Abstract:

A fruit preparation comprising fruit base and/or fruit concentrate containing sugars originally present in the fruit, iota carrageenan in a concentration of 0.3 to 3% by weight of said fruit composition, at least one sugar product, said fruit preparation being free of gelatine, gelatine derivatives and dairy products and said fruit preparation being aerated with an overrun in the range of 20 to 200%, having a water content of at least 20% by weight of said fruit preparation and having a solids content of at least 5% by weight of said fruit preparation; a process for making a fruit preparation, the process comprising the steps of: providing a mixture comprising iota carrageenan in a concentration of 0.3 to 3% by weight of the fruit preparation, at least one sugar product and fruit base and/or fruit concentrate containing sugars originally present in the fruit optionally together with water; and aerating the mixture to a overrun of 20 to 200%, wherein said fruit preparation is free of gelatine, gelatine derivatives and dairy products, having a water content of at least 20% by weight of said fruit preparation and having a solids content of at least 5% by weight of said fruit preparation; and the use iota carrageenan as a texturisation agent in fruit preparations, said fruit preparations comprising fruit base and/or fruit concentrate containing sugars originally present in the fruit and being free of gelatine, gelatine derivatives and dairy products.
NON-GELATIN CONTAINING NON-DAIRY AERATED FRUIT PREPARATION AND
METHOD OF MAKING SAME

Technical field of the invention

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The present invention relates to a non-gelatin containing, non-dairy aerated fruit preparation, a method of making same and the use of iota carrageenan as a texturisation agent in same.

Background of the invention

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US 5,538,751 describes a thickened foodstuff having improved stability and retention of smoothness upon reheating comprising a non-pre-gelatinized amylose polymer containing component and an effective amount of a biopolymer to disperse the amylose polymer component, said biopolymer selected from the group consisting of a sheared amylopectin component, iota carrageenan, kappa carrageenan, xanthan, maltodextrins, pectins, alginates, agar, gum arabic, locust bean gum, guar gum, carboxymethyl cellulose, hydroxypropyl methyl cellulose, and mixtures thereof; wherein the amylose polymer containing component is present as a dispersed phase.

US 4,935,258 describes an aseptic, storable fruit juice mixture comprised of a deionized or ultrafiltration juice selected from apple, grape or pear juice blended with a minor amount of a red, orange or yellow colored juice, said red, orange or yellow colored juice being blended therein as a concentrate, puree or a mixture and the concentration of said juice mixture adjusted with water to give a brix of 23 to 26. US 4,935,258 further describes the provision of a fruit juice mix for whipped and/or frozen and especially hard pack applications, as above, containing stabilizers therein, for example guar gum, locust bean gum, carrageenan, and specific amounts of xanthan gum or like products alone or mixed with other stabilizers and also vegetable protein. There is no indication of the stability of the thereby whipped fruit juice.

US 5,246,725 describes a low-fat frozen ice product spoonable at temperatures in excess of 4°F (-15.5°C) comprising a sugar alcohol present in the range of from about 5.5% to about 9.5% by weight, glycerine present in the range of from about 0.85% to about 2.0% by weight, a gelling agent, preferably one or more of pectin, agar-agar, gelatin, carrageenan, alginates, gum arabic or gum tragacanth, present in the range of from about 0.5% to about 1.15% by weight, a bulking agent present in the range of from about 3% to about 10% by weight, a synthetic sweetener present in the range of from about 0.03% to about 0.1% by weight.
weight, and the balance water. US 5,246,725 further describes the pumping and aeration of the product.

WO 2002-071872A2 describes an aerated semi-moist gel comprising a mixture of: a sweetener, a fruit concentrate, an ionic hydrocolloid, soluble calcium, an edible acid, a cation source, and a whipping protein, wherein the hydrocolloid preferably comprises an alginate, a carrageenan, a low methoxy pectin, or mixtures thereof.

