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Canadian Intellectual Property Office
An agency of Industry Canada

CA 2451627 C 2008/07/08

(11)(21) 2 451 627

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 2003/12/01

(41) Mise à la disp. pub./Open to Public Insp.: 2005/06/01

(45) Date de délivrance/Issue Date: 2008/07/08

(51) Cl.Int./Int.Cl. *A21D 13/08* (2006.01), *A21D 6/00* (2006.01), *A21D 8/06* (2006.01)

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(54) Titre : PATE FEUILLETEE SANTE
(54) Title: HEALTHY PUFF PASTRY

(57) Abrégé/Abstract:
The invention relates to a method of producing a low-fat nutritious puff-pastry crust comprising mixing sour cream or yogurt with eggs, grape-seed oil, whole wheat flour and baking soda or baking powder in proportions that produce a smooth mixture, kneading the mixture to produce a dough, chilling and wrapping the dough in a moisture-retention wrap, forming the dough into suitable pastry crust shapes, then baking the crust at an elevated temperature until the crust is crispy and has a light golden colour.

Abstract

The invention relates to a method of producing a low-fat nutritious puff-pastry crust comprising mixing sour cream or yogurt with eggs, grape-seed oil, whole wheat flour and baking soda or baking powder in proportions that produce a smooth mixture, kneading the mixture to produce a dough, chilling and wrapping the dough in a moisture-retention wrap, forming the dough into suitable pastry crust shapes, then baking the crust at an elevated temperature until the crust is crispy and has a light golden colour.

Attorney docket no: v80228CA
Filename: #124411 v2 - taranoff / patent final / healthy puff pastry

Healthy Puff Pastry

Field of the Invention

This invention relates generally to baked products and in particular to puff pastries and to a method of making such pastries.

Background

Puff pastry is a light, tender pastry traditionally made by layering shortening (or other suitable fat) and pastry dough, then rolling out and folding the dough repeatedly. This painstaking and time-consuming process yields a pastry made of dozens of layers. The pastry "puffs" when baked because the moisture in the dough creates steam between the layers, causing them to separate.

Traditionally, puff pastry dough is made by first preparing a folded sheet comprising at least one layer of fat sandwiched between at least two layers of dough, and then repeatedly folding and rolling the sheet over on itself, with rest periods of about 10-15 minutes between each folding and rolling step. This process results in a laminated sheet of pastry dough having a large number of thin layers of dough separated from each other by interposed layers of fat.

One method of making puff pastry dough is known as the “French method” and involves mixing flour, butter, margarine and salt at low speed to produce a mixture having a fine crumb texture. Then, cream of tartar is dissolved in water, added to the mixture and mixed for about 3 minutes to obtain a smooth dough. The dough is then rounded into a ball and rested for 30 minutes. Then, the dough is cut cross-wise and rolled out into the shape of a cross, and roll-in fat is shaped into a flat block and placed into the center of the cross. The dough ends are then folded over the fat such that the fat is wrapped completely into the

dough. Repeated rolling and folding steps are carried out with 15 minute rest periods in between until a suitable number of layers are formed, producing a laminated composite puff pastry dough sheet.

The French method for preparing puff pastry dough is very time consuming, and typically takes 2 to 3 hours or more. Another, slightly quicker method of preparing puff pastry dough involves mixing together a dough part comprising flour, water and butter for 2-3 minutes until a smooth dough is formed, then rounding the dough into a ball and letting the ball rest for about 30 minutes. Then, a fat part is formed by mixing together butter, shortening, flour and salt until well mixed; then, this mixture is formed into a square block. The dough part is then cut cross-wise and rolled out into the shape of a cross, and then the fat part is placed into the center of the cross and the ends of the dough part are folded over the fat part until the fat is wrapped completely in the dough part. Then, the combined dough and fat parts are given a three fold, rested for about 30 minutes, then given another three fold, and then a four fold, until a sheet of laminated composite puff pastry dough is produced. The dough is then rested for 45 minutes before it is proofed and baked.

