



(51) International Patent Classification:

A23C 19/076 (2006.01) A23C 19/09 (2006.01)
A23C 19/16 (2006.01) A21D 13/00 (2006.01)

(21) International Application Number:

PCT/IB2016/052674

(22) International Filing Date:

10 May 2016 (10.05.2016)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

1507988.2 11 May 2015 (11.05.2015) GB

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,
PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,
SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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

Published:

— with international search report (Art. 21(3))

(54) Title: CHEESE PRODUCT

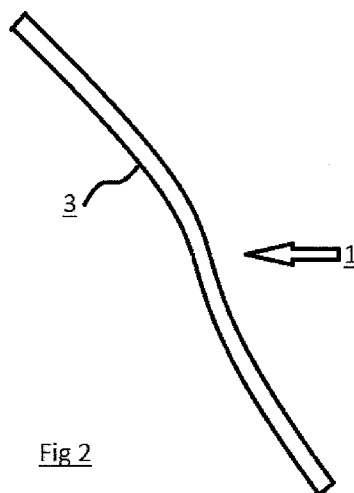


Fig 2

(57) Abstract: A cheese product comprises soft cheese encapsulated in a tubular vegetable casing. The cheese product can be manufactured by pumping cheese into a tubular casing, or forming the casing *in-situ* by coating the outside of a rope of cheese product. The cheese product can be used to form the stuffing in a stuffed-crust pizza.



Cheese product

Technical Field of the Invention

The present invention relates to a cheese product, a method of manufacturing a cheese product, a method of manufacturing a stuffed crust pizza comprising such a
5 cheese product and a stuffed crust pizza comprising the cheese product.

Background to the Invention

Stuffed crust pizzas, in which a filling is formed in the crust of a pizza, are well known. The most common filling is cheese. Currently, to form a stuffed crust pizza, a rope of semi-hard cheese, normally a processed semi-hard cheese, is placed around the
10 circumference of a pizza near the edge, but leaving sufficient excess bread such that the edge can be folded/rolled over the rope of cheese to encapsulate it. Typically, this semi-hard cheese rope collapses somewhat during cooking creating a cavity within the crust.

These semi-hard cheese ropes suffer certain disadvantages, in particular, in comparison to soft cheeses (including cream cheeses), they can collapse during
15 cooking, the mouthfeel is less desirable, can be bland in taste and provide a less suitable vehicle to carry flavours. However, owing to their soft nature, soft cheeses are not suitable for the handling operations required to introduce them into the crust of a pizza, e.g. a rope of soft cheese cannot be formed and picked up by hand.

Summary of the Invention

According to a first aspect of the present invention, there is provided a cheese product comprising soft cheese (including cream cheese) encapsulated in a tubular casing.

Those skilled in the art will be familiar with the expression “soft cheese”, which is used to describe a product which is cream cheese or any cheese with a moisture content which exceeds 50%.

Providing a soft cheese encapsulated in a casing allows the soft cheese to be handled much more easily both by hand and machine, accordingly, a pizzaiolo (or pizzaiola), can pick up and place the cheese product around the circumference of a pizza and easily roll the edge of the bread over the cheese product to encase it in the crust. The casing thus both allows manipulation and maintains the form of the soft cheese as the crust is folded over. It is not possible to use soft cheese in this manner without the innovation of encapsulation within casing.

The casing may contain at least 90% soft cheese, preferably at least 95% soft cheese, more preferably at least 99% soft cheese and most preferably only soft cheese.

The cheese product may consist of soft cheese encapsulated by a casing.

The soft cheese may be heat-stable. Those skilled in the art will understand the term heat stable to mean a cheese (either coated or used as a filling) capable of withstanding cooking temperatures through frying, deep frying, baking or grilling, without the fats and moistures separating and running off.

The soft cheese may be heat stable at a temperature of at least 150 degrees C, preferably at least 200 degrees C, more preferably at least 250 degrees C and most preferably at least 300 degrees C. Whilst pizza ovens may operate at up to 350 degrees C, or more, the cheese itself is typically shielded from the heat, so being stable to at least 220 degrees C is normally suitable, but higher is preferred.

The soft cheese may be cream cheese. That is to say cream cheese is classified as a soft cheese and is especially suitable to carrying flavours and has an excellent mouthfeel.

In one particular embodiment, the cream cheese may be a cheese as defined by the US Food and Drugs Administration Code of Federal Regulations (annual edition) - April 1, 1996 Edition, Title 21, Chapter I, Subchapter B, Part 133, Subpart B, Sec. 133.133, as a cream cheese.