US 2004/01 09933A describes an aerated confection comprising from 0.5 to 20% by weight on a dry weight basis of fruit solids based on the total weight of said aerated confection and from 0.01 to 0.2% by weight of a hexametaphosphate based on the total weight, said aerated confection having a moisture content of from 1 to 5% by weight, wherein the gum preferably comprises a guar gum, a carrageenan, an arabic gum, a xanthan gum, or mixtures thereof.

WO 2007/039064A describes an aerated semi-moist gel comprising a mixture of: a sweetener, a fruit concentrate, an ionic hydrocolloid, soluble calcium, an edible acid, a cation source, and a whipping protein, wherein said semi-moist gel having a moisture content of from 14 to 30% by weight based on the total weight and wherein said soluble calcium comprises dicalcium phosphate, calcium sulfate, calcium chloride, calcium citrate, calcium malate, calcium lactate, and mixtures thereof, wherein the ionic hydrocolloid preferably comprises an alginate, a carrageenan, a low methoxy pectin, or mixtures thereof.

US 2007/01 16848A describes a flowable aerated composition comprising hydrophobin and a yield stress agent, the composition having a continuous phase viscosity, measured at a shear rate of 10 s⁻¹, of from 0.01 to 2000 Pa s, and a continuous phase apparent yield stress of at least 4 Pa, wherein suitable ingredients that can be used as the yield stress agents, particularly in food systems, include gelling polysaccharides, including thermoreversible gelling biopolymers such as gelatine, iota- and kappa-carrageenan, and agar.

US 2008/021791 OA describes microfoamed fruit or vegetable puree containing native defatted soluble seric proteins and optionally a texturing agent, the overrun being less than or equal to 50%, the average diameter of the bubbles being less than 200 μm and the microfoamed fruit or vegetable puree being stable for at least 28 days at a temperature between 1 and 10°C, wherein the texturising agent is advantageously selected from agar agar, carrageenan and pectin.

Consumers are suspicious about animal-based products after various scares concerning animal husbandry including BSE, various dioxin scares and the illegal use of antibiotics to assist the growth of animals. Products free of any ingredients derived from animals in particular without gelatine and gelatine derivatives are therefore attractive to
consumers in general and vegetarians and Muslims in particular, since this means that no ingredients derived from pigs will be present. Aerated fruit preparations containing milk products produced by pumping are available. However, no non-dairy non-gelatin containing aerated fruit preparations are known to the inventors, which can be produced by pumping.

It is therefore desirable to provide non-dairy non-gelatin containing aerated fruit preparations, which can be produced by pumping.

Summary of the invention

It is an object of the present invention to provide a non-gelatin containing, non-dairy aerated fruit preparation.

In dairy-based aerated fruit preparations the stability is provided by gelatin or by carrageenan-casein interaction. It is surprising that stability of the aerated fruit preparation can be obtained in the presence of at least one sugar product and/or sugars originally present in the fruit in the absence of casein, emulsifiers and calcium ions just by using sufficient iota carrageenan. An aerated non-dairy fruit preparation is realised, which can be produced by pumping or whipping a non-aerated mixture which is not sensitive during preparation or storage to fruit type and pH, once the pH has been adjusted to fruit type, or to calcium ion concentration, whereas if pectins are used instead of iota carrageenan the non-aerated mixture is sensitive to pH and calcium ion concentration upon storage rendering it non-pumpable or non-whippable after storage. Moreover, such aerated non-dairy fruit preparations with iota carrageenan do not exhibit separation of a liquid phase upon storage in a refrigerator over a period of 1 month and can be soft to cuttable depending upon the concentration of iota carrageenan.

It is an advantage of the present invention to provide a process for making a non-gelatin containing, non-dairy aerated fruit preparation.

It is a further advantage of the present invention to provide a texturisation agent for use in non-gelatin containing, non-dairy aerated fruit preparations.

The above objective is accomplished by the fruit preparation, method for making same and use of iota carrageenan as a texturisation agent in same according to the present invention.

A first aspect of the present invention relates to a fruit preparation comprising fruit base and/or fruit concentrate containing sugars originally present in the fruit, iota carrageenan in a concentration of 0.3 to 3% by weight of the fruit preparation, optionally at least one sugar product, said fruit preparation being free of gelatine, gelatine derivatives and dairy products and said fruit preparation being aerated with an overrun in the range of 20 to
200%, having a water content of at least 20% by weight of said fruit preparation and having a solids content of at least 5% by weight of said fruit preparation.

