Abstract: A food product on a stick comprises an edible mass (2) and a support member (4) comprising a core terminal section (8) embedded into said edible mass (2) and an opposed terminal section (10) protruding out of said edible mass, so as to define a gripping handle for the consumer; the edible mass (2) comprises a composition of yogurt and edible thickeners and has a consistency such that it maintains its shape features under not confined conditions, at an equilibrium temperature higher than 0°C and up to at least 8°C; the support member (4) comprises an intermediate section (12) adjacent said core section (8) defining a supporting base for said edible mass. The core section (8) has securing means (14) adapted to bind the non-frozen edible mass to the core section.

FIG. 5C
Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
A food product on a stick

The present invention relates to a novel food product having a structure similar to that of an ice cream on a stick, that is, of the type comprising a shaped edible mass supported by an elongate support and gripping member which is partially embedded in the edible mass and has a terminal section protruding out of the edible mass so as to define a gripping handle for the consumer.

In particular, the invention relates to a product of the type mentioned above in which the edible mass is a yogurt-based composition.

Food products on sticks in which the edible mass is constituted by frozen yogurt are well known. Typically, the term "frozen yogurt" or "yogurt ice cream" means a refreshing dessert which has a composition (texture) similar to that of a conventional ice cream but with a lower fat content.

The process for the preparation of frozen yogurt is similar to the process for the preparation of ice cream and differs therefrom mainly in a step of inoculation with lactic strains which is generally performed after the pasteurization and homogenization of the mixture. Freezing is typically carried out in a freezer which brings about stirring of the mixture in order to incorporate air and produce an "over-run". The addition of air, with an over-run which is typically of the order of 50-100%, enables a creamy consistency to be achieved, giving rise to a palatable product. The freezing temperature is typically of the order of from -17 to -26°C so that the frozen mass contains ice crystals.

Food products based on frozen yogurt which is produced by static freezing without the incorporation of air are also known. In this case, however, the edible mass has a stiff and firm consistency which is detrimental to its palatability characteristics.

The present invention relates to a food product of the type indicated above the yogurt-based edible mass of which is intended to be stored and consumed at an equilibrium temperature higher than 0°C and typically between 2°C and 8°C, which has no over-run,
that is to say it does not have air incorporated as a result of mechanical whipping, and which is therefore free of ice crystals at the consumption and storage temperature.

The above-mentioned edible mass to which the invention relates has a consistency such that it can maintain its shape features in an unconfmed condition at an equilibrium temperature higher than 0°C and up to at least 4°C.

The object of the invention is to provide a food product on a stick in which a yogurt-based edible mass having the above-mentioned characteristics can be supported in unconfined conditions by support means of the stick type so that it can be consumed in the manner of a typical ice cream on a stick.

In view of this objective, the subject of the invention is a food product having the characteristics defined in the appended claims.

Further characteristics and advantages of the food product according to the invention will become clear from the following detailed description, given with reference to the appended drawings, which are provided by way of non-limiting example and in which:

Figure 1 is a perspective view of a food product according to the invention,

Figure 2 is a perspective view of the food product of Figure 1, packaged,

Figures 3 and 4 are perspective views of two embodiments of a support member which constitutes part of the food product of Figure 1, and

Figures 5a, 5b, 5c and 5d are perspective views which illustrate, in the sequence indicated, operative steps for the production of the food product.

With reference to the drawings, a food product according to the invention comprises a shaped edible mass 2 comprising a yogurt-based composition and a support member for the edible mass, generally indicated 4.

The edible mass 2 is shown with a shape having a generally triangular profile in plan, with rounded corners and with a generally rectangular base 6 with rounded ends. However, the shape of the edible mass is intended to be widely variable so that conical or frustoconical,
as well as pyramidal or frusto-pyramidal shapes can be envisaged.

The support member 4, two embodiments of which are shown in Figures 3 and 4, comprises a terminal section 8 which acts as a core, that is, which is intended to be embedded in the edible mass 2, a terminal section 10 which acts as a gripping handle for the consumer, and an intermediate section 12 having the function of a supporting base for the edible mass.

Naturally, the shape of the core terminal section 8 may vary widely depending on the shape of the edible mass 2. In the preferred embodiment, the core section 8 has a flattened, elongate shape, preferably with a profile which is tapered towards the end of the food product remote from the terminal section 10 which acts as the gripping handle.