When baked, the puff pastry dough rises to yield a crisp, light pastry which is characterized by a structure of parallel, horizontal flakes, and can be used with savoury or sweet fillings to provide pies, turnovers, strudels, etc. The rising and flaking are obtained without the aid of yeast or chemical leaveners, and instead occurs as a result of vaporization of moisture and the expansion of air trapped in the dough.

A sheet of pastry dough can have 700 or more alternating layers of fat and dough. As rest periods are required between folding and rolling steps, all methods of preparing laminated composite puff pastry dough is time-consuming. Furthermore, these methods all require judicious amounts of shortening (fat), butter and/or margarine. Butter is high in cholesterol; shortening and margarine are high in saturated fats and trans-fatty acids, which are considered harmful to a

person's health when consumed in substantial quantities. As there has been an increasing tendency towards healthier food products, there exists a great demand for fat-reduced and nutritious products.

Canadian patent application no. 2,269,623 (Ferrari-Philippe) discloses a method for preparing flaky pastry that does not involve forming laminated composite dough. In this method, a composition containing flour, salt, acid proteins and an inactive fermenting agent is mixed at room temperature. During the mixing step, lumps of butterfat are added to this mixture so as to obtain a heterogeneous paste; and finally water is incorporated in this paste, the paste is extruded, and the resulting flaky pastry is stored at a temperature between -40°C and +10°C. While this method avoids the time-consuming steps of forming a laminated composite sheet of dough, this method uses substantial amounts of unhealthy fats in order to provide a puff pastry with properties and qualities similar to traditional puff pastries.

Canadian application no. 2,158,970 (Boode-Boissevain et al.) discloses a fat-reduced laminated dough, wherein anaqueous gel containing 20-50 wt.% of maltodextrin and 0-30wt.% of ß-glucan and/or pentosans is present as a fat replacer. However, this fat-reduced dough is of the laminated composite type which is time-consuming to make.

Canadian application no. 2,070,220 (Moore et al.) discloses a process for making pastry dough, and in particular, for making pie crust dough. The process involves making two phases: a dough-like mixture of flour, water, salt, polyol and oil, and a shortening and starch phase. These phases are laminated to make heterogeneous pastry dough which has a flaky tender texture when baked. This dough composition is made in a manner which is largely independent of processing temperatures and mix times. The dough is characterized by having multiple, discontinuous layers which are interrupted by regions of gluten and starch/fat phase.

Summary of the Invention

Traditional methods of preparing puff pastries involve delicate time consuming steps that use high-fat ingredients that are not favoured in today's healthy lifestyles. It is thus an object of the invention to provide an improved puff pastry that is low in fat and is nutritious, and a method of making such a puff pastry that is faster and easier than traditional methods for preparing laminated composite pastry dough.

According to one aspect of the invention, there is provided a method of making a reduced-fat and reduced-water puff pastry crust, comprising the following steps:

a) mix together 124 to 130 parts (volume) sour cream or yogurt with 90 to 110 parts (volume) eggs, 125 to 160 parts (volume) grape-seed oil, and 1 part (volume) baking soda or baking powder until a smooth mixture is produced;

b) add 550 to 620 parts (volume) wheat flour to the mixture to form a dough, then knead the dough for three to five minutes;

c) wrap the dough in a moisture retention covering and chill the dough for at least 20 minutes,

d) form the dough into a crust shape; then

e) bake the crust at an elevated temperature until the crust is crispy and has a light golden colour.

One or more of these ingredients can be organically produced to provide additional nutritional benefits. In step (a), up to 1 part (volume) salt can be added to the mixture to provide additional flavour. Also, the flour can comprises at least 75 vol. % low-gluten flour. In step (d), the dough can be cut into multiple portions which are each formed into a crust shape.

To produce a crispy crust having a light golden colour, the dough can be baked in an electric skillet or covered pan for six to eight minutes at a temperature between 270 and 400°F.

According to another aspect of the invention, there is provided a method of making a reduced fat vanilla cream pastry cake comprising forming a plurality of pastry crusts according to the above method, and combining these crusts with a vanilla pastry cream made by one of the following methods:

Method 1: Blend together a mixture comprising 230-350 parts (wt.) sugar, 50-200 parts (wt.) milk, 14-20 parts (wt.) agar-agar, 10-20 parts (wt.) vanilla powder, 70-130 parts (wt.) honey, and 70-130 parts (wt.) maple syrup, 85-125 parts (wt.) flour. Then, combine the mixture with 1950-2050 parts (wt.) of boiling milk and stir the combination until a cream is formed.

