

COCOA COMPOSITION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of European Patent Application No. 20158681.5, filed February 21, 2020, which is hereby incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

[0002] The invention relates to a cocoa composition that is low in milk solids, comprising a plasticizer ingredient and a bulking ingredient, said cocoa composition having a sensorial quality comparable to that of milk-containing cocoa compositions. The invention further relates to food products comprising the cocoa composition according to the invention.

BACKGROUND OF THE INVENTION

[0003] Chocolate flavour is one of the most popular flavors in the world, with many foodstuffs incorporating chocolate or cocoa-derived ingredients in some fashion. Chocolate confectionary covers a wide range of sweet food products based on cocoa-derived ingredients, such as chocolate, cocoa-based coatings or couvertures, and cocoa-based fillings. Chocolate is especially popular for its typical fast melting in the mouth resulting in an explosion of bitter-sweet cocoa taste. Many chocolate confectionary recipes also contain in addition to the cocoa-derived ingredients milk solids to give an extra dimension of creaminess and milky taste.

[0004] However, despite its appeal, milk-based chocolate confectionary products contain significant amounts of butter fat, milk protein and lactose. As a result, milk-based chocolate confectionary cannot be consumed by those suffering from lactose intolerance or milk allergies. It will also be undesirable for those following a vegan diet or avoiding dairy for religious or lifestyle reasons.

[0005] Past attempts to replace milk solids in milk-based chocolate confectionary products have resulted in a products of poor sensorial quality that lack the typical creamy mouthfeel and flavor of traditional milk-based chocolate confectionary products.

[0006] Thus, there remains a need for chocolate confectionary products reduced in milk solids with an improved quality and eating sensation.

SUMMARY OF THE INVENTION

[0007] The present invention relates to a cocoa composition comprising at least 2.0 weight% of cocoa solids and less than 5.0 weight% of milk solids, and characterized in that it comprises 0.5-20.0% of a bulking ingredient and 0.5-10.0% of a plasticizers ingredient.

[0008] The present invention also relates to a food product comprising such a cocoa composition, characterized in that the food product is, for example, a bakery or confectionary product.

DETAILED DESCRIPTION

[0009] Unless otherwise specified herein, all weights are expressed as a percentage, by weight, relative to the total weight of the cocoa composition.

[00010] The present invention relates to a cocoa composition comprising at least 2.0 weight% of cocoa solids and less than 5.0 weight% of milk solids, and characterized in that it comprises 0.5-20% of a bulking ingredient and 0.5-10% of a plasticizers ingredient.

Cocoa Composition

[00011] The term “cocoa composition” will be used to refer to a substantially homogeneous and fat-continuous composition, typically comprising a mixture of cocoa liquor and/or cocoa powder, cocoa butter and/or cocoa butter replacers, equivalents, improvers, and/or substitutes, sugar and/or sugar replacers plus one or more optional ingredients such as emulsifiers and flavoring agents.

[00012] The cocoa composition according to the present invention comprises cocoa solids in an amount of at least 2 weight%, preferably at least 3 weight%, more preferably at least 5 weight%, more preferably at least 10 weight%, more preferably at least 15 weight%.

[00013] The term “cocoa solids” as used herein may refer to any component derived from cocoa beans such as, but not limited to, cocoa liquor, cocoa powder and/or cocoa butter.

[00014] Cocoa liquor, also called “cocoa mass”, is produced from ground cocoa beans. Prior to or after grinding, the beans may be fermented, dried, roasted, alkalized and/or treated using any other technique known in the art. In one aspect, the cocoa composition of the present invention will comprise 5-30 weight%, preferably 10-25 weight%, more preferably 15-25 weight%, more preferably 18-22 weight% cocoa liquor.

[00015] Cocoa butter is the fat extracted from cocoa beans, typically by pressing the cocoa liquor. Cocoa butter may be deodorized to remove strong or undesirable tastes. Cocoa butter may be replaced, in whole or in part, by cocoa butter alternatives. Cocoa butter alternatives are well known in the art and include cocoa butter replacers, cocoa butter equivalents, cocoa butter improvers, and cocoa butter substitutes. They are typically vegetable fats and/or vegetable fat fractions with similar physical or chemical properties to cocoa butter.