The core section is made of an edible substance which is solid and firm at the storage temperature of the product (>0-8°C) such as, for example, chocolate or an edible composition similar to chocolate.

In a preferred embodiment, the core section 8 has securing means 14 which fasten the core section to the edible mass 2 which, as indicated above, is not intended to be frozen and is therefore free of ice crystals.

Securing means suitable for preventing the removal of the core section from the non-frozen edible mass may be constituted by one or more through holes 14 which are formed in the core section 8 and through which the edible mass is intended to extend.

The intermediate section 12 comprises, adjacent the core section 8, a plate-like formation. This formation extends in a plane substantially orthogonal to the plane in which the core section 8 lies. The intermediate section has an upper surface 16 which is in contact with the edible mass 2 and is also made of an edible substance generally corresponding to the edible substance of which the core 8 is made. The intermediate section 12 and the core 8 constitute a unitary body.
In the embodiment shown in Figure 3, the intermediate section 12 has a surface 16 which is in contact with the edible mass and which has a width and extension equal to the extension of the base 6 of the edible mass. As shown in Figure 4, however, an embodiment in which the intermediate section 12 has a surface 16 having an extension such as to be in contact with and to support only a portion of the surface of the base 6 of the edible mass may also be envisaged.

The terminal section 10 which acts as the gripping handle is typically constituted by a stick or bar which is made of plastics material or of wood and is fixed firmly and fastened to the intermediate section 12 and/or the core section 8.

An embodiment in which the section 10 which acts as the gripping handle is also made of an edible substance may also be envisaged.

In the embodiment in which the gripping member 4 has a composite structure, that is, in which it is formed by an edible portion (sections 8 and 12) and by a non-edible portion (section 10), the gripping member may be produced by a co-moulding process in accordance with techniques known per se to persons skilled in the art. For example, the co-moulding may be performed in a book mould having a mould cavity which is shaped to reproduce the core section 8 and the intermediate section 12, by positioning a stick of a shape corresponding to the handle section 10 inside the mould so that the handle section 10 which is made of non-edible substance is fastened to the shaped edible portion as a result of the moulding.

In another embodiment, the gripping member 4 may be constituted by an integral body made entirely of an edible substance such as, for example, chocolate, liquorice or a similar substance which can be handled by the consumer.

Figures 5a to 5d illustrate the operative steps of the production of a food product according to the invention.

A mould for shaping the edible mass is indicated 20 in Figure 5a. The mould 20 is
composed, for example, of two half-shells 20a, 20b connected to one another by means of peripheral flanges 22a, 22b which are welded together. The two half-shells may be made, for example, of a metal foil optionally coated on its internal surface by a polymer material suitable for contact with foodstuffs; the flange portions 22a, 22b may be coated with a heat-sealable lacquer. In particular, the mould 20 may constitute a wrapper in which the food product can be packaged for marketing.

The edible mass is poured into the mould (Figure 5b).

In the next step (Figure 5c), the support member 4 is inserted in the edible mass with the core section 8 completely immersed in the edible mass and with the intermediate section 12 in contact with the surface 6 which constitutes the base of the edible mass 2.

After cooling to bring about at least partial setting of the edible mass, the product may be removed from the mould (Figure 5d). However, as indicated above, the mould 20 per se may constitute the intermediate or final packaging wrapper of the food product, thus rendering the removal step unnecessary within the scope of the production process.

The edible mass 2 is fastened to the support member 4 even when the edible mass is not frozen, by virtue of the securing means 14.

As indicated above, the edible mass 2 is a yogurt-based edible composition obtained by lactic fermentation without freezing and including thickeners which, at the typical storage temperature higher than 0°C and up to at least 8°C has a consistency such that it is self-supporting and can maintain its shape features in not confined conditions (without the support of a package which maintains its shape).

The edible mass of the food product according to the invention is thus generally free of an edible coating confining the yogurt-based composition in its interior. At the storage and consumption temperature, the edible mass is free of ice crystals and has a consistency similar to that of a pudding.
By way of example, the typical viscosity values are between 2,000,000 and 4,000,000 cps measured by a Brookfield Helipath Spindle viscosimeter, probe F, with a temperature range of between 0°C and 20°C.

