

Description

This invention relates to a method and an apparatus for preparing a roundish, particle-coated food product and to a roundish, particle-coated food product.

A well-known method for preparing a food product, such as ice-cream bonbons, involves carefully shaping a piece of food material, such as ice-cream, followed by coating said piece, for instance with chocolate or another coating material.

In Ice Cream Field, December 1958, pages 21 and 69, and in US patents 3 036 533 and 3 029 750 a spherical ice-cream product is described, produced by moulding ice-cream into balls and coating these balls with particles, such as coconut particles.

GB 2 075 326 (Morinaga & Co. Ltd) describes the production of a spherical frozen confection by coating hard particulate core material in a revolving pan, cooling this material below freezing temperature and adding an aqueous coating material, thereby obtaining a generally spherical product comprising a core of any shape provided with a thick coating layer.

These methods for producing roundish food products suffer from the disadvantage that they either require a pre-moulding step for producing the roundish core or result in a relatively thick coating.

Conijn in DE 1 813 516 describes the production of cylindrical or spherical croquettes by rolling a piece of breaded ragout material between relatively moving surfaces. This method is, however, time-consuming and requires the use of expensive equipment.

Finally DE-A-3,519,052 describes a method for preparing roundish, coated food product bodies by rolling pieces of food material in the presence of a particulate coating material in a revolving drum. This method is meant for coating preshaped baked dough products with particulate material while preventing distortion of the shape. For that purpose special means are arranged to prevent distortion of these pre-shaped products or with other words to maintain the original shape thereof.

It is an object of the invention to provide a novel, industrially applicable method of reshaping plastic, deformable food material and simultaneously coating it to provide a roundish, coated food product.

Therefore, the invention relates to a method for preparing roundish, coated food product bodies by rolling pieces of food material in the presence of a particulate coating material in a revolving drum, as just described, which method according to the invention is characterised in that plastic, deformable food material is extruded into a strand, this strand

is separated into pieces and these pieces are reshaped into roundish, coated bodies by rolling in the drum.

The present invention is of particular interest for shaping frozen confection material because of its speed, rendering additional cooling means superfluous.

In this application the expression roundish bodies refers to bodies mainly having curved outer surfaces. Examples of roundish bodies are barrel-shaped pieces, spherical pieces and annular or toroidal pieces.

Particularly, the method according to the invention is used to prepare regularly shaped, roundish products, more preferably substantially spherical products.

Rolling is the rotating of the product while being in contact with a rigid body. Preferably, the rolling is carried out in more than one direction.

The expression revolving drum refers to any rotatable hollow body suitable for coating products such as a coating pan, which is rotatable about a horizontal or inclined axis.

As particulate coating material, any particulate material suitable for coating a food product may be used. These coating materials include powders, granules, granulates etc. Preferably, the particle size of the coating material is between 0.001 - 5 mm. Suitable coating materials include, for instance, flour, milk powder, cocoa powder, wafer crumbs, bread crumbs, nut particles, expanded rice particles, ground, baked, foamed egg-white, fruit particles, edible seed materials, kernels, freeze-dried or spray-dried materials, chocolate particles, coconut particles etc.

For savoury products, breading material, such as cracker meal, bread crumbs, Japanese crumbs etc., is generally preferred whereas for ice confections wafer crumbs, chopped nuts, chocolate flakes, ground coco and cocoa are preferred.

The coating materials having a particle size in the upper range, e.g. between 1-5 mm, have the advantage that they provide an effective distance between the coated food product cores of some millimetres, thus preventing adherence of the products to each other. Examples of these coating materials are coarse bread crumbs, nut particles etc.

The coating materials having a particle size in the lower range, e.g. between 0.001-1 mm, have the advantage that they provide a uniformly distributed coating, giving an attractive appearance and an effective protection of the product from damage. Examples of such coating materials are flour and cocoa.

Plastic, deformable food materials suitable for use in a method according to the invention are generally viscous food materials such as mashed

potato, minced fish paste, ice-cream, milk ice, mel-lorine, sherbet, dough, vegetable pastes, minced meat, ragout, etc.

The method according to the invention can be used for preparing roundish food products having various sizes. Preferably, the method of the invention is used to prepare food products having a volume of less than 250 ml so that one or more of these products can be used for constituting a one-person portion.

An interesting aspect of a method according to the invention is the possibility of preparing small size ("one-bite") food products, particularly products having a volume of less than 40 cm³, more preferably from 1 to 20 cm³.