[00016] Cocoa powder is produced by further grinding or milling the “dry” residue obtained from cocoa liquor after pressing. It may be natural cocoa powder, with a pH of around 5.5, or it may be processed (e.g. treated with alkali or acid). It may have a relatively high fat content, e.g. above 15 weight% residual cocoa butter, a standard fat content (e.g. 10-15 weight% cocoa butter), or a low fat content (less than 10 weight% cocoa butter). Fat-free cocoa powders may also be used (e.g. with a fat content of less than 2 weight%).

[00017] In one aspect of the invention, the cocoa composition is a chocolate composition and is characterized in that it comprises cocoa solids in an amount of at least 30 weight%, preferably at least 33 weight%, more preferably at least 35 weight%. In one preferred aspect, the composition of the invention will comprise 30-95 weight%, preferably 30-75 weight%, more preferably 30-55 weight% of cocoa solids. Advantageously, the composition will include not less than 18 weight%, preferably not less than 20 weight%, more preferably not less than 25 weight% cocoa butter.

[00018] The terms “chocolate composition” and “chocolate” will be used interchangeably. Although, they should not be interpreted as being limited to any particular legal definitions of chocolate, in one aspect of the invention, the chocolate composition will be a chocolate product as defined in Directive 2000/36/EC of the European Parliament and of the Council of 23 June 2000.

[00019] Alternatively, the cocoa composition according to the present invention may comprise cocoa solids in an amount of from 2.0 to 20.0 weight%, preferably of from 3.0 to 18.0 weight%, more preferably of from 3.0 to 15.0 weight%. Examples of such cocoa compositions include coating (or couverture) and compound type compositions. These compositions can typically be differentiated from chocolate compositions in that at least some of the cocoa butter content has been replaced by one or more cocoa butter alternatives.

[00020] The cocoa composition according to the present invention further comprises milk solids in an amount of less than 5.0 weight%, preferably in an amount of less than 4.0 weight%,

more preferably less than 3.0 weight%, more preferably less than 2.0 weight%, more preferably less than 1.0 weight%. Milk solids according to the present invention may be defined as any dry component derived from milk such as, but not limited to, milk fat or fractions thereof, lactose, skimmed or whole milk powder, whey, whey powder, caseinate, and/or milk hydrolysate. As used herein, “milk” refers to milks of mammalian origin (e.g. non-human milks such as cow, buffalo, sheep, and/or goat milk). In one aspect, the cocoa composition of the invention will be substantially free of milk solids.

[00021] Although they may be used to produce foodstuffs comprising coatings, fillings or inclusions, the cocoa compositions of the invention will not themselves include such components. Indeed, the compositions of the invention will preferably be homogenous (or “continuous”) cocoa compositions, i.e. with a consistent texture and structure throughout.

[00022] The cocoa compositions will preferably be moldable compositions. As used herein, the term “moldable” refers to a composition that is capable of being formed into a shape in a mold, setting (preferably at room temperature), and then retaining the molded shape after removal of the mold. Thus, the compositions of the invention will preferably not be in the form of a powder or of a particulate material. Furthermore, the compositions of the present invention will preferably have a water content of less 10% by weight based on the total weight of the composition. More preferably, they will have a water content of less 5%, more preferably less than 3%, more preferably less than 2%, and more preferably less than 1% by weight.

Plasticizer Ingredient

[00023] The cocoa composition of the invention comprises 0.5-10.0 weight% of a plasticizer ingredient. Preferably, the plasticizer ingredient will be present in the cocoa composition in an amount from 1.0 to 9 weight%, more preferably from 1.5 to 8 weight%, more preferably from 2 to 7 weight%, more preferably from 2.5 to 6 weight%.

[00024] Without wishing to be bound by theory, it is believed that the plasticizer ingredient will perform, at least in part, a comparable function in the cocoa composition of the invention to milk fat in a traditional milk-containing cocoa composition. In particular, it has been found that the plasticizer ingredient will result in the cocoa composition having a less brittle structure and a more creamy mouthfeel.