A second aspect of the present invention relates to a process for making a fruit preparation, the process comprising the steps of: providing a mixture comprising iota carrageenan in a concentration of 0.3 to 3% by weight of the fruit preparation and fruit base and/or fruit concentrate containing sugars originally present in the fruit optionally together with water and optionally with at least one sugar product; and aerating the mixture to a overrun of 20 to 200%, wherein said fruit preparation is free of gelatine, gelatine derivatives and dairy products, having a water content of at least 20% by weight of said fruit preparation and having a solids content of at least 5% by weight of said fruit preparation.

A third aspect of the present invention relates to the use of iota carrageenan as a texturisation agent in fruit preparations according to the first aspect.

A fourth aspect of the present invention relates to the use iota carrageenan as a texturisation agent in fruit preparations, said fruit preparations comprising fruit base and/or fruit concentrate containing sugars originally present in the fruit and being free of gelatine, gelatine derivatives and dairy products and optionally being aerated.

Detailed Description

Definitions

The term fruit base, as used in disclosing the present invention, means fruit juice and/or fruit puree and/or fruit pulp, which contain sugars originally present in the fruit.

The term water content, as used in disclosing the present invention, means the water present in the fruit base together with any water that has been added during production.

Degrees Brix (symbol °Bx) is a measurement of the dissolved sugar-to-water mass ratio of a liquid. It is measured with a saccharimeter that measures specific gravity of a liquid or more easily with a refractometer. A 25 °Bx solution is 25% (sugar/water), with 25 grams of sugar per 100 grams of solution. To put it another way, there are 25 grams of sucrose sugar and 75 grams of water in the 100 grams of solution.

The term equivalent weight of fruit, as used in disclosing the present invention, is either that weight of fruit juice and/or puree and/or fruit pulp actually used in a non-concentrated state or if fruit concentrate is used the corresponding weight of fully rehydrated fruit i.e. rehydrated to give a Brix sweetness of 10. The fruit concentrate is obtained by dehydration of fruit juice and/or fruit puree and/or fruit pulp having a typical Brix sweetness before dehydration of 10 to give a fruit concentrate with a typical Brix sweetness of 60.
The term sugar product, as used in disclosing the present invention, embraces monosaccharides, oligosaccharides e.g. disaccharides, polysaccharides (e.g. inulin and polydextrose) and sugar alcohols.

The term dairy product, as used in disclosing the present invention, embraces any product derived from milk.

The term gelatine, as used in disclosing the present invention, means all forms of gelatine including those derived from fish.

The term gelatine derivative, as used in disclosing the present invention, means any product derived from gelatine.

The term aerated, as used in disclosing the present invention, means the incorporation of bubbles of air or another gas e.g. carbon dioxide or nitrogen.

The term overrun, as used in disclosing the present invention, is the percentage expansion of the fruit preparation due to aeration. It can be measured by measuring the change in density. For example, the overrun of the aerated fruit preparations can be measured as follows. A plastic container of known volume is filled with the unaerated, fruit preparation and weighed. The container is then emptied, cleaned and filled with aerated fruit preparation and weighed again. The %overrun is calculated from the measured weights as follows:

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\%\text{overrun} = \frac{(\text{weight of unaerated fruit preparation} - \text{weight of aerated fruit preparation}) \times 100}{\text{weight of aerated fruit preparation}}
\]

The term texturising agent, as used in disclosing the present invention, means any additive, which provides the aerated fruit preparation with both thixotropic and aerated structure-stabilising properties.

The term mousse, as used in disclosing the present invention, is a homogeneously aerated product, which does not collapse after aeration and which provides little resistance to a spoon or cutting implement.

The term "free of any ingredients derived from animals", as used in disclosing the present invention, means an entirely vegetal product excluding any ingredient such as dairy products, gelatine, gelatine derivatives, eggs and egg-based products and glycerine derived from animal fats.