For allowing a short rolling time, it is preferred that the starting piece of food material has dimensions which are substantially equal in each main direction, such as a substantially cubical piece or a cylindrical piece having a diameter which substantially equals its length.

The rolling step is carried out in a revolving drum, the axis of rotation being generally horizontal, but most preferably at a small angle to the horizontal. This allows the continuous operation by introducing the food material at one end and discharging it at the other end of the drum.

The invention also relates to an apparatus for preparing roundish coated food product bodies comprising a drum mounted for rotation about its axis, means for rotating said drum, means for feeding food bodies to be coated and means for feeding particulate material into the drum.

This type of apparatus is known as such from DE-A-3,519,052, which is however meant for coating preshaped baked dough products with particulate material while preventing distortion thereof. As discussed before this apparatus is unsuited for shaping soft plastic, structure-less material such as ice cream, mashed potato, dough, pastes, ragout etcetera into any desired shape. To that end the invention provides an apparatus as described before, which is characterised by means for extruding plastic, deformable material into a strand and means for separating this strand into pieces for feeding into the drum.

Preferably, the drum is provided with a profile for distributing the particulate material across the inner surface of the drum. Preferably, this profile is less than 2 mm in height to avoid damage to the structure of the food product.

Most preferred is a profile constituted by a particulate coating having a particle size of less than 2 mm, preferably about 1 mm. Preferably, the coating is arranged in helical areas.

Depending on the nature of the product to be reshaped, the linear speed of rotation of the drum in combination with the amount of particulate coat-

ing material can be varied within a broad range. In this context the expression linear speed of rotation refers to the circumferential speed or linear speed of any point on the cylindrical inner surface of the drum.

Usually the speed of rotation will be rather high to allow quick reshaping during coating. It has been found, however, that the speed of rotation has to be determined empirically, depending on the rheology of the food product. At relatively low speed, barrel-shaped products can be obtained. At higher speed, generally spherical shapes are obtained, while at still higher speeds substantially annular or toroidal shapes can be obtained. Intermediate rotational speeds will generate roundish products having a shape which is between a spherical shape and an annular shape, such as a dumbbell-shape, if seen in cross-section.

For food products having a volume of approximately 10 cm³ and a viscosity comparable to ice-cream of -5° C, a linear speed of rotation of between 40 and 60 metre/minute and a residence time in the drum of between 1 and 60 seconds will generally result in substantially spherical products. An increase in speed to between 60 and 150, and in particular to approximately 75 metres per minute, will generally result in substantially annular products.

For taste and keepability reasons it is often preferred to coat the product with a fluid coating material subsequent to the above-mentioned rolling to form a substantially continuous coating layer around the product.

Suitable fluid coating materials are, for instance, fat-based materials such as oil-in-water emulsions and water-based materials such as egg-white, water, etc. Most preferred is the use of batter material for savoury products and molten chocolate couverture for ice confection products.

Application of the fluid coating material can be carried out by any conventional method, such as e.g. spraying, feeding through a curtain of fluid etc.

Another aspect of the invention is the coating of a product which has previously been coated with a fluid material, with a particulate material. Application of such a particulate coating material improves the texture and appearance of the product. Furthermore, this particulate coating provides an effective distance between the cores of the product when stored in one package so that adherence is prevented.

It is well known in itself to coat e.g. chocolate-coated ice-cream products with a particulate material such as nuts. A problem during this coating is that the chocolate often drips off the product, thus forming a so-called dripping foot. It is highly desired to avoid the formation of such a dripping foot. It has been found that the formation of such a

dripping foot is avoided by applying the particulate coating material in a revolving drum as described above.

This method is advantageous in that it is fast and can be carried out continuously.

A preferred method according to the invention involves reshaping a piece of frozen confection material in the presence of a particulate coating material, coating the product thus obtained with a fluid coating material and the product with a second particulate material.

The second particulate coating material is not necessarily the same as the particulate coating material used during rolling. For safeguarding adherence of the second particulate material to the product, the second particulate material is preferably applied shortly after the fluid material so that this still has a fluid or plastic consistency.

Preferred embodiments of the invention have been chosen for purposes of illustration and description and are described in the following description and examples and shown in the accompanying drawings:

Fig. 1 shows a cross-section of a substantially spherical ice-cream product according to the invention.

Fig. 2 shows a cross-section of a barrel-shaped ice confection according to the invention.

Fig. 3 shows a cross-section of a substantially annular fish product according to the invention.

Fig. 4 shows a dumbbell-shaped cross-section of a round potato product according to the invention.