Method 2 (vegan recipe): Blend together a mixture comprising 50-200 parts (wt.) soya or rice milk; 270–350 parts (wt.) sugar; 70-200 parts (wt.) maple syrup; 90-125 parts (wt.) flour; 14-20 parts (wt.) agar-agar; and, 13-20 parts (wt.) vanillin. Combine the mixture with 1950-2050 parts (wt.) of boiling soya or rice milk and stirring until a cream is formed.

After the cream has cooled, a cake can be formed by stacking together alternating layers of the crusts with the cream.

Detailed Description of Embodiments of the Invention

According to one embodiment of the invention, there is provided a method for making a reduced-fat, nutritious puff pastry crust that is quicker than traditional methods of making a puff pastry crust.

Generally speaking, the method comprises mixing sour cream or yogurt with eggs, grape-seed oil, whole wheat flour and baking soda or baking powder in proportions that produce a smooth mixture, kneading the mixture to produce a

dough, chilling and wrapping the dough in a moisture-retention wrap, forming the dough into suitable pastry crust shapes, then baking the crust at an elevated temperature until the crust is crispy and has a light golden colour.

The wheat flour and egg whites used in this method contain proteins that provide strength for the dough so it will rise and not collapse when baked. When wheat flour is moistened and stirred, two proteins in the flour, namely, glutenin and gliadin, connect and cross-connect to form strands of gluten, which help give structure to the baked crust. The more a batter is stirred, the stronger the gluten becomes. Wheat is the only grain with significant amounts of gluten-forming potential; other grains like corn and oats do not create the gluten in dough. Baked goods made from high-gluten flours have a firm crumb; low-gluten flours give more tender results. In this method, at least 75 vol. % of the flour used should be low-gluten flour such as whole wheat flour, with the balance being higher gluten flour such as white flour. When using 550-620 parts (volume) flour, 90-110 parts (volume) eggs and 124-130 parts (volume) sour cream are used. Alternatively, 124-126 parts (volume) of yogurt can be substituted for the sour cream.

Importantly, the ingredients used in this method do not include any butter, shortening, or margarine. These missing ingredients provide fat in traditional baking that coat the flour proteins, reducing their contact with moisture in the recipe and shortening the length of the gluten strands when the flour is stirred with the moisture. However, for the reasons mentioned above, these missing ingredients are considered unhealthy and are thus not desired in fat-reduced nutritious foods.

However, some fat is necessary in baking as it serves as a lubricator in the dough forming process; without such a lubricator, the gluten strands form more readily when the dough is kneaded, thereby resulting in a tough undesirable baked good. In place of the fats provided by the shortening, butter or margarine, lubricating fats for this pastry are provided by the grape-seed oil.

For the amounts of flour and eggs defined above, 125-160 parts (volume) grape-seed oil is used. Grape-seed oil is selected as it one of the most stable cooking oils known. Also, it has very good heat stability and serves to enhance the natural flavor of foods and reveals a subtle pleasant buttery flavor. It has a high smoke point at approximately 420°F (216°C); when the dough is baked at a temperature below the grape-seed oil smoke point, the negative effects associated with oil breakdown above the smoke-point are avoided. Grape-seed oil is a polyunsaturated oil and has the beneficial effects of lowering the blood levels of LDL cholesterol while increasing the levels of HDL cholesterol. Grape-seed oil contains between 68-78% linoleic acid, which has been found to substantially reduce the blood cholesterol levels in humans. Grape-seed oil is also enriched in vitamin E; this vitamin is well known for its potential anti-oxidant effects in human tissue. Vitamin E is also considered by some to prevent or reduce the chances of heart disease and cancer. Also, grape-seed oil contains proanthrocyanidins, which have been found to be excellent antioxidants that protect tissues from a range of oxidative injuries.