[00025] In one aspect of the invention the plasticizer ingredient may be a liposoluble ingredient from a vegetable source, including vegetable fats and oils. Preferably, the plasticizer

will be a vegetable fat or oil (such as palm or palm kernel oil, or shea butter) with a melting point below that of cocoa butter. More preferably, it will be selected from the group consisting of liquid oils, randomized fats and combinations of two or more thereof. Advantageously, the liposoluble ingredient is free from glycerin.

[00026] Liquid oils are oils that remain liquid at room temperature. The liquid oils used in accordance with the present invention will preferably be vegetable liquid oils, that is, liquid oils from a vegetable source. Suitable vegetable sources include, by way of example only, almonds, pine nuts, pistachios, cashews, hazelnuts, peanuts, sesame seeds, sunflower seeds, high-oleic sunflower seeds, rapeseeds or mixtures of two or more thereof. They may also include specific varieties of cocoa beans that produce particularly soft cocoa butter such as Brazilian cocoa bean. When using such “soft” cocoa beans as plasticizers, both cocoa butter and/or cocoa liquor may be used. These will then also contribute cocoa solids to the overall composition.

[00027] The oils may be used as such – that is as oils extracted through pressing or other known methods from their source – or they may be incorporated into the cocoa composition in the form of a paste produced by grinding the source (e.g. a nut paste). Preferably the liquid oil will be present in the cocoa composition in an amount of 0.5 to 5 weight%, more preferably in an amount of 0.5 to 3 weight%, more preferably from 1 to 2 weight%. When incorporated in the form of a paste, sufficient paste will be added to achieve the preferred liquid oil content(s) as specified above.

[00028] In a specific aspect of the present invention, the plasticizer ingredient will comprise or consist of liquid oil in the form of a paste selected from almonds, pine nuts, pistachios, cashews, hazelnuts, peanuts, sesame seeds and mixtures of two or more thereof. Preferably, the plasticizer ingredient will comprise or consist almond oil and/or hazelnut oil which will advantageously be added to the cocoa composition in the form of an almond and/or hazelnut paste.

[00029] The plasticizer ingredient may also comprise or consist of randomized fats. The term “randomized fat” as used herein refers to triglyceride compositions comprising long chain and/or short chain fatty acids that are randomly distributed over the glycerol backbones of the triglycerides. Long chain fatty acids are defined as fatty acids with 16 to 24 carbon atoms. Short chain fatty acids are defined as fatty acids with 4 to 14 carbon atoms. The ratio between long chain and short chain fatty acids in the randomized fats may range from 20/80 up to 80/20. Preferably, the ratio will be from 30/70 to 70/30, more preferably from 40/60 to 60/40.

Alternatively, the triglyceride composition of the randomized fat may consist only of long chain fatty acids that are randomly distributed over the triglyceride backbone. These long chain fatty acids may be saturated fatty acids (S) or unsaturated fatty acids (U). Randomized fats may be obtained by chemical and/or enzymatic interesterification or by any other method available to a person skilled in the art. Randomization may be complete or partial. A partially randomized fat is a fat which has not been allowed to react to achieve its fully converted state for a given set of reaction conditions.

[00030] In one aspect of the present invention, the randomized fat may be a randomized cocoa butter. Randomized cocoa butter may be obtained by chemical or enzymatic interesterification. It may also be obtained by deodorizing the cocoa butter for a long time (1 to 4 hours) at extremely high temperatures (above 235°C).

[00031] Preferably the randomized fat will be present in the cocoa composition in an amount of 0.5 to 5 weight%, more preferably in an amount of 0.5 to 3 weight%, more preferably from 1 to 2 weight%.

[00032] Advantageously, liquid oils and/or randomized fats used in accordance with the present invention will not comprise any hydrogenated fat. Preferably, the plasticizer ingredient will not comprise any hydrogenated fat.

[00033] Preferably, emulsifiers such as lecithin and/or PGPR will not be used as plasticizers. Thus, the plasticizer ingredient will preferably be present in addition to any such emulsifiers.