Fig. 5 is a schematic part-sectional side elevation of an apparatus embodying the invention.

Fig. 1 shows a cross-section of a substantially spherical ice confection product comprising an ice-cream core 1 provided with a first particulate coating layer 2 of wafer crumbs and a continuous chocolate coating layer 3 and a second particulate coating layer 4 of chopped nuts. The diameter of the product is approximately 30 mm.

Fig. 2 shows a barrel-shaped ice confection comprising an ice-cream core 5 provided with a particulate layer 6 and a syrup layer 7.

Fig. 3 shows a substantially annular fish product comprising a minced fish core 8 provided with a particulate breading layer 9, a batter coating 10 and an outer breading layer 11. The radius is approximately 20 mm and the height 12 mm.

Fig. 4 shows a dumbbell-shaped, cross-sectional view of a mashed potato fill 12 having a particulate breading layer 13.

Fig. 5 schematically shows an apparatus according to the invention for producing the above products comprising a rotatable drum 14, a driving mechanism 15 for rotating said drum, a supply tube 16 for introducing viscous, plastic deformable

food material, a wire-cutting means 17, a chute 18 and particulate coating material and a discharge end 19 for discharging the reshaped, coated product.

The revolving drum is provided with an inner profile having a height of 1.5 mm and being constituted of spherical particles of glass which are applied along helical areas 20 of the drum 14. An inclined sieve 21 for separating the product from excess particulate coating material is arranged at the discharge end 19 of the drum.

EXAMPLE 1

Cylindrical pieces of ice-cream having a volume of approximately 7 cm³ are produced by wire-cutting an extruded circular strand of ice-cream having a temperature of -5°C and an overrun of 120%. The pieces of ice-cream having a diameter of 21 mm and a length of 21 mm are immediately transferred to a revolving drum having a diameter of 60 cm, the interior of which is kept at ambient temperature and which contains wafer crumbs having an average particle size of approximately 2 mm. The revolving drum is rotated about a substantially horizontal axis at a linear speed of 55 m/min. The residence time of the product in the drum is approximately 10 seconds. The resulting products are substantially spherical, the weight ratio of crumbs : ice-cream is about 1:5. The product is subsequently hardened to -20°C and subsequently coated with a chocolate couverture by feeding it through a curtain of molten chocolate couverture, followed by immediately coating the product for a second time by introducing it into a second rotating drum which contains hazelnut particles having an average particle size of 2.5 mm. The second drum is rotated at a linear speed of 55 m/min; the residence time of the product in the drum is approximately 5 seconds. The resulting product is schematically shown in Fig. 1.

A pointed bag is filled with approximately 10 of these balls and stored at freezing temperatures.

EXAMPLE 2

Cylindrical pieces of mashed potato having a volume of approximately 3 cm³ are produced by extruding and wire-cutting a strand of mashed potato having a temperature of 4°C and an overrun of 20%. The cylindrical pieces of the mashed potato having a diameter of 18 mm and a length of 12 mm are immediately transferred to a revolving drum having a diameter of 60 cm, the interior of which is kept at ambient temperature and which contains a breading material having an average particle size of 1 mm. The revolving drum is rotated about a substantially horizontal axis at a linear

speed of 70 m/min. The residence time of the product in the drum is approximately 5 seconds.

The resulting products are substantially annular; the weight ratio mashed potato : breeding material is approximately 5:1.

EXAMPLE 3

Cylindrical pieces of ice-cream having a volume of approximately 3 cm³ are produced by wire-cutting an extruded circular strand of ice-cream having a temperature of -4°C and an overrun of 120%. The pieces of ice-cream having a diameter of 18 mm and a length of 12 mm are immediately transferred to a revolving drum having a diameter of 60 cm, the interior of which is kept at ambient temperature and which contains cocoa powder having an average particle size of between 0.001 and 0.05 mm. The revolving drum is rotated about a substantially horizontal axis at a linear speed of 70 m/min. The residence time of the product in the drum is approximately 10 seconds.

The resulting products are substantially annular; the weight ratio ice-cream : cocoa powder is approximately 20:1. The product is subsequently hardened to below -20°C.