The product has and maintains a gelatinous consistency comparable to that of a pudding, within a temperature range of between 0°C and 20°C. In eating conditions, the intermediate section 12 acts as a supporting base for the shaped edible mass.

By way of example, the yogurt composition according to the invention may be produced with the use of the following raw materials (percentages by weight):
- liquid milk (e.g. with 3.5% fat content and 3-3.5% protein content): 65-98%
- liquid cream (30-40% fat content): 0-10%
- added sugars: 0-10%
- milk proteins (added): 0-5%
- thickeners: 0.01-3%, preferably 0.01-2.5%
- flavourings: 0-1%
- probiotic strains: 0-0.3%, preferably 0.1-0.3%
- yogurt strains: 0.02-0.05%

with the optional addition of a percentage of from 0 to 8% of fruit purée and/or 0-5% of whole pieces of fruit; the above-mentioned percentages being percentages by weight relative to the total mass.

In a preferred embodiment, the thickeners are selected from gelatine, carrageenin, xanthans, gellans, and mixtures thereof, preferably gelatine in a fairly large amount gelatine, preferably of between 1.2 and 2.5% by weight.

The presence of probiotic strains, preferably in amounts of from 0.01 to 0.3% by weight and in any case in an amount such as to ensure a minimum concentration of $1 \times 10^9$ UFC/portion of live and viable micro-organisms upon the expiry of the shelf life of the product also constitutes a preferred characteristic. The product preferably has an edible fat content of less than 8% by weight and preferably between 3 and 6% by weight, a milk protein content of from 3 to 7% by weight, and an acid pH of between 3.5 and 4.5.
portion of edible mass is typically 30-60 g, preferably about 40 g.

The total moisture content is of the order of 60-80% by weight.

By way of example, a preferred formulation contains the following ingredients:
UHT whole milk: 69%
liquid cream with 35% fats: 8.89%
caster sugar: 8.3%
milk proteins: 4%
gelatine, 220 Bloom: 1.6%
apricot flavouring: 0.1%
lactic strains: 0.01%
probiotic strains: 0.1%
fruit puree 15 Bx: 8%.

The preparation process may be carried out in accordance with the following example.

Preparation example

The liquid milk and any cream are mixed cold to form the liquid phase. The liquid phase is heated to 40-45°C. Optional sugars and proteins are then mixed.

The dry ingredients (sugar plus proteins) are dosed into the liquid phase and, only when proteins are present, mixing is carried out at 40-45°C for 30-45 minutes.

The mixture is then heated to 65-85°C and the thickeners are added. A homogenization step follows, preferably with two stages (110/40 bar to 250/60 bar), preferably at about 220 bar and 50 bar.

The mixture is pasteurized (from 80°C for 15 minutes to 100°C for one minute) preferably at about 92°C for 2 minutes. The mixture is cooled to incubation temperature, that is, the optimal temperature for the development and life of the strains, which is generally between
30°C and 45°C, preferably from 37°C to 42°C.

The yogurt lactic strains (Streptococcus termophilus and Lactobacillus bulgaricus) are inoculated and then any probiotics are added.

Fermentation is carried out to a pH of from 3.9 to 4.5, preferably about 4.2.

The coagulate is then broken down by mechanical stirring and any fruit, fruit pieces, and flavourings are added, as well as any probiotics if they were not added at the start of the fermentation.

The mixture is cooled to a temperature generally of between 20°C and 35°C such as to allow the yogurt to be dosed into the moulds as illustrated in Figures 5a-5b. The yogurt is cooled and kept generally at a temperature typical of a domestic refrigerator, that is, at a temperature higher than 0°C and lower than 8°C, typically at a temperature of about ± 2°C.

As indicated above, the addition of probiotic strains constitutes a preferred aspect, in particular, the product according to the invention can satisfy the most stringent requirements of the European Standard which is shortly to be implemented and which provides for a probiotic content upon the expiry of the product (a preservation period typically of 45 days) which must be \(1 \times 10^9\) /portion (one thousand million colony-forming units/portion). It has been found that most probiotic lactic strains usable in the edible composition undergo only minimal deterioration at the production, packaging and storage temperature; the selection of providing a product which is intended to be stored and eaten in the non-frozen state thus permits the use of a vast range of probiotic lactic strains.