Bulking Ingredient

[00034] The cocoa composition of the invention comprises 0.5-20.0 weight% of a bulking ingredient. Preferably, the bulking ingredient will be present in the chocolate composition in an amount from 1.0 to 19.0 weight%, more preferably from 2.0 to 18.0 weight%, more preferably from 3.0 to 16.0 weight%, more preferably from 4.0 to 14.0 weight%.

[00035] The bulking ingredient may be selected from the group consisting of oligosaccharides, polysaccharides, soluble dietary fibres, insoluble dietary fibres and mixtures of two or more thereof.

[00036] Oligosaccharides are saccharide polymers containing a small number, typically three to ten, of monosaccharides. Suitable oligosaccharides for use in the present invention include fructo-oligosaccharides (FOS). FOS are short chains of fructose molecules found in

many vegetables. They are considered soluble dietary fibres. Another type of suitable oligosaccharides is galacto-oligosaccharides (GOS), which also occur naturally. They consist of short chains of galactose molecules. These compounds, which act as soluble fibres, cannot be digested in the human small intestine, and instead pass through to the large intestine, where they promote the growth of Bifidobacteria, which are beneficial to gut health.

[00037] In one aspect of the invention the bulking ingredient comprises an oligosaccharide in a range of from 2.0 to 15.0 weight%, preferably in a range of from 3.0 to 12.0 weight%, more preferably in a range of from 4.0 to 10.0 weight%.

[00038] Suitable polysaccharides include glucose polymers such as starch, and starch-derivatives such as glucose syrup, maltodextrin and dextrin. Fructans and inulin are further examples of suitable polysaccharides. These are polymers of fructose with a much higher degree of polymerization than FOS. They are also considered soluble dietary fibres. Another example of soluble fibre suitable for use in the present invention is polydextrose which is obtained by thermal polymerisation of dextrose. Suitable polysaccharides may also include agar, galactomannans such as guar gum, locust bean gum, and amylopectins, pectin and combinations of two or more of the above.

[00039] In one aspect of the invention the bulking ingredient comprises a polysaccharide in a range of from 2.0 to 15.0 weight%, preferably in a range of from 3.0 to 12.0 weight%, more preferably in a range of from 4.0 to 10.0 weight%.

[00040] Suitable insoluble fibres may be selected from the group consisting of resistant starches, cereal fibres, fruit fibres, fibres of legumes and mixtures of two or more thereof.

[00041] Preferably, the bulking ingredient will be selected from the group consisting of vegetable fibres, dextrin, maltodextrin, polydextrose, inulin, dehydrated grain syrups (such as dried rice syrup), pectin, and mixtures of two or more thereof.

[00042] Alternatively, the bulking agent will include or consist of vegetable fibres selected from the group consisting of cereal and grain fibres, fruit fibres and mixtures of two or more thereof, preferably rice fibres, pea fibres, coconut fibres, soy fibres and mixtures of two or more thereof.

[00043] In yet another aspect of the invention, the bulking ingredient comprises 3.0-15.0 weight% of an oligo- and/or polysaccharide and 0.5-10.0 weight% of a vegetable dietary fibre. More preferably the bulking ingredient comprises 3.5-10.0 weight% of a polysaccharide and 1.0-6.0 weight% of a vegetable fibre.

[00044] In one more aspect of the invention, the compositions will also be free of carob and/or soy.

[00045] The cocoa composition of the present invention may also comprise other ingredients such as emulsifiers and/or flavourings. Emulsifiers suitable for use in the present invention will be well known to a person skilled in the art and may include, by way of example only, lecithin, PGPR and/or variants thereof such as hydrolysed or PC-enriched (or phosphatidylcholine-enriched) lecithin. Flavourings may include, but are not limited to, vanilla flavour, vanillin, caramel flavour and the like.

[00046] Preferably, the cocoa composition will not comprise any protein other than that incidentally introduced through the above-recited ingredients. In one aspect, the cocoa composition will not comprise any protein other than its incidental cocoa protein content.