The term ice product, as used in disclosing the present invention, means a product cuttable at a temperature of -4°C or below e.g. a non-dairy ice cream or a water ice.

The term spreadability, as used in disclosing the present invention, is defined as a shear stress in the range of 50 to 1000 Pa, preferably 100 to 700 Pa, even more preferably from 100 to 500 Pa, measured at 10°C with a Haake VT 500 viscometer equipped with a
"vane", which is a central rod with 4 vanes mounted orthogonally to one another, all the 
vanes being 24 mm high at the join to the central rod and 18 mm high at the outer edge 
parallel to the central rod, which is 10 mm from the centre of the rod, and the top edges of the 
vanes are in a plane perpendicular to the rod. The shear stress is measured at a rotation 
speed of 0.2 rpm and the top of the vanes are level with the surface of the fruit preparation 
whose spreadability is being determined.

The term spoonable, as used in disclosing the present invention, means no observable 
collapse of a heaped spoonful of the aerated fruit preparation.

The term solids concentration in the food preparation, as defined herein, as used in 
disclosing the present invention, means the percentage by weight of solids after removal of 
the liquid and includes both insoluble solids such as fibres and soluble substances.

Fruit preparation

The fruit preparation of the aspects of the present invention comprises fruit base, which 
may be present, at least in part, as fruit concentrate. The fruit base and/or fruit concentrate 
may be of a single fruit or of a mixture of one or more fruits. The concentration of fruit 
equivalent, i.e. non-dehydrated fruit, is preferably in the range of 30 to 100% by weight of the 
fruit preparation, with a range of 40 to 80% by weight of the fruit preparation being 
particularly preferred. Obviously in the case of 100% any water added will not fully rehydrate 
the fruit concentrate used.

According to an embodiment of the aspects of the present invention, the fruit 
preparation comprises 30 to 100% by weight of fruit base.

According to an embodiment of the aspects of the present invention, the overrun is 30 
to 70% with 40 to 50% being preferred.

According to an embodiment of the aspects of the present invention, the fruit 
preparation may further comprise an emulsifier. Suitable emulsifiers include sucro-esters 
(sucrose esters of fatty acids), citric esters, lactic esters, pea protein, gluten protein and 
locust (carob) bean gum (the protein of the carob germ), with a preferred concentration in the 
case of sucro-esters being at most 1% by weight of the fruit preparation and in the case of 
gluten, pea protein and locust bean gum being at most 3% by weight of the food preparation. 
An emulsifier is not necessary in the case of aeration with industrial equipment such as a 
Mondomix®, from Haas-Mondomix B.V., in which a gas is injected into the fruit preparation in 
a continuous process under considerable pressure. Emulsifiers are also not necessary to 
obtain overruns of 20 to 30% using domestic mixers such as a Hobbart® planetary beater of
a Kitchen Aid® mixer. However, emulsifiers are likely to be necessary to obtain overruns
greater than 30% using domestic beaters and mixers.

The concentration of iota carrageenan in the fruit preparation of the aspects of the
present invention is preferably in the range of 1.0 to 2.0% by weight of the fruit preparation.

5 Iota carrageenan occurs naturally together with kappa or epsilon carrageenan. In
Eucheuma Spinosium ca. 90% of the carrageenan is iota carrageenan and ca. 10% is
kappa carrageenan. Iota carrageenan will generally be added in the form of a mixture with
another type of carrageenan, which does not act as a texturising agent, according to the
present invention. The use of carrageenan mixtures with at least 50% by weight of iota
carrageenan is preferred and with at least 80% by weight is particularly preferred.

10 It is well known to one skilled in the art, that carrageenans are susceptible to
degradation (depolymerisation) at pH at or below 5.0. However, the degradation at a pH of
3.8 to 4.0 is slow enough that no significant degradation occurs at such pH's even if mixtures
containing carrageenans are subjected to elevated temperatures for a long period.
Furthermore, no significant degradation of carrageenans at a pH of 3.6 if subjected to
15 elevated temperatures for a very short period (flash) heat treatment or with acidification just
before cooling i.e. cooking at a pH > 3.6 e.g. 3.8 with a pH reduction to 3.6 just before
cooling. In an embodiment of the first aspect of the present invention, the fruit preparation
further comprises a buffer. Preferred buffers are alkali citrates, alkali tartrates and alkali
phosphates.