However, it is noted that the expression “cream cheese” is to be understood as broader than that defined by the USFDA and in particular includes cheese with a moisture content of greater than 55%, as exemplified by Dairygold ® American style soft cheese (Set) (10225179) (available from Dairygold ® Food Ingredients of Cork, which has a moisture content of 60.5% and a fat content of 29.2%.

The soft cheese may comprise a cheese defined as a soft ripened cheese by the US Food and Drugs Administration Code of Federal Regulations April 1 2014 revision, TITLE 21, CHAPTER I, SUBCHAPTER B, PART 133, Subpart B Sec. 133.182 Soft ripened cheeses.

The casing may be a vegetable casing. Collagen, skin and other casings may be useful, but vegetable casing is preferred, especially because of its suitability for vegetarians.

The casing may break down and disintegrate at elevated temperatures. For
5 example the casing may disintegrate at a temperature of 220 degrees C, preferably at a temperature of 150 degrees C and more preferably at a temperature of 100 degrees C. Whereas many casings are intended for use in sausages, or sausage-like products, where maintaining their structure at elevated temperature is preferable, in this invention, it is preferable that the casing disintegrates as the temperature rises, in order that the casing
10 is not a barrier between the inside of the crust and the cheese within.

The cheese product may be in the form of a rope, that is to say, a product that is substantially longer than it is wide. Accordingly, the casing may have a length of at least twice its diameter, preferably at least four times its diameter, more preferably at least 5 times its diameter and most preferably at least 10 times its diameter. Suitably
15 the diameter of the tubular casing is between 6mm and 30mm, e.g. between 10mm and 30mm. Suitably the length is at least 50mm, preferably at least 100mm, more preferably at least 300mm and most preferably between 400 and 600mm. The length may be up to 1 metre, e.g. between 800 and 1200mm, or as little as 10-30mm. Around 50 cm is ideal for two cheese products to be placed end-to-end around the circumference
20 of an 11 inch (28cm) pizza. Even longer cheese products, e.g. about 100 cm could be used, so that only one such product is required to encase an entire 11 inch pizza, and of course cheese products of more than 100cm could be used for larger pizzas.

The casing may be comprised in a pizza base.

The casing may be comprised in the pizza base of a pizza.

In a second aspect of the invention, there is provided a method of forming a cheese product comprising pumping soft cheese into a tubular casing to form the cheese product of the first aspect of the invention.

5 According to a third aspect of the invention there is provided a method of forming a cheese product according to the first aspect of the invention comprising pumping soft cheese through a liquid coating material such that the coating material forms a tubular casing around the cheese. The coating material may be vegetable fat, and may for example be alginate. The coating/casing may be cured *in-situ*, e.g. by
10 running the coated product into a further bath containing a curing agent, such as chloride. The optional and preferred features of the first aspect of the invention apply equally to the second and third aspects of the invention.

 According to a fourth aspect of the invention, there is provided a method of forming a stuffed-crust pizza comprising providing a pizza base; providing a cheese
15 product comprising soft cheese encapsulated in a casing; and encasing the cheese product in the pizza base.

 The method may further comprise applying toppings to the pizza base and baking it in an oven, such as a pizza oven.

 The method may comprise applying the cheese product around the
20 circumference of the pizza base and folding over the edges of the pizza base to encase the product.

 The method may comprise providing at least two cheese products at different regions of the circumference of the pizza.

The at least two cheese products may comprise soft cheeses having different flavours.

Aside from use in pizzas, the cheese products of the invention, with the encapsulation in vegetable casing, may be placed in other food products, such as bakery products, such as bagels or croissants, meat/poultry products, e.g. chicken breast, to form stuffed chicken breast, steaks, to form stuffed steak products, or inside sausages such as chorizo.

Detailed Description of the Invention

In order that the invention may be more clearly understood an embodiment thereof will now be described, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 shows a lateral cross section through the cheese product of the invention;
Figure 2 shows a plan view of the cheese product of figure 1;
Figure 3 shows a perspective view of a part formed pizza base including the cheese product of figures 1 and 2.

Referring to figures 1 and 2, a cheese product 1, consists of a casing 3 (shown at a much exaggerated thickness in figure 1), which encapsulates a heat-stable soft cheese 2.