Sweeteners

[00047] The cocoa composition will preferably include one or more sweeteners. These may be selected from caloric sweeteners and/or non- or low-caloric sweeteners. Caloric sweeteners may be, but are not limited to sucrose, fructose, glucose or combinations of two or more thereof. Non- and low-caloric sweeteners include, without limitation, high intensity sweeteners such as aspartame, saccharin, steviol glycosides, sugar alcohols and combinations of two or more thereof. Sugar alcohols (also called polyols), include amongst others sorbitol, mannitol, xylitol, maltitol, maltitol syrup, lactitol, erythritol, isomalt and hydrogenated starch hydrolysates.

[00048] Preferably, the confectionary composition will not include maltitol, lactitol, and/or erythritol in an amount of more than 30 weight%, more preferably not in an amount of more than 20 weight%, more preferably not in an amount of more than 10 weight%, more preferably not in an amount of more than 5 weight%. Advantageously, it will contain substantially no maltitol, lactitol, and/or erythritol. In one aspect, it will not include any sugar alcohols. In another aspect, the composition will not include any high intensity sweeteners. In another aspect, it will not include any non- or low-caloric sweeteners.

[00049] Preferably, the sweetener will consist of sucrose. The amount of sucrose in the cocoa composition will preferably be at least 30 weight%, more preferably at least 30.5 weight%, more preferably at least 32 weight%, more preferably at least 35 weight%.

[00050] In one aspect of the invention the cocoa composition is a chocolate composition, comprising at least 30 weight% of cocoa solids and less than 2 weight% of milk solids, characterized in that it comprises 0.5-20.0 weight% of a bulking ingredient and 0.5-10.0 weight% of a plasticizer ingredient.

[00051] In a preferred aspect of the invention the cocoa composition is a chocolate composition, comprising at least 30 weight% of cocoa solids, less than 2 weight% of milk solids and at least 30 weight% of sucrose, characterized in that it comprises 0.5-20.0 weight% of a bulking ingredient and 0.5-5.0 weight% of a liquid oil and/or a randomized cocoa butter.

[00052] In a more preferred aspect of the invention, the cocoa composition is a chocolate composition, comprising at least 30 weight% of cocoa solids, less than 2 weight% of milk solids and at least 30 weight% of sucrose, characterized in that it comprises 0.5-20.0 weight% of a bulking ingredient and 0.5-5.0 weight% of a liquid oil and/or a randomized cocoa butter, wherein the bulking ingredient is selected from the group consisting of an oligosaccharide, a polysaccharide, a soluble dietary fiber, an insoluble dietary fiber and a mixture of two or more thereof and wherein the composition is free of carob, soy and/or sugar alcohols.

[00053] Alternatively, the cocoa composition of the invention will comprise cocoa solids in an amount of from 2 to 20 weight% and less than 2 weight% of milk solids, and is characterized in that it comprises 0.5-20.0 weight% of a bulking ingredient and 0.5-10.0 weight% of a plasticizer ingredient.

[00054] In a preferred aspect of the invention, the cocoa composition comprises cocoa solids in an amount of from 2 to 20 weight%, less than 2 weight% of milk solids and at least 30 weight% of sucrose, and is characterized in that it comprises 0.5-20.0 weight% of a bulking ingredient and 0.5-10.0 weight% of a liquid oil and/or a randomized fat.

[00055] In a more preferred aspect of the invention, the cocoa composition comprises cocoa solids in an amount of from 2 to 20 weight%, less than 2 weight% of milk solids and at least 30 weight% of sucrose, and is characterized in that it comprises 0.5-20.0 weight% of a bulking ingredient and 0.5-10.0 weight% of a liquid oil and/or a randomized fat wherein the bulking ingredient is selected from the group consisting of an oligosaccharide, a polysaccharide, a soluble dietary fiber, an insoluble dietary fiber and a mixture of two or more thereof and wherein the composition is free of carob, soy and/or sugar alcohols.