Another ingredient missing from this method that is normally found in traditional puff pastry recipes is water. Water is used in traditional recipes to cause the dough to rise during baking: as the water in the dough evaporates in high heat (around 400 °F), steam forms between the layers of dough and fat, causing them to separate. However, steam will leach vitamins, minerals, enzymes and other nutritional matter from the dough. As there is no separately added water in this recipe, much of the nutritional matter will be retained in the crust after baking.

One part (volume) of baking soda is used in the method to cause the dough to rise. Alternatively, one part (volume) of baking powder can be substituted for the baking soda to serve as the rising agent, although baking soda is preferred for its healthier ingredients.

Optionally, up to one part (volume) of salt can be used to the method to add flavour. Also optionally, one or more of the ingredients can be organic.

To form the dough, all the ingredients except the flour are whisked together for about three minutes until a smooth mixture is formed. Then, the flour is added to the mixture to form dough, and the dough is kneaded for about three minutes. Then, the dough is wrapped in a plastic wrap and chilled in a refrigerator for about 20-30 minutes. The step of chilling is important, as gluten in flour needs time to absorb necessary moisture in order to make dough sufficiently pliable for the rolling procedure. Wrapping is also important as it prevents moisture from escaping the dough. After the dough has been chilled, the dough can be cut into portions, and these portions can be rolled into pastry crusts. These crusts can be baked in covered pan for about three to four minutes for each side of the crust at a temperature of between 270-400°F inside the covered pan.

The pan in which the dough is baked must have good thermal conductivity and be able to distribute heat evenly to the dough. The pan is covered during baking to retain the heated air that is necessary to cook the dough. The temperature of the dough must be closely monitored to ensure that the crust is baked for a period of time not exceeding 6-8 minutes total when baking at a temperature between 270-400°F. The dough can be cooked at a lower temperature; however the baking period must be extended to ensure that a crispy crust having a light golden colour is obtained. The pan can optionally be made of a relatively non-reactive multi-ply material to ensure than minimal metal is absorbed by the dough. One such suitable covered pan is the Versa Tec™ brand pan sold or the Versa Tec EOC electric skillet made by Saladmaster™. This pan or skillet is made of 316L surgical grade steel, which has excellent heat conductivity and distribution, and minimal reactivity with food. When using the electric skillet or any other covered pan having its own temperature dial, care must be taken to check that the temperature inside the pan is within the specified

range, as the temperature setting on the dial is often inaccurate. Alternatively, the dough can be baked in a conventional oven.

The resulting crust has physical properties and organoleptic qualities that are similar to those of puff pastries made by traditional methods, yet is lower in fat and retains much of the nutritional matter original present in the uncooked ingredients. This recipe enables the pastry shell to be made without a number of ingredients typically found in pastry recipes, namely: butter, shortening, margarine and water. Each of these ingredients is undesirable from a nutritious dietary perspective. Butter is high in cholesterol and in saturated fats. Shortening and margarine are high in trans fatty acids. Trans fatty acids are created when vegetable oil is processed into hardened fat such as margarine or shortening. Also, by minimizing the water content in this recipe, more of the nutritious material in the ingredients is retained in the pastry. Furthermore, the crust can be made much more quickly that traditional method, as the crust is formed without having to perform the time-consuming steps of folding and rolling the dough.

The dough can be formed into many shapes and be baked into crusts for a number of different savory and sweet fillings, such as meat pies, vegetable pies, cream pies, fruit cakes etc. In particular, the crusts can stacked with layers of pastry cream to form a cake. The pastry cream can be made from a suitable recipe as is known in the art, or can be a vanilla pastry cream made according to the following method:

First, bring 1950-2050 g of 2%-3.25% m.f. milk to a boil. Then, combine the following ingredients in a separate container and blend into a mixture:

sugar	230-350 g
milk (2%-3.25% m.f.)	50-200 g
agar-agar	14-20 g

eggs	100 g (optional)
vanilla powder	10-20 mg
yellow food colouring	5 drops (optional)
honey	70-130 g
maple syrup	70-130 g
flour	85-125 g

Combine the blended mixture with the boiling milk and stir continuously until the mixture bubbles and a cream is formed. Cook the cream for about 2 minutes in a heated container. Then, remove the container from the heat and quickly cool the container and the contents therein, for example, by immersing the container in cold water. When the cream is cold, natural flavours, liqueur, berries and/or dried fruit can be added as desired.

