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(54) Title: METHOD FOR PREPARATION OF A COATED FOOD PRODUCT

(57) Abstract: The disclosure relates to a method for preparation of a food product. The method comprises the following steps: applying on the food product a batter composition; applying on the food product a coating composition; applying oil on the food product, wherein said batter composition, said coating composition and said oil form a coating of the food product; subjecting the food product and the coating to a hot air cooking treatment in an impingement oven at such a temperature and for such a period of time that the coating is cooked while the food product remains substantially untreated by the hot air cooking treatment, wherein the temperature of the hot air cooking treatment is in the range of 230°C to 290°C and wherein the hot air in the hot air cooking treatment is applied on both the top and the bottom of the food product.



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METHOD FOR PREPARATION OF A COATED FOOD PRODUCT

Field of invention

The present invention relates to a method for preparation of a coated food product.

5 Technical Background

Food coatings for meats, seafood, vegetables and the like have been used for many years. In home preparation, the food is typically first coated with a batter comprising essentially flour, milk, eggs and seasoning, and the resulting product is then typically coated with bread or cereal crumbs which
10 have been either dried or toasted. The coated food is then cooked, usually fried, and served for consumption.

Consumers typically enjoy food with a fried-like taste and texture. However, consumers also typically prefer the ease and simplicity of conventional baking or microwave cooking as an alternative to frying.
15 Consequently, the food industry has responded by developing different methods and compositions for providing products which, upon conventional oven reheating, result in food with a fried-like texture and flavour.

In the industry coated food products are traditionally pre-fried in oil for 30-60 seconds at 180-200°C prior to cooking / chilling / freezing. The purpose
20 of this is for example to set or fix the coating to the substrate; to reduce the surface microbial load of the product; to develop colour; to add oil to the coating for enabling the product to be reconstituted by the end user in an oven or under a grill without burning; and to improve the mouth feel and eating characteristics of the final product after reconstitution.

25 The pre-frying process carries a number of inherent dangers which require special safety systems or procedures. Moreover, the pre-frying process is generally regarded as "dirty" in that often a great deal of time is required to clean the equipment after use. Further, the pre-frying process introduces large costs into the process for equipment, oil, energy etc.
30 Furthermore, strict quality control procedures are required in order to ensure

that the final product is as of the quality required. The term “the first thing that the consumer tastes in a fried product is the oil” is a major part of ensuring that frying oil quality is maintained at a high level. Moreover, consumers typically view fried foods as less nutritionally desirable due to the high fat content than other kind of foods.

Consequently, many attempts have been made by food processors and ingredient companies alike to find a way of eliminating the need for the pre-frying part of the process.

US 7,531,200 disclose a process for preparing a frozen battered food product. The process starts with the pre-dusting of the food product to be batter-coated, followed by the application to said dusted food of a prepared batter, the composition of which batter comprises a cellulose derivative that coagulates in a hot water bath or in the presence of water vapour. The process continues with the heating of the coagulated, batter-coated food using a traditional, microwave or infrared oven, so that the coagulated batter coating layer does not melt on cooling, and concludes with the cooling and freezing of the above product.

US 5,770,252 disclose a breaded food product being made by applying breading on an uncooked core food, and a starch overcoat film on the breading.

US 5,266,339 disclose a method for preparing a battered foodstuff, particularly, chicken, which has the taste, texture and appearance of a fried food, but which has not been fried. The batters of the present invention are applied after the chicken has been cooked and while the chicken is hot. The latent heat of the chicken causes the batter to fix on the chicken. In a preferred embodiment, the batter coated chicken is further coated with a bread crumb mixture before the batter is fixed. The bread crumb mixture may also include flavoured vegetable based oils derived from frying chicken for the purpose of imparting savoury and fried food flavour characteristics to the non-fried food.

US 4,943,438 disclose a breading crumb mixture and process for coating food products. The crumb mixture and process impart a fried-like texture and flavour to the resultant food products. The breading crumb

mixture comprises extruded flour dough crumbs, dielectrically baked crumbs and beaded shortening. The process of the invention includes the steps of coating a food product with a binding agent, breading the coated product with the breading crumb mixture, baking the breaded product in a humidified oven, 5 applying edible oil in atomized form to the surface of the baked product, and exposing the baked product surface to high temperature heating for the purpose of browning and crisping.

Summary of the invention

An object of the present invention is to provide an alternative method 10 for achieving fried-like flavour and texture for food products consistent with consumer demands but without the disadvantages of frying.

The above object is achieved by the method according to the independent claim. Further embodiments of the invention are disclosed in the dependent claims.

15 In particular, according to a first aspect of the present invention, a method for preparation of a food product is disclosed. The method comprises the steps: applying on the food product a batter composition; applying on the food product a coating composition; applying oil on the food product, wherein said batter composition, said coating composition and said oil form a coating 20 of the food product; and subjecting the food product and the coating to a hot air cooking treatment in an impingement oven at such a temperature and for such a period of time that the coating is cooked while the food product remains substantially untreated by the hot air cooking treatment, wherein the temperature of the hot air cooking treatment is in the range of 230°C to 290°C 25 and wherein the hot air in the hot air cooking treatment is applied on both the top and the bottom of the food product.

That the food product remains substantially untreated by the hot air cooking treatment shall be interpreted as that the food product remains in a substantially uncooked state. For example if the food product is a raw piece of 30 meat, e.g. chicken meat, the meat is raw even after the hot air cooking treatment according to the inventive method.