The casing 3 is an edible vegetable based casing, such as the Ascona (RTM) NutraCasing (RTM), formed from natural water soluble polysaccharides. The casing 3 is tubular, and is sealed at both ends in order to fully encapsulate the soft cheese 2.

Known sausage-stuffing machines (not shown) may be used to form the cheese product 1, by placing the soft cheese 2 in a hopper (not shown), and pumping it through a nozzle (not shown) into a long tube of casing 3. In order to produce the long tubular cheese product, the casing is closed, by twisting, or other sealing means, such as heat-sealing, only after filling a significant length of the casing. In this exemplary embodiment, the length is 50cm and the casing is of 17mm diameter.

Alternatively, the cheese product may be produced by placing the soft cheese 2 in a hopper (not shown), and pumping it through a ball (not shown) containing coating material, such as vegetable fat, e.g. alginate, so as to form a coating layer of alginate on the outer surface of the cheese product. The product may then pass into a second bath containing a curing agent, for example, chloride, to cure the alginate coating to form the casing. In this example, the cheese product can be cut into lengths (e.g. of about 50cm) as it leaves the nozzle, such that the coating coats the ends to close the casing. Suitable machines to carry out this method are the Handtmann VF628 and VF620, although other machines could equally be used.

Having formed the cheese product 1, it is used to form a stuffed crust pizza. Thus, with reference to figure 3, a circular pizza base 4 of, in this embodiment, a 35cm diameter is provided on a surface and two 50cm long cheese products 1, 1' are placed end to end around the circumference of the pizza base on its upper surface 6, to form a circle, approximately 5cm inwards of the edge 5 of the base 4. The edge 5 is then folded inwards over the cheese products 1 1' to encapsulate them and form a stuffed crust. Toppings are then applied to the upper surface 6 of the pizza base and it is baked in a pizza oven (at e.g. 350 degrees C) to form a pizza.

During baking, the casing 3 will reach a temperature of at least 150 degrees C at which point it will disintegrate, whilst the soft cheese 2 within will remain stable.

Example

In one example of the invention, a heat stable soft cheese, in particular a cream
5 cheese, was formed by the following method for a 72kg batch:

Ingredients: 33% (23.76Kg Ireland/UK) Full Fat Soft Cheese, 14% (10.08Kg Ireland/UK) Fresh Curd, 11% (7.92Kg Ireland/UK) Low Fat Soft Cheese, 11% (7.92Kg Ireland/UK) Mild Cheddar, 11% (7.92Kg Ireland/UK) Mature Cheddar, 10% (7.2Kg Ireland) Water, 6% (4.32Kg Ireland) Natural Cheese Flavour, 2% (1.44Kg / Thailand)
10 Starch, 1.9% (1.37Kg Germany) Stabilisers (E331, E339, E452), <0.1% (<0.072/Kg China) Potassium Sorbate (E202), <0.1% (<0.072/Kg Belgium) Lactic Acid (E270).

All cheese ingredients are placed in a Stephan ® Cooker UMSK80 and blended with direct steam heat injection to 40°C. The Stephan ® Cooker UMSK80 is reopened and all remaining ingredients added. The mix is further blended with direct steam heat
15 injection to 78°C. Direct steam is shut off at this point and product held for 1 minute at this temperature. The contents of the Stephan ® Cooker UMSK80 are then pumped directly to a stainless steel holding vessel. The product is then chilled and allowed to cool fully to <5°C.

The cooled heat stable soft cheese was then introduced into a vegetable casing
20 of 17 mm diameter, product code SCDA 1710, Nutra Casing (RTM) produced by ASCONA Foods Group Ltd of Mississauga, Ontario (Canada) using a Handtmann VF608FPL Vacuum Filling Machine.. The tubes of heat-stable soft cheese were then closed and separated automatically by twisting at 50cm intervals, along the 10m length

of the vegetable casing, in order to form a plurality of cheese products, in the form of ropes consisting of long lengths (50cm) of tubular casing containing soft cheese.

The product of the example was then manually handled and placed on a pizza base – the product could be picked up with ease and would even suffer a degree of squeezing without breaking or collapsing, in a manner completely impossible prior to encapsulation. The base was folded to enclose the product in the crust (as described in relation to the embodiment above), and baked in an oven at 350 degrees C for 10 minutes. When the cooked pizza base was cut, the casing had completely disintegrated, leaving no visible residue and in view of its heat stability, the soft cheese did not leak out of the crust, nor collapse considerably during cooking to form a cavity within the crust. The mouthfeel and flavour of the cheese in the crust was excellent.