Figure 2 is a schematic illustration of a packaged product according to the invention. The food product is packaged in a sealed wrapper 24 which surrounds the entire food product including the edible mass 2 and the terminal section 10 of the gripping member. The wrapper 24 may be formed by a pair of half-shells 24a and 24b pre-drawn and welded together along their peripheral outline. Notches 26 or lines of weakening may be provided in the wrapper portion surrounding the gripping handle 10 to enable the consumer to open
the wrapper.
Claims

1. A food product comprising an edible mass (2) and a support member (4) comprising a core terminal section (8) embedded into said edible mass (2) and an opposed terminal section (10) protruding out of said edible mass, so as to define a gripping handle for the consumer, characterised in that said edible mass (2) is a non-aerated without overrun composition comprising yogurt and an amount of from 0.1 to 3% by weight of edible thickeners whereby it has a consistency such that it retains its shape features, under not confined conditions, at an equilibrium temperature higher than 0°C and up to at least 8°C, and in that said support member (4) comprises an intermediate section (12) adjacent said core section (8) defining a supporting base for said edible mass.

2. A food product according to claim 1, characterised in that said core section (8) has securing means (14) adapted to fasten said edible mass to the core section, when said edible mass is in a non-frozen condition, or is free from ice crystals.

3. A food product according to claims 1 or 2, characterised in that said securing means (14) comprise at least one through hole (14) made in said core section.

4. A food product according to any of claims 1 to 3, characterised in that said core section (8) has a generally flattened shape and said intermediate section comprises a plate-like shaped portion in contact with said edible mass and extending in a plane which is orthogonal to the general plane of said core section.

5. A food product according to claim 4, characterised in that said intermediate section comprises a disk-like formation (12) having a surface (16) facing towards said edible mass (2) which surface has an extent such as to be in contact with a portion of the base (6) of said edible mass.

6. A food product according to any of claims 1 to 5, characterised in that said core section (8) is of edible substance.
7. A food product according to any of claims 1 to 6, characterised in that said intermediate section (12) is of edible substance.

8. A food product according to any of claims 1 to 7, characterised in that said terminal section (10) of the supporting member (4), protruding out of said edible mass is formed of a non-edible material and is fastened to said intermediate section (12) and/or to said core section (8).

9. A food product according to any of claims 1 to 7, characterised in that said terminal section (10) of the supporting member (4) protruding out of said edible mass is formed of an edible substance and is fastened to or is integrated with said intermediate section (12) and/or said core section (8).

10. A food product according to any of claims 1 to 9, characterised in that said edible thickeners are selected from the group consisting of gelatine, carrageenin, xanthans, gellans, and mixtures thereof.

11. A food product according to any of the preceding claims, characterised in that said edible mass (2) comprises probiotic strains, preferably in the amount of from 0.01% to 0.3% by weight.

12. A food product according to any of the preceding claims, characterised in that said edible mass (2) has a fat content which is no higher than 8% by weight.

13. A food product according to any of the preceding claims, characterised in that said edible mass (2), at the storage temperature of 2 ± 2°C, has a viscosity within the range of from 2,000,000 to 4,000,000 cps, determined by means of a Brookfield Heüpath Spindle viscosimeter, probe F, or is capable of maintaining a viscosity within said range at a temperature of from 0°C to 20°C.

14. A food product according to any of the preceding claims, characterised in that said edible mass (2) has a protein content of from 3 to 7% by weight, a fat content of from 3 to
6% by weight and a thickeners content of from 0.01 to 2.5% by weight.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. A23G3/56 A23C9/137 A23L1/00 A23L1/0532 A23L1/054 A23L1/0562

According to International Patent Classification (IPC) or to both national classification and IPC.

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

A23C A23L B65D A236

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched.

Electronic data base consulted during the international search (name of data base and, where practical search terms used)

EPO-Internal, WPI Data, FSTA

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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

'S' special categories of cited documents

'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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Date of the actual completion of the international search

20 January 2010

Date of mailing of the international search report

26/01/2010

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 Authorised officer

Delorenzi, Sibilla
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