In an embodiment of the aspects relating to the present invention the fruit preparation
further comprises added acid e.g. citric acid, tartaric acid, malic acid etc.

The solids concentration in the fruit preparation is preferably between 20 and 50% by
weight of the fruit preparation with the balance being water.

20 The Brix of the fruit preparation is preferably in the range of 5 to 60, preferably from 10
to 30.

The multiplication product of the % by weight concentration of iota carrageenan in the
fruit preparation and the Brix of the fruit preparation is preferably in the range of 10 to 50 and
particular preferably in the range of 15 to 35.

30 The total soluble substance (TSS), which approximately corresponds to the at least
one sugar product and/or sugars originally present in the fruit is less than 50% by weight of
the fruit preparation.

In an embodiment of the aspects relating to the present invention the fruit preparation,
as defined herein, is a mousse.

35 The fruit preparation, as defined herein, is suitable for storage at temperatures between
O and 10°C.
The aerated fruit preparation of the present invention is cuttable with a shear stress of greater than 100 Pa.

According to an embodiment of the first aspect of the present invention, no observable separation of liquid is observed with the fruit preparations, according to the present invention, over a period of 1 month at a temperature of 5°C.

The fruit preparation of the aspects of the invention is preferably not an ice product e.g. a non-dairy ice cream or a water ice.

The fruit preparation of the first aspect of the present invention preferably does not comprise a non-pre-gelatinized amylose polymer.

The fruit preparation of the first aspect of the present invention preferably does not comprise hexametaphosphate.

The fruit preparation of the first aspect of the present invention preferably does not comprise soluble calcium compounds.

The fruit preparation of the first aspect of the present invention preferably does not comprise hydrophobin.

The fruit preparation of the first aspect of the present invention preferably does not comprise native defatted soluble seric proteins.

The fruit preparation of the first aspect of the present invention preferably does not comprise a puree derived from the fruit of the genus Actinidia having substantially little degradation of the fruit's naturally occurring pectins.

Sugar products

The at least one sugar product is selected from the group consisting of monosaccharides, oligosaccharides and sugar alcohols. The concentration in the fruit preparation of sugar product and/or sugars originally present in the fruit, according to the present invention, is preferably in the range of 5% to 60%, preferably from 10 to 50% by weight of the fruit preparation with a range of 20 to 40% by weight being particularly preferred. The at least one sugar product is selected from the group consisting of digestible and non-digestible sugar products.

Suitable monosaccharides include, pentoses and hexoses. Suitable pentoses include D-ribose, D-arabinose, D-xylulose, D-lyxose, D-ribulose and D-xylulose. Suitable hexoses include D-fructose, D-sorbose D-psicose, D-tagatose, D-altrose, D-glucose, D-mannose, D-gulose, D-idose, D-galactose and D-talose

In an embodiment of the aspects, according to the present invention, the oligosaccharide is a disaccharide.
In an embodiment of the aspects, according to the present invention, the disaccharide is selected from the group consisting of sucrose, lactulose, lactose, maltose, trehalose and cellobiose.

Suitable disaccharides are sucrose, with a glucose monomer and a fructose monomer, lactulose, with a galactose monomer and a fructose monomer, lactose, with a galactose monomer and a fructose monomer, maltose, with two glucose monomers, trehalose, with two glucose monomers, cellobiose, with two glucose monomers, kojibiose, with two glucose monomers, nigerose, with two glucose monomers, isomaltose, with two glucose monomers, β,β-trehalose, with two glucose monomers, sophorose, with two glucose monomers, Laminaribiose, with two glucose monomers, gentiobiose, with two glucose monomers, turanose, with a glucose monomer and a fructose monomer, maltulose, with a glucose monomer and a fructose monomer, palatinose, with a glucose monomer and a fructose monomer, gentiobiulose, with a glucose monomer and a fructose monomer, mannobiulose, with two mannose monomers, melibiose, with a galactose monomer and a glucose monomer, melibiose, with a galactose monomer and a fructose monomer, retinues, with a rhamnose monomer and a glucose monomer, rutinulose, with a rhamnose monomer and a fructose monomer, and xylobiose, with two xylpyranose monomers.