Alternatively, the above ingredients can be replaced with the following ingredients which are free of animal products, to produce a "vegan" pastry cream: 1900-2050 g soya milk or soya beverage, or rice milk or any milk of non animal origin;270 – 350 g sugar; 70-200 g maple syrup; 90-125 g flour; 14-20 g agar-agar; and, 13-20 g vanillin.

A stack can then be formed of alternating layers of pastry crusts and cream to form a cake. The cake can be covered with an outer layer of cream, and sprinkled with nuts or other toppings as desired.

The following are examples of recipes for forming pastry crusts and pastry creams:

<u>Example 1:The pastry crust</u>

The pastry crust is made from dough having the following ingredients:

"Liberty" sour cream, 5.5% m.f.	½ cup (125 parts)

eggs,	2 (100 parts)
grape seed oil	½ cup (125 parts)
flour, whole wheat	2 ½ cup (375 parts)
flour, white	½ cup (125 parts)
salt	¼ tsp (1 part)
baking soda	¼ tsp (1 part)

Instead of sour cream, ½ cup of natural goat yogurt, 4.4% m.f. can be substituted. Preferably, all the ingredients are organic.

To form the dough, all the ingredients except the flour are whisked together for 3 minutes until a smooth mixture is formed. Then, the flour is added to the mixture to form a dough, and the dough is kneaded for 3 minutes. Then, the dough is rolled into a cylinder about 1 foot long, and the cylinder is wrapped in a plastic bag and chilled for 20-30 minutes in a refrigerator.

After the dough has been chilled, the cylinder is cut into 16 portions, and the portions are rolled into thin pastry crusts. These crusts are baked in a preheated covered Saladmaster Versa Tec™ pan at a temperature setting at between low and medium until the crusts are crispy and have a light golden colour. Alternatively, the crusts can be baked inside a Saladmaster EOC skillet for four minutes on each side at a temperature setting of 320°F. The baked crusts can then be filled with a variety of savoury or sweet fillings.

Example 2: Vanilla Pastry Cream

A vanilla pastry cream is made from the following ingredients:

part I

milk 2%-3.25%	2000 g

part II

granulated sugar, non-refined	300 g

milk (2%-3.25%)	100 g
agar-agar	15 g
eggs	100 g (optional)
vanilla powder	15 mg
yellow food colouring	5 drops (optional)
honey	100 g
maple syrup	100 g
flour	100 g

These ingredients are combined as follows:

First, bring first part of milk to a boil in a heated Saladmaster pan. Then, mix the ingredients in the second part in a small bowl and blend with a hand wire whip. Once the milk is boiling, add the contents in the bowl into the pan and stir continuously with the wire whip until the mixture bubbles and a cream is formed. Cook the cream for 2 minutes in the pan, then remove the pan from the heat and then quickly cool the pan and the contents therein in a sink filled with cold water. When the cream is cold, add natural flavours, liqueur, berries and/or dried fruit as desired.

Example 3: Vegan Pastry Cream

The following is a recipe for a cream free of animal products, and comprises the following ingredients:

part I

soya milk, soya beverage, rice milk or any milk of non animal origin	2000 g

part II

soya milk, soya beverage, rice milk or any milk of non animal origin milk	100g
sugar	300g

maple syrup	100g
flour	100g
agar-Agar	15g
vanillin	15 mg

These ingredients are combined as follows:

First, bring the first part of milk to a boil in a heated Saladmaster pan. Then, mix the ingredients of the second part in a small bowl and blend with a hand wire whip. Once the milk is boiling, add the contents in the bowl into the pan and stir continuously with the wire whip until the mixture bubbles and a cream is formed. Cook the cream for 2 minutes in the pan, then remove the pan from the heat and then quickly cool the pan and the contents therein in a sink filled with cold water. When the cream is cold, add natural flavours, liqueur, berries and/or dried fruit as desired.