Claims

1. Method for preparing roundish, coated food product bodies by rolling pieces of food material in the presence of a particulate coating material in a revolving drum, characterised in that plastic, deformable food material is extruded into a strand, this strand is separated into pieces and these pieces are re-shaped into roundish, coated bodies by rolling in the drum.
2. Method according to Claim 1, characterized in that the food material is frozen confection material.
3. Method according to Claim 1, characterized in that the food material is selected from the group of mashed potato, minced fish, dough, minced meat, vegetable paste and ragout.
4. Method according to any of Claims 1 to 3, characterized in that the volume of each piece of food material is less than 250 cm³.
5. Method according to claim 4, characterised in that the volume of each piece of food material is less than 40 cm³.
6. Method according to Claim 1, characterized in that each piece has dimensions which are sub-

stantially equal in each main direction.

7. Method according to Claim 1, characterized in that the linear speed of revolution of the revolving drum is controlled between 40 and 60 metres/min.
8. Method according to Claim 1, characterized in that the linear speed of revolution of the revolving drum is controlled between 60 and 150 metres/min.
9. Apparatus for preparing roundish, coated food product bodies comprising a drum (14) mounted for rotation about its axis, means (15) for rotating said drum, means for feeding food bodies to be coated and means (18) for feeding particulate coating material into the drum, characterized by means (16) for extruding plastic, deformable material into a strand and means (17) for separating this strand into pieces for feeding into the drum (14).

Revendications

1. Procédé de préparation de pièces de produit alimentaire enrobé, de forme arrondie par roulage des morceaux de matière alimentaire en présence d'une matière d'enrobage en particules dans un tambour rotatif, caractérisé en ce qu'une matière alimentaire plastique, déformable, est extrudée en cordon, ce cordon est séparé en morceaux et ces morceaux sont remis en forme de pièces enrobées de forme arrondie par roulage dans le tambour.
2. Procédé selon la revendication 1, caractérisé en ce que la matière alimentaire est une matière de confiserie congelée.
3. Procédé selon la revendication 1, caractérisé en ce que la matière alimentaire est choisie dans le groupe pomme de terre en purée, poisson hâché, pâte à pain, viande hâchée, pâte végétale et ragout.
4. Procédé selon l'une quelconque des revendications 1 à 3, caractérisé en ce que le volume de chaque morceau de matière alimentaire est inférieur à 250 cm³.
5. Procédé selon la revendication 1, caractérisé en ce que le volume de chaque morceau de matière alimentaire est inférieur à 40 cm³.
6. Procédé selon la revendication 1, caractérisé en ce que chaque morceau a des dimensions qui sont sensiblement égales dans chaque di-



speed of 70 m/min. The residence time of the product in the drum is approximately 5 seconds.

The resulting products are substantially annular; the weight ratio mashed potato : breaching material is approximately 5:1.

EXAMPLE 3

Cylindrical pieces of ice-cream having a volume of approximately 3 cm³ are produced by wire-cutting an extruded circular strand of ice-cream having a temperature of -4 °C and an overrun of 120%. The pieces of ice-cream having a diameter of 18 mm and a length of 12 mm are immediately transferred to a revolving drum having a diameter of 60 cm, the interior of which is kept at ambient temperature and which contains cocoa powder having an average particle size of between 0.001 and 0.05 mm. The revolving drum is rotated about a substantially horizontal axis at a linear speed of 70 m/min. The residence time of the product in the drum is approximately 10 seconds.

The resulting products are substantially annular; the weight ratio ice-cream : cocoa powder is approximately 20:1. The product is subsequently hardened to below -20 °C.

Claims

1. Method for preparing roundish, coated food product bodies by rolling pieces of food material in the presence of a particulate coating material in a revolving drum, characterised in that plastic, deformable food material is extruded into a strand, this strand is separated into pieces and these pieces are re-shaped into roundish, coated bodies by rolling in the drum. 30
2. Method according to Claim 1, characterized in that the food material is frozen confection material. 40
3. Method according to Claim 1, characterized in that the food material is selected from the group of mashed potato, minced fish, dough, minced meat, vegetable paste and ragout. 45
4. Method according to any of Claims 1 to 3, characterized in that the volume of each piece of food material is less than 250 cm³. 50
5. Method according to claim 4, characterised in that the volume of each piece of food material is less than 40 cm³. 55
6. Method according to Claim 1, characterized in that each piece has dimensions which are sub-

stantially equal in each main direction.