In an embodiment of the aspects of the present invention, the sugar alcohol is selected from the group consisting of erythritol, maltitol, sorbitol and xylitol.

Suitable sugar alcohols include erythritol, arabitol, xylitol, ribitol, mannitol, sorbitol, dulcitol, iditol, isomalt, maltitol and lactitol.

Process for making a fruit preparation

A second aspect of the present invention concerns a process for making a fruit preparation, the process comprising the steps of: providing a mixture comprising iota carrageenan in a concentration of 0.3% to 3%, preferably from 0.5 to 3% by weight of said fruit preparation, at least one sugar product and fruit base and/or fruit concentrate optionally together with water; and aerating the mixture to a overrun of 20% to 200%, preferably 20% to 150%, and more preferably from 30% to 70%. In one preferred embodiment, where citric ester or sucro-ester is used as an emulsifier, the overrun is preferably from 40% to 50%. In another preferred embodiment, where pea protein, gluten protein or locust bean gum is used as an emulsifier, the overrun is preferably from 100% to 150%.

The fruit base may be of a single fruit or of a mixture of one or more fruits. The mixture is optionally heated to improve by reducing the viscosity the pumpability of the mixture in the aeration step.
The mixture of iota carrageenan, at least one sugar product and fruit base and/or fruit concentrate optionally together with water can be prepared at elevated temperatures. It is well known to one skilled in the art, that carrageenans are susceptible to degradation (depolymerisation) especially at pH at or below 3.6, if subjected to elevated temperatures for a long period. Certain fruits naturally have a pH < 4 for example lemons have a pH of about 1.8 to 2.3, oranges have a pH of about 2.5 to 3, raspberries have a pH of 3.0 to 3.3 and mangoes have a pH of 3.7 to 4.3. Therefore, if lengthy heating at elevated temperatures is involved for mixtures containing the fruit base of such fruits and iota carrageenan, a buffer may be necessary to increase the pH above 3.6 to avoid degradation of the iota carrageenan. Preferred buffers are alkali citrates, alkali tartrates and alkali phosphates. If only a short heating at elevated temperatures is involved or if the fruit base naturally has a pH > 3.6, the addition of a buffer may not be necessary.

The fruit preparation, according to the present invention, is prepared by pumping an easily pumpable thixotropic mixture with a soft texture with the soft texture being recovered after foaming as a spoonable foam.

Industrial applicability

The fruit preparation, according to the present invention, aerated industrially, domestically or in a craft shop to provide a mousse dessert, a topping etc.

Examples

Example 1:

Sufficient carrageenan source containing ca. 90% iota carrageenan to provide 20 g of iota carrageenan was preblended with 7.5 g of an emulsifier (a mixture of 20wt% sucrose esters of fatty acids and 80wt% citric acid ester of mono- and di-glycerides of fatty acids), and 50 g of sucrose and dispersed with stirring in 230 g of hot water at ca. 80°C.

600 g of strawberry pulp was preblended with 100 g sucrose and 1.5 g of citric acid and heated to boiling point. The iota carrageenan solution was added and the resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 1 day at a temperature at or below 30°C, the mixture was whipped for a few minutes in a Kitchen Aid® planetary beater to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.
Example 2:

Sufficient carrageenan source containing ca. 90% iota carrageenan to provide 20 g of iota carrageenan was preblended with 4 g of an emulsifier (a mixture of 20wt% sucrose esters of fatty acids and 80wt% citric acid ester of mono- and di-glycerides of fatty acids), and 50 g of sucrose and dispersed with stirring in 230 g of hot water at ca. 80°C.

600 g of apricot pulp was preblended with 100 g sucrose and 4 g of trisodium citrate and heated to boiling point. The iota carrageenan solution was added and the resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 2 days at a temperature at or below 30°C, the mixture was whipped under pressure in a continuous beater (Mondomix type) to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.