[00056] Advantageously, the cocoa composition according to the invention shows very similar properties to milk-containing cocoa compositions. Along with the cocoa-derived

ingredients, milk solids are responsible for some of the most important properties of cocoa compositions. These properties include its sensory qualities, its creamy mouth feel and snap, for instance, and its melting behavior. It was found that the cocoa composition according to the invention, although not brittle, maintains the desired snappy effect when broken or bitten into. It was found to have a creamy eating sensation that is comparable to that of milk-based cocoa compositions.

[00057] The cocoa composition of the present invention can be produced by any conventional method for making chocolate or cocoa-based confectionary compositions known to the skilled person. The cocoa solids and other ingredients of the cocoa composition according to the invention are mixed, ground and conched substantially in the same manner one would produce chocolate or cocoa-based confectionary compositions, using any methods known to those of skill in the art. Once the cocoa composition is processed, it can be placed in molds, or otherwise formed or applied in and/or onto food products as is known in the art.

Food Products

[00058] As such, the present invention further relates to food products comprising cocoa compositions as described herein. These food products will preferably be bakery products and/or confectionary products but could also include other dairy-free or dairy-reduced food products (termed “dairy alternative” products).

[00059] A “bakery product” can be defined as any food product wherein flour is used to produce a dough or a batter. Examples of bakery products are, without limitation, breads such as bagels, buns, rolls, biscuits and loaf breads; cookies; brownies; muffins; desserts such as cakes, cheesecakes and pies; snack cakes; sweet goods such as doughnuts, Danish, sweet rolls, cinnamon rolls and coffee cake.

[00060] A “confectionary product” is a food item that is rich in sugar. Confectionary products may be amongst others candies, candied nuts, candy bars, caramels, chocolates, chocolate bars, chocolate drops, chocolate in the form of hollow figures or any desired shape, filled chocolate bars, pralines, truffles, cereal bars, chewing gum, pastillage, and other confections that are made primarily of sugar.

[00061] A “dairy-alternative” product is an alternative for products traditionally based on milk such as but not limited non-dairy beverages; frozen desserts like ice cream; and other

chilled desserts; non-dairy alternatives for cultured dairy such as yoghurt, cream and fresh or cream cheeses; and dairy alternatives for custard-based desserts.

[00062] Cocoa compositions of the invention may be used in food products in any form such as melted and mixed into the recipe of the end product, in the form of fillings, inclusions, toppings or coatings, molded around other discrete ingredients such as nuts, fruit, dried fruit, biscuits or biscuit pieces, candy pieces or shapes, and the like, or any combination of two or more thereof. Thus, the present invention also relates to bakery products, confectionery products, and frozen or chilled desserts comprising the chocolate compositions of the present invention as a filling, inclusion, topping and/or coating, and to confectionery products comprising the chocolate compositions of the present invention together with one or more discrete ingredients.

EXAMPLES

[00063] A number of samples (1-14) were prepared using the recipes shown in Table 1, below. The ingredients used are described in Table 2.

[00064] The dry ingredients (including any bulking agents), the cocoa liquor and a part of the cocoa butter were mixed together for 10 minutes in a Hobart mixer at a temperature of 45 to 50°C. The cocoa butter addition was adapted on a case-by-case basis to get a correct texture for refining. Optimal fat content in the mixer was 25-26%.

[00065] The resulting chocolate paste was then refined in a Bühler three roll refiner, in order to produce refiner flakes having a reduced particle size between 18 and 24µm.

[00066] The refiner flakes were then dry-conched for 6 hours at a temperature of 65°C in a 5kg batch Bühler Elkolino monoshaf conche running clockwise at a rotor speed of 1000 rpm. Additional cocoa butter was added when needed during the filling of the conche, in order to ensure a proper mechanical shearing and a good flavour development. At the end of the dry conching, any remaining cocoa butter and PGPR was added to the conche. The mixture was then wet-conched for 30 min at 1500rpm counter-clockwise at a temperature of 45°C. The chocolate mass was then unloaded.

[00067] Plasticizer ingredients were added into the chocolate mass manually in a bucket after conching to avoid contaminating the conching equipment with potential allergens like e.g. nuts. If necessary, viscosity and yield value of the resulting chocolate were adjusted by adding further cocoa butter and/or emulsifiers (resulting in the total amounts indicated in Table 1).