7. Method according to Claim 1, characterized in that the linear speed of revolution of the revolving drum is controlled between 40 and 60 metres/min. 5
8. Method according to Claim 1, characterized in that the linear speed of revolution of the revolving drum is controlled between 60 and 150 metres/min. 10
9. Apparatus for preparing roundish, coated food product bodies comprising a drum (14) mounted for rotation about its axis, means (15) for rotating said drum, means for feeding food bodies to be coated and means (18) for feeding particulate coating material into the drum, characterized by means (16) for extruding plastic, deformable material into a strand and means (17) for separating this strand into pieces for feeding into the drum (14). 15

Revendications

1. Procédé de préparation de pièces de produit alimentaire enrobé, de forme arrondie par roulage des morceaux de matière alimentaire en présence d'une matière d'enrobage en particules dans un tambour rotatif, caractérisé en ce qu'une matière alimentaire plastique, déformable, est extrudée en cordon, ce cordon est séparé en morceaux et ces morceaux sont remis en forme de pièces enrobées de forme arrondie par roulage dans le tambour. 25
2. Procédé selon la revendication 1, caractérisé en ce que la matière alimentaire est une matière de confiserie congelée.
3. Procédé selon la revendication 1, caractérisé en ce que la matière alimentaire est choisie dans le groupe pomme de terre en purée, poisson hâché, pâte à pain, viande hâchée, pâte végétale et ragout.
4. Procédé selon l'une quelconque des revendications 1 à 3, caractérisé en ce que le volume de chaque morceau de matière alimentaire est inférieur à 250 cm³.
5. Procédé selon la revendication 1, caractérisé en ce que le volume de chaque morceau de matière alimentaire est inférieur à 40 cm³.
6. Procédé selon la revendication 1, caractérisé en ce que chaque morceau a des dimensions qui sont sensiblement égales dans chaque di-



rection principale.

7. Procédé selon la revendication 1, caractérisé en ce que la vitesse linéaire de révolution du tambour rotatif est commandée entre 40 et 60 mètres/minute.

5

8. Procédé selon la revendication 1, caractérisé en ce que la vitesse linéaire de révolution du tambour rotatif est commandée entre 60 et 150 mètres/minute.

10

9. Dispositif pour la préparation de pièces de produit alimentaire enrobé de forme arrondie, comprenant un tambour (14) monté pour tourner autour de son axe, des moyens (15) pour faire tourner ledit tambour, des moyens d'alimentation en produits alimentaires à enrober et des moyens (18) pour amener la matière d'enrobage en particules dans le tambour, caractérisé par des moyens (16) pour extruder une matière plastique, déformable en cordon et des moyens (17) pour séparer ce cordon en morceaux pour alimenter le tambour (14).

15

20

25

Patentansprüche

1. Verfahren zum Herstellen rundlicher, überzogener Nahrungsmittelkörper durch Rollen von Stücken von Nahrungsmittelmateriale in Gegenwart von teilchenförmigem Überzugsmaterial in einer sich drehenden Trommel, dadurch gekennzeichnet, daß plastisches, verformbares Nahrungsmittelmateriale in Form eines Stranges extrudiert wird und dieser Strang in Stücke geteilt wird und diese Stücke durch Rollen in der Trommel zu rundlichen, überzogenen Körpern umgeformt werden.

30

35

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das Nahrungsmittelmateriale ein gefrorenes Süßwarenmateriale ist.

40

3. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das Nahrungsmittelmateriale aus der Kartoffelbrei, Fischfaschiertes, Teig, Fleischfaschiertes, Gemüsepaste und Ragout umfassenden Gruppe gewählt wird.

45

4. Verfahren nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß das Volumen jedes Nahrungsmittelmaterialestückes kleiner als 250 cm³ ist.

50

5. Verfahren nach Anspruch 4, dadurch gekennzeichnet, daß das Volumen jedes Nahrungsmittelmaterialestückes kleiner als 40 cm³ ist.

55

6. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die Abmessungen jedes Stückes in jeder Hauptrichtung im wesentlichen gleich sind.

7. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die Umfangsgeschwindigkeit der sich drehenden Trommel zwischen 40 und 60 m/min geregelt wird.

8. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die Umfangsgeschwindigkeit der sich drehenden Trommel zwischen 60 und 150 m/min eingestellt wird.

9. Vorrichtung zur Herstellung rundlicher, überzogener Nahrungsmittelkörper, welche Vorrichtung eine um ihre Achse drehbar gelagerte Trommel (14), Mittel (15) um diese Trommel zu drehen, Mittel zum Zuführen von zu überziehenden Nahrungsmittelkörpern und Mittel (18) zum Zuführen von teilchenförmigem Überzugsmateriale in die Trommel aufweist, gekennzeichnet durch Mittel (16) zum Extrudieren von plastischem, verformbarem Materiale in Form eines Stranges und Mittel (17) zum Teilen dieses Stranges in Stücke zum Zuführen in die Trommel (14).