The above embodiment and example is described by way of example only. Many variations are possible without departing from the scope of the invention as defined in the appended claims. For example, shorter cheese products may be placed into bakery products such as bagels or croissants prior to cooking, or meat/poultry products such as chicken breast, steaks and so forth may be sliced (by hand or machine) and stuffed with the cheese products of the invention (by hand or machine). Sausages, such as chorizo, could even be formed around these cheese products, to provide a soft cheese stuffing.

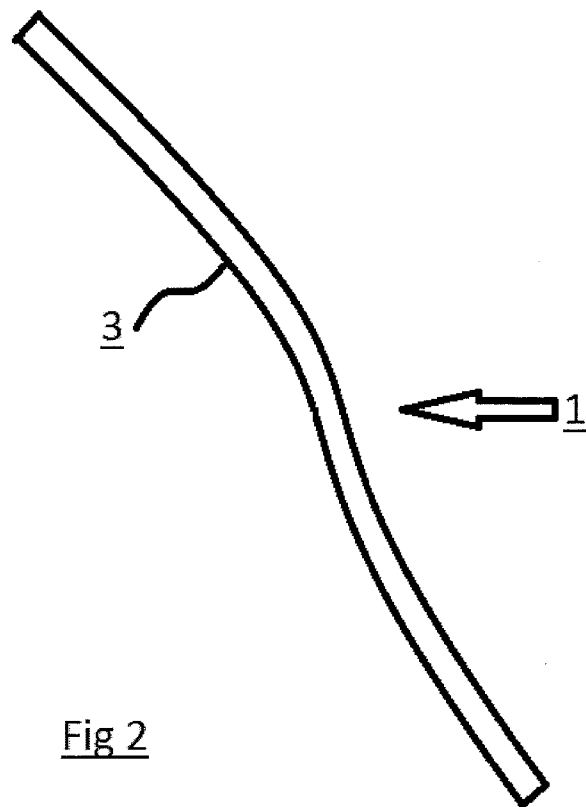
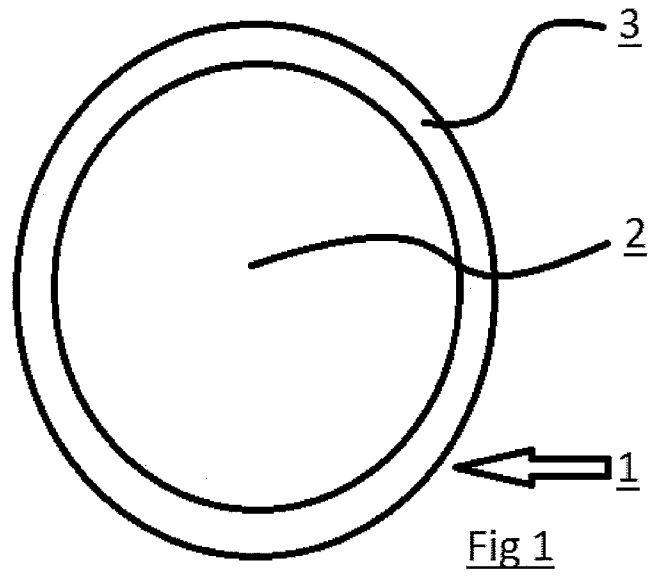
CLAIMS

1. A cheese product comprising soft cheese encapsulated in a tubular casing;
wherein the casing is a vegetable casing.
2. A cheese product according to claim 1 wherein the contents of the casing is at
5 least 90% soft cheese.
3. A cheese product according to claim 2 wherein the contents of the casing is at
least 95% soft cheese
4. A cheese product according to claim 3 wherein the contents of the casing is at
least 99% soft cheese.
- 10 5. A cheese product according to claim 4 wherein the contents of the casing is only
soft cheese.
6. A cheese product according to any of the preceding claims consisting of soft
cheese encapsulated by a casing.
7. A cheese product according to any of the preceding claims wherein the soft
15 cheese is heat-stable.
8. A cheese product according to any of the preceding claims wherein the soft
cheese is heat stable at a temperature of 150 degrees C.
9. A cheese product according to any of the preceding claims wherein the soft
cheese is heat stable at a temperature of 200 degrees C.
- 20 10. A cheese product according to any of the preceding claims wherein the soft
cheese is heat stable at a temperature of 250 degrees C.

