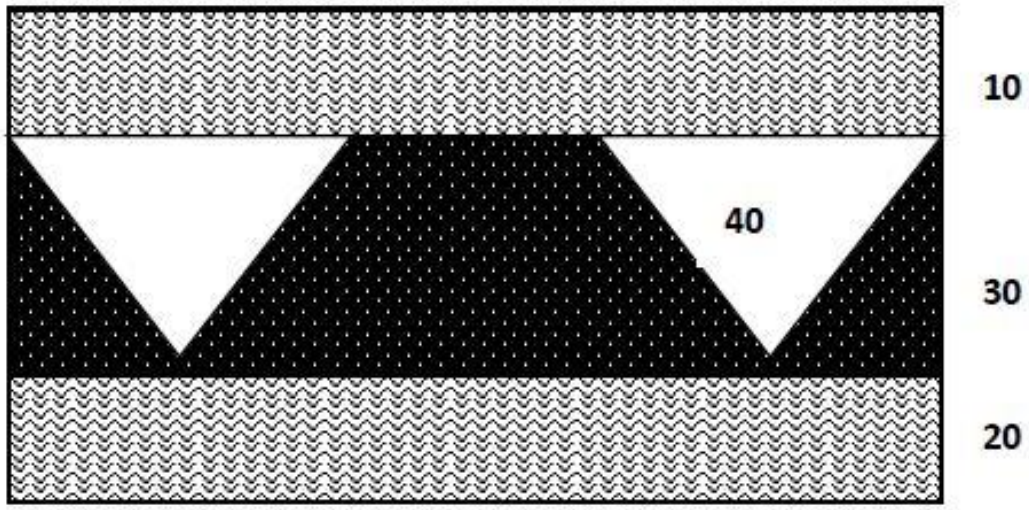

Figure 2

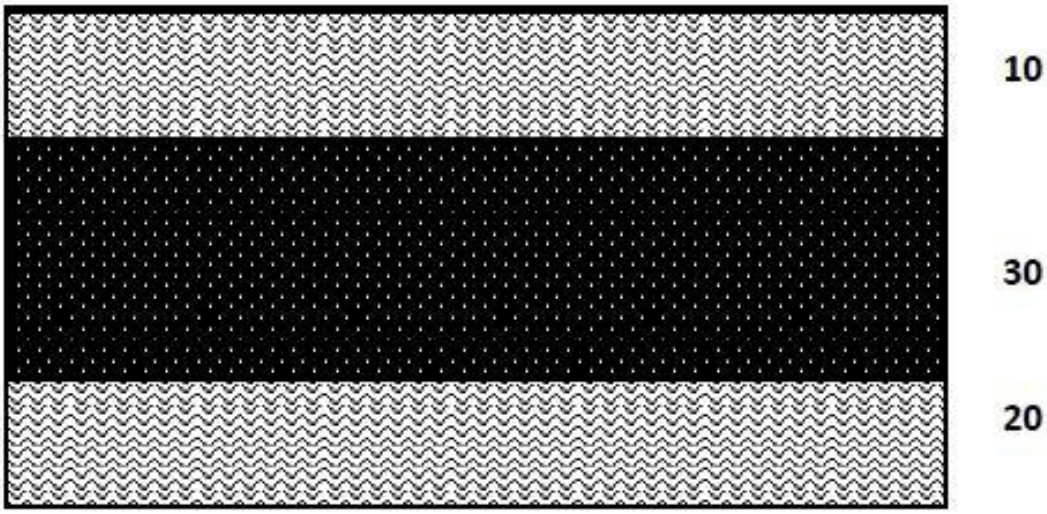

Figure 3

END