[00068] After adjustment of the rheology, the chocolate underwent a hand tempering process and was moulded into bars. Tempering involves the controlled heating and cooling of the mixture to selectively cause the crystallisation of the cocoa butter in the preferred crystalline form V.

[00069] Several of the obtained chocolates were then analysed to determine viscosity, yield value and colour using the methods described below. The results are shown in Table 3.

ANALYTICAL METHODS

Particle Size

[00070] A small amount of finished chocolate is placed on the measuring surface of a Mitutoyo micrometer (0-25mm). By pressing, an indication of the size of the largest non-compressible particles can be measured.

Colour

[00071] Color values are expressed as Hunter L, -a and -b values, where the L value represents the “brightness” of the product (black/white scale), the “a” value represents the amount of green/red and the “b” value represents the amount of yellow/blue. The quotient of “a” over “b” represents the redness of the product. The following procedure is used to determine the color value of chocolate.

[00072] A small amount of chocolate at 50°C is poured into an optically neutral petri dish (diameter 55mm) right to the top. The petri dish is then placed on a calibrated spectrophotometer Minolta CM2500D (Illuminant D65, 10° observer, read values in Hunter L -a and b values, software Minolta SPECTRA MAGIC version 1.00). The L, a and b-values of the chocolate sample are then measured and recorded following the manufacturer’s instructions.

Flow Properties

[00073] The flow behaviour of the chocolate is measured by the ICA-Method 46 – 2000 - Viscosity of Cocoa and Chocolate Products using a rheometer RM200 (Lamy Rheology Instruments, Champagne au Mont d’Or, France). It is a shear-rate imposed rheometer whereby its speed ranges from 0.3 to 1500rpm and the torque from 0.05 to 30 mNm. The temperature of the measuring cell is kept at 40°C. A small amount of chocolate is brought into the tube. After pre-shearing the chocolate for 10 min at 5s-1, a stepped flow procedure is applied by increasing

and decreasing the shear rate while measuring the shear stress. The Casson model is used to define Casson Yield stress and Casson Viscosity for recipes with a fat content below 38%. For recipes with a fat content higher than 38% a polynomial model is used.

Table 1: Recipes

Ingredients (%) / Sample no.	1	2	3	4	5	6	7
WAF CL	21.57	19.55	19.36	19.91	20.4		
Low Roast IVC CL						13.74	13.74
WAF Cocoa Butter	28.40	32.42	33.01	31.27	32.60	26	26
Ivory butter				2.91			
Sugar	41.13	37.29	36.93	37.97	38.91	42.2	42.2
Rice flour		6.96					
Toasted soy flour					7.27		
Maltodextrin						6.84	
Inulin			6.89	7.09		6.84	
Dried rice syrup							13.68
Coconut milk powder	7.68						
Almond paste		2.86	2.83				
Hazelnut paste						4	
Pistachio Paste							4
Vanillin	0.01	0.01	0.01	0.01	0.01		
Vanilla			0.02	0.02		0.01	0.01
PGPR	0.05	0.05	0.05	0.05	0.21		
Soy lecithin	1.16	0.86	0.85	0.78	0.6	0.37	0.37
TOTAL (%)	100	100	100	100	100	100	100
Theoretical fat content (%)	45.88	45.38	45.74	45.56	46.26	36.21	35.97

Table 2: Ingredients

Ingredient Name	Ingredient Detail / Origin	Function
WAF Cocoa Liquor	Rain Forest Alliance West African cocoa liquor / Cargill	Cocoa Solids