The cream made by the second or third examples can be combined with the 10-16 pastry crusts made from the first example to produce a cream cake. This cake will have alternating layers of cream and crust, and can have various toppings as is known in the art. The cake is formed by spreading a layer of pastry cream on a crust and covering the cream layer with another crust and lightly pressing the second crust with a palm of a hand in order to provide a firm bond between the crusts. The cream should be spread generously over the crust because the crust is very dry as there is no water in the dough. These steps are repeated until a stack is formed. When the last crust has been put into place, the whole stack is lightly pressed by a cutting board or something similarly flat and heavy, in order to prevent uncontrollable sliding of the layers of the cake during the resting period. This step is important to produce a round and firm shape of the cake. Then, spread the last amount of the cream over the cake. At this stage a cake is at least 1" higher and 2-3" narrower than the desired size. The cake is then refrigerated for at least 10-12 hours ("rest period") until it obtains its desired shape. During the rest period, the dry crusts absorb the

cream; the cream is moisturizing the dry flakes of the crusts and lets them grow in width while absorbing the moisture. This process causes the cake to become about 1" shorter and 2-3" wider in diameter by the end of the rest period. After the cake has rested, it can be decorated. Also, the flavors of the crusts and the cream combine together and the taste of the cake gains its peak by the 3rd day.

When using the "Vegan" cream, the amount of cream should be reduced somewhat relative to the dairy cream on the crust as the crusts have additional moisture through the usage of soya milk in the dough instead of animal-based products such as eggs and sour cream.

While the preferred embodiment of the invention has been illustrated and described, it will be appreciated that various changes can be made therein without departing from the scope and spirit of the invention.

What is claimed is:

1. A method of making a reduced-fat and reduced-water puff pastry crust, comprising:

a) mixing together 124 to 130 parts (volume) sour cream or yogurt with 90 to 110 parts (volume) eggs, 125 to 160 parts (volume) grape-seed oil, and 1 part (volume) baking soda or baking powder until a smooth mixture is produced;

b) adding 550 to 620 parts (volume) wheat flour to the mixture to form a dough, then kneading the dough for three to five minutes;

c) wrapping the dough in a moisture retention covering and chilling the dough for at least 20 minutes,

d) forming the dough into a crust shape; then

e) baking the crust in at an elevated temperature until the crust is crispy and has a light golden colour.

2. The method of claim 1 further comprising in step (a), adding up to 1 part (volume) salt to the mixture.

3. The method of claim 1 wherein the flour comprises at least 75 vol. % low-gluten flour.

4. The method of claim 1 wherein in step (d), the dough is cut into multiple portions which are each formed into a crust shape.

5. The method of claim 1 wherein the crust is baked for six to eight minutes at a temperature between 270 and 400°F.

6. The method of claim 1 wherein at least one of the sour cream, yogurt, eggs, grape-seed oil, or flour is organically produced.

7. The method of claim 1 wherein the crust is baked in a electric skillet or covered pan.

8. A method of making a reduced fat vanilla cream pastry cake comprising:

a) forming a plurality of pastry crusts according to the method of claim 4;

b) forming a vanilla pastry cream by

i. blending together a mixture comprising 230-350 parts (wt.) sugar, 50-200 parts (wt.) milk, 14-20 parts (wt.) agar-agar, 10-20 parts (wt.) vanilla powder, 70-130 parts (wt.) honey, and 70-130 parts (wt.) maple syrup, 85-125 parts (wt.) flour,

ii. combining the mixture with 1950-2050 parts (wt.) of boiling milk and stirring the combination until a cream is formed, then cooling the cream; and

c) forming a cake by stacking together alternating layers of the crusts with the cream.

9. A method of making a reduced fat vanilla cream pastry cake comprising:

a) forming a plurality of crusts according to the method of claim 4;

b) forming a vanilla pastry cream by

i. blending together a mixture comprising 50-200 parts (wt.) soya or rice milk; 270–350 parts (wt.) sugar; 70-200 parts (wt.) maple syrup; 90-125 parts (wt.) flour; 14-20 parts (wt.) agar-agar; and, 13-20 parts (wt.) vanillin;

ii. combining the mixture with 1950-2050 parts (wt.) of boiling soya or rice milk and stirring until a cream is formed; then,

c) after the cream has cooled, forming a cake by stacking together alternating layers of the crusts with the cream.