Example 3:

Sufficient carrageenan source containing ca. 90% iota carrageenan to provide 20 g of iota carrageenan was preblended with 9 g of an emulsifier (a mixture of 20wt% sucrose esters of fatty acids and 80wt% citric acid ester of mono- and di-glycerides of fatty acids), and 50 g of sucrose. This blend was dispersed in 600 g of raspberry pulp and 100g of sucrose, 230 g of water and 4 g of trisodium citrate added with stirring. The resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 5 days at a temperature at or below 30°C, the mixture was whipped for a few minutes in a Kitchen Aid® planetary beater to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.

Example 4:

Sufficient carrageenan source containing ca. 90% iota carrageenan to provide 20 g of iota carrageenan was preblended with 7.5 g of an emulsifier (a mixture of 20wt% sucrose esters of fatty acids and 80wt% citric acid ester of mono- and di-glycerides of fatty acids), and 50 g of sucrose and dispersed with stirring in 230 g of hot water at ca. 80°C.

600 g of raspberry pulp was preblended with 100 g sucrose and 4 g of trisodium citrate and heated to boiling point. The iota carrageenan solution was added and the resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 2 days at a temperature at or below 30°C, the mixture was whipped for a few minutes in a Kitchen Aid® planetary beater to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.
obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling to 30°C, the mixture was whipped for a few minutes in a Kitchen Aid® planetary beater to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.

Example 5:
Sufficient carrageenan source containing ca. 90% iota carrageenan to provide 20 g of iota carrageenan was preblended with 4 g of an emulsifier (a mixture of 20wt% sucrose esters of fatty acids and 80wt% citric acid ester of mono- and di-glycerides of fatty acids), and 50 g of sucrose. This blend was dispersed in 600 g of strawberry pulp and 100g of sucrose, 230 g of water and 1.5 g of citric added with stirring. The resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 1 day at a temperature at or below 30°C, the mixture was whipped under pressure in a continuous beater (Mondomix type) to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.

Example 6:
Sufficient carrageenan source containing ca. 90% iota carrageenan to provide 17 g of iota carrageenan was preblended with 2 g of locust bean gum, and 50 g of sucrose. This blend was dispersed in 600 g of strawberry pulp and 100g of sucrose, 230 g of water and 1.5 g of citric acid added with stirring. The resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 3 days at a temperature at or below 30°C, the mixture was whipped for a few minutes in a continuous beater (Mondomix type) to provide a mousse with an overrun of 100% to 150%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.

Example 7:
Sufficient carrageenan source containing ca. 90% iota carrageenan to provide 17 g of iota carrageenan was preblended with 7.5 g of HC9 base, a sucroester, and 50 g of sucrose and dispersed with stirring in 230 g of hot water at ca. 80°C.
600 g of mango pulp was preblended with 100 g sucrose and 1.5 g of citric acid and 2 g of trisodium citrate and heated to boiling point. The iota carageenan solution was added and the resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 1 day at a temperature at or below 30°C, the mixture was whipped for a few minutes on a Kitchen Aid® planetary beater to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.

Example 8:
Sufficient carageenan source containing ca. 90% iota carageenan to provide 15 g of iota carageenan was preblended with 7.5 g of HC9 base, a sucroester, and 50 g of sucrose. This blend was dispersed in 600 g of mango pulp and 100g of sucrose, 230 g of water and 1 g of citric acid added with stirring. The resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 5 days at a temperature at or below 30°C, the mixture was whipped for a few minutes in a Kitchen Aid® planetary beater to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.

Example 9:
Sufficient carageenan source containing ca. 90% iota carageenan to provide 20 g of iota carageenan was preblended with 7.5 g of HC9 base, a sucroester, and 50 g of sucrose and dispersed with stirring in 230 g of hot water at ca. 80°C.

600 g of apricot pulp was preblended with 100 g sucrose and 4 g of trisodium citrate and heated to boiling point. The iota carageenan solution was added and the resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 1 day at a temperature at or below 30°C, the mixture was whipped for a few minutes in a Kitchen Aid® planetary beater to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.