Low Roast IVC CL	Low Roast Ivory Coast Cocoa Liquor / Cargill	Cocoa Solids
WAF Cocoa Butter	Rain Forest Alliance West African cocoa butter / Cargill	Cocoa Solids
Sugar	Standard icing sugar	Sweetener
Ivory butter	Randomised interesterified cocoa butter / Cargill	Plasticizer
Almond paste	Almond milk paste / Di Bartolo	Plasticizer
Hazelnut Paste	Low roast hazelnut paste / Ferrero Trading Lux S.A.	Plasticizer
Pistachio Paste	Pistacchio Sicilia In Pasta / Di Bartolo	Plasticizer
Toasted soy flour	Full fat soy flour Soja Austria San / Soja Austria	Bulking Agent + Plasticizer
Coconut milk powder	Vegan coconut milk powder SternCream Vegan/ Sternchemie	Bulking Agent + Plasticizer
Rice flour	P-Hydrolyzed rice flour / Risoscotti	Bulking Agent
Maltodextrin	Maltodextrin C Dry™ MD01915/ Cargill	Bulking Agent
Inulin	Inulin Fibruline® Instant/ Cosucra	Bulking Agent
Dried rice syrup	Dehydrated rice syrup Sipadry-rice 32/ Meurens Natural	Bulking Agent
Vanillin	Vanillin / Prova	Flavor
Vanilla	Natural vanilla extract/ Prova	Flavor
PGPR	Polyglycerol polyricinoleate Radamuls Poly 2253K/ Oleon	Emulsifier
Soy lecithin	Soya lecithin Epikuron 135 F IP/ Cargill	Emulsifier

Table 3: Measurements

Sample	1	3	4
Viscosity	0.317	0.325	0.344
Yield Value	1.12	1.66	1.7
L	37.57	40.41	39.1
a	8.72	9.21	9.02
b	9.56	11.5	10.68

CLAIMS

1. A cocoa composition comprising at least 2 weight% of cocoa solids and less than 5 weight% of milk solids, and characterized in that it comprises 0.5-20% of a bulking ingredient and 0.5-10% of a plasticizers ingredient, wherein the plasticizer ingredient is a liposoluble ingredient and is from a vegetable source.
2. The cocoa composition according to claim 1, wherein the bulking ingredient is selected from the group consisting of an oligosaccharide, a polysaccharide, a soluble dietary fiber, an insoluble dietary fiber and a mixture of two or more thereof.
3. The cocoa composition according to any one of the preceding claims, wherein the soluble and/or insoluble dietary fibre are selected from the group consisting of: cereal or grain fibres, fruit fibres and mixtures of two or more thereof, preferably rice fibres, pea fibres, coconut fibres, soy fibres and mixtures of two or more thereof.
4. The cocoa composition according to any one of the preceding claims, characterized in that the liposoluble ingredient is selected from the group of glycerin, liquid oil, randomized fats and combinations of two or more thereof.
5. The cocoa composition according to any one of the preceding claims, characterized in that the plasticizer ingredient does not comprise any hydrogenated fats.
6. The cocoa composition according to claim 4, characterized in that the liquid oil is selected from the group of oils sourced from almonds, pine nuts, pistachios, cashews, hazelnuts, peanuts, sesame seeds, sunflower seeds, high-oleic sunflower seeds, rapeseeds and mixtures of two or more thereof.
7. The cocoa composition according to claim 4, characterized in that the liquid oil is in the form of a paste selected from almonds, pine nuts, pistachios, cashews, peanuts, sesame seeds and mixtures of two or more thereof.

8. The cocoa composition according to any of the preceding claims, characterized in that it comprises at least 30 weight%, preferably at least 30.5 weight%, more preferably at least 32 weight%, more preferably at least 35 weight% sucrose.
9. The cocoa composition according to any one of the preceding claims, characterized in that it comprises at least 30 weight% of cocoa solids.
10. The cocoa composition according to any one of claims 1 to 8, characterized in that it comprises cocoa solids in an amount of from 2 to 20 weight%.
11. The cocoa composition according to any one of the preceding claims, characterized in that it is substantially free from milk solids.
12. The cocoa composition according to any one of the preceding claims, characterized in that it comprises less than 30% sugar alcohols, preferably less than 20%, more preferably does not contain any sugar alcohols.
13. Food products comprising the cocoa composition according to any of the preceding claims together.
14. Food products according to claim 13, and characterized in that the food products are bakery products, confectionary products, dairy-alternative products.