11. A cheese product according to any of the preceding claims wherein the soft cheese is heat stable at a temperature of 300 degrees C.
12. A cheese product according to any of the preceding claims wherein the soft cheese is cream cheese.
- 5 13. A cheese product according to any of the preceding claims wherein, at a temperature of 200 degrees C, the casing disintegrates.
14. A cheese product according to any of the preceding claims wherein, at a temperature of 150 degrees C, the casing disintegrates.
15. A cheese product according to any of the preceding claims wherein, at a
10 temperature of 100 degrees C, the casing disintegrates.
16. A cheese product according to any of the preceding claims in the form of a rope.
17. A cheese product according to any of the preceding claims wherein the casing has a length of at least twice its diameter.
18. A cheese product according to any of the preceding claims wherein the casing
15 has a length of at least four times its diameter.
19. A cheese product according to any of the preceding claims wherein the casing has a length of at least 5 times its diameter.
20. A cheese product according to any of the preceding claims wherein the casing has a length of at least 10 times its diameter.
- 20 21. A cheese product according to any of the preceding claims wherein the casing has a diameter of between 6 and 30mm.

22. A cheese product according to any of the preceding claims wherein the casing has a length of at least 50mm.
23. A cheese product according to any of the preceding claims wherein the casing has a length of at least 100mm.
- 5 24. A cheese product according to any of the preceding claims wherein the casing has a length of at least 800mm.
25. A cheese product according to any of the claims 1 to 23 wherein the casing has a length of between 400 and 600mm.
26. A pizza base comprising a cheese product according to any of the preceding
10 claims.
27. A pizza comprising the pizza base according to claim 26.
28. A method of forming a cheese product comprising pumping soft cheese into a tubular vegetable casing to form the cheese product of any of claims 1 to 25.
29. A method of forming a cheese product according to the first aspect of the
15 invention comprising pumping soft cheese into a bath of vegetarian liquid coating material such that the coating material forms a tubular casing around the cheese.
30. A method of forming a stuffed-crust pizza comprising providing a pizza base; providing a cheese product comprising soft cheese encapsulated in a vegetable
20 casing; and encasing the cheese product in the pizza base.
31. A method according to claim 30 further comprising applying toppings to the pizza base and baking it in an oven, such as a pizza oven.

32. A method according to claim 30 or 31 comprising applying the cheese product around the circumference of the pizza base and folding over the edges of the pizza base to encase the product.
33. A method according to any of claims 30 to 32 comprising providing at least two
5 cheese products at different regions of the circumference of the pizza base.
34. A method according to any of claims 30 to 33 wherein the at least two cheese products may comprise soft cheeses having different flavours.
35. A method according to any of claims 30 to 34 wherein the cheese product is a cheese product according to any of claims 1 to 25.
- 10 36. A pizza or pizza base manufactured by the method of any of claims 30 to 35.
37. A cheese product, a pizza base, a pizza, a method of producing a cheese product, or a method of manufacturing a pizza substantially as described herein with reference to the accompanying drawings.



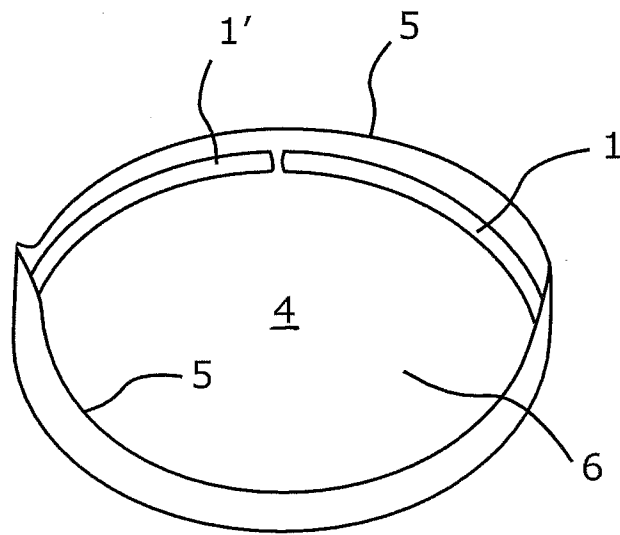


Fig 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/052674

A. CLASSIFICATION OF SUBJECT MATTER

INV. A23C19/076 A23C19/16 A23C19/09 A21D13/00
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A23C A21D

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 practicable, search terms used)

EPO-Internal, BIOSIS, FSTA, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search

21 July 2016

Date of mailing of the international search report

01/08/2016

Name and mailing address of the ISA/

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Munteanu, I

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/052674

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

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