Example 10:
Sufficient carrageenan source containing ca. 90% iota carrageenan to provide 20 g of iota carrageenan was preblended with 50 g of sucrose and dispersed with stirring in 230 g of hot water at ca. 80°C.

600 g of strawberry pulp was preblended with 100 g sucrose and 1.5 g of citric acid and heated to boiling point. The iota carrageenan solution was added and the resulting mixture with a pH of 3.8 to 4.0 was heated and concentrated until a Brix of 30-32° was obtained providing ca. 1 kg of finished product with a (soluble) solids concentration of 30 to 35% by weight of the mixture. After cooling and storing for 1 day at a temperature at or below 30°C, the mixture was whipped under pressure in a continuous beater (Mondomix type) to provide a mousse with an overrun of 50 to 80%.

The final texture of the mousse, which could be frozen, was smooth and spoonable.
CLAIMS

1. A fruit preparation comprising fruit base and/or fruit concentrate containing sugars originally present in the fruit, iota carrageenan in a concentration of 0.3 to 3% by weight of said fruit composition, said fruit preparation being free of gelatine, gelatine derivatives and dairy products and said fruit preparation being aerated with an overrun in the range of 20 to 200%, having a water content of at least 20% by weight of said fruit preparation and having a solids content of at least 5% by weight of said fruit preparation.

2. The fruit preparation according to claim 1, wherein said fruit preparation further comprises at least one sugar product.

3. The fruit preparation according to claim 2, wherein said at least one sugar product is selected from the group consisting of monosaccharides, oligosaccharides and sugar alcohols.

4. The fruit preparation according to claim 3, wherein said oligosaccharide is a disaccharide.

5. The fruit preparation according to any one of claims 1 to 4, wherein said at least one sugar product together, if present, and said sugars originally present in the fruit have a concentration in the range of 5% to 60% by weight of said fruit preparation.

6. The fruit preparation according to any one of claims 1 to 5, wherein said concentration of iota carrageenan is 1 to 2% by weight of said fruit preparation.

7. The fruit preparation according to any one of claims 1 to 6, wherein said fruit preparation is a mousse.

8. The fruit preparation according to any one of claims 1 to 7, wherein iota carrageenan is the sole texturing agent in said fruit preparation.

9. The fruit preparation according any one of claims 1 to 8, wherein said fruit preparation further contains an emulsifier.
10. The fruit preparation according to any one of claim 1 to 9, wherein said fruit preparation is free of any ingredients derived from animals.

11. The fruit preparation according any one of claims 1 to 10, wherein said fruit preparation comprises 30 to 100% by weight of fruit base equivalent.

12. The fruit preparation according to any one of claims 1 to 11, wherein said fruit preparation is not an ice product.

13. A process for making a fruit preparation, the process comprising the steps of: providing a mixture comprising iota carrageenan in a concentration of 0.3 to 3% by weight of the fruit preparation, at least one sugar product and fruit base and/or fruit concentrate containing sugars originally present in the fruit optionally together with water; and aerating the mixture to a overrun of 20 to 200%, wherein said fruit preparation is free of gelatine, gelatine derivatives and dairy products, having a water content of at least 20% by weight of said fruit preparation and having a solids content of at least 5% by weight of said fruit preparation.

14. Use of iota carrageenan as a texturisation agent in fruit preparations, said fruit preparations comprising fruit base and/or fruit concentrate containing sugars originally present in the fruit and being free of gelatine, gelatine derivatives and dairy products.

15. The use according to claim 14, wherein said fruit preparation is aerated.
### A. CLASSIFICATION OF SUBJECT MATTER

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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)

- A23L

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, BIOSIS

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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* Further documents are listed in the continuation of Box C.

* Special categories of cited documents:
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Date of the actual completion of the international search: 6 December 2010

Date of mailing of the international search report: 13/12/2010

Name and mailing address of the ISA:
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Fax: (+31-70) 340-3916

Authorized officer:

Munteanu, Ioana S.
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