With the inventive method for preparation of a food product it is possible to apply a coating onto a food product without the need of frying the

food product. Thus, drawbacks, listed in the technical background, with frying a food product is avoided although the by consumers desired fried-like flavour and texture is still present. One of the advantages of this invention is that it allows producers to accurately predict the oil content of their products, whatever type of oil is used. It therefore opens up avenues to produce low fat or lower fat or fat controlled type products. Moreover, the risk of a product carrying tainted oil flavours will also be reduced using this invention, leaving the product with an overall fresher cleaner more natural taste as compared with a pre-fried product. According to the inventive method a pre-cooked coated food product is produced. Pre-cooked in the meaning of the coated food product is partially cooked, i.e. the coating is cooked while the food product remains substantially uncooked. The pre-cooked coated food product may be finally cooked in a household type oven. An advantage is that the consumer may cook the food product according to the consumers own requirements since the food product remains substantially uncooked during the pre-cooking stage of the present invention. By applying the hot air in the hot air cooking treatment on both the top and the bottom of the food product an even cooking of the coating is enabled. Further by applying the hot air in the hot air cooking treatment on both the top and the bottom of the food product an even heat treatment to the coating is ensured. This results in a consistent product in terms of taste texture colour and overall appearance.

Furthermore, the method may comprise the step of applying on the food product a pre-dusting composition, wherein the pre-dusting composition is a part of the coating of the food product.

Moreover, the method may comprise the step of cooling the coated food product subsequent to the step of subjecting the food product and the coating to the hot air cooking treatment. By cooling or even freezing the pre-cooked food product the shelf life of the food product will increase. The cooled or frozen coated food product can be finally cooked in a household type oven to give a crisp coated food product.

Furthermore, the temperature of the hot air impingement cooking treatment may preferably be 270°C to 290°C.

Moreover, the period of time for the hot air impingement cooking treatment may be in the range of 30s to 240s, preferably 30s to 180s and more preferably 50s to 120s. Thus, it is made possible to produce a large quantity of food products per time unit.

5 Further, the oil may be applied by spraying. For example, the oil may be applied by spraying oil on all the sides of the food product simultaneously. By applying the oil by spraying it is possible to accurately control the amount of oil applied and to ensure even coverage. By applying the oil to all sides simultaneously a uniform distribution of oil all around the product is achieved.

10 Moreover, the amount of oil applied on the food product may be in the range of 1-10% of the weight of the food product and the coating after the hot air cooking treatment, preferably 3-8% of the weight of the food product and the coating after the hot air cooking treatment and more preferably 3-6% of the weight of the food product and the coating after the hot air cooking
15 treatment.

Detailed description of preferred embodiments

The inventive method relates to a method for coating a food product with a coating without the need of frying the food product. The inventive method may be applied on various types of food products, i.e. chicken, fish,
20 seafood, red meat, cheese or vegetables.

According to an embodiment of the present invention the method comprises the following subsequent steps: a) Applying on the food product a pre-dusting composition; b) Applying on the food product a batter composition; c) Applying on the food product a coating composition; d)
25 Applying oil on the food product. The pre-dusting composition, the batter composition, the coating composition and the oil form a coating of the food product; and e) Subjecting the food product and the coating to a hot air cooking treatment at such a temperature and for such a period of time that the coating is cooked while the food product remains substantially uncooked.

30 The different compositions are applied to the food product by different applying units familiar to the person skilled in the art.

The pre-dusting composition comprises flour and/or starch and/or proteins. Typical types of flour used are wheat, maize or rice flour. Both native

and modified starch from corn, wheat, rice, potato, tapioca and others is typically used. Proteins such as vegetable gums, wheat gluten, egg albumin, milk protein are typically used. The pre-dusting composition may also
5 composition is mainly used in order to improve adhesion of later applied compositions, control pick up of later applied compositions, change texture of the end food product and add flavour to the end food product.

According to one embodiment of the present invention the application of the pre-dusting composition is optional.

10 The batter composition typically comprises any of the ingredients of the pre-dusting composition together with a liquid, i.e. water, milk, wine, beer or oil.

The coating composition typically comprises breading crumbs blended with other additional ingredients such as spices. The breading crumbs are
15 typically made from flour, gluten, water, salt and spices. The flour may be a mixture of wheat, rice and corn flour. Also malted barley extract may be added to the breading crumb dough. Also other kind of starches for example from potato or vegetables (e.g. peas) may be added. Potato or vegetables starch may also replace the flour. The breading crumbs are typically produced
20 by extruding the raw dough. However, as the skilled person is well aware of, other production methods are also widely used.

The oil is best applied using a spinning disc to atomize the liquid. The liquid is sprayed or dripped on to a spinning disc in a chamber above and beneath a product transportation belt. This produces a cloud of atomized
25 liquid which then totally covers the product. This allows the oil to be applied on all sides simultaneously in order to control accurately the amount of oil applied and to ensure even coverage.

The quality of the oil is important as this will have a major impact on the flavour and colour of the product. This choice however is more related to
30 the consumer's requirements. Typical oils used are sunflower oil or olive oil but also other kinds of oil may be used. The oil used should be fresh and clean.

The oil application is required in order to prevent the coating from becoming dry and burnt when subjecting the food product and the coating to a hot air impingement cooking treatment. Further, the oil aid mouth feel and flavour development.

5 One of the advantages of this invention is that it allows producers to accurately predict the oil content of their products, whatever type of oil is used. It therefore opens up avenues to produce low fat or lower fat or fat controlled type products. Typically the amount of oil applied on the food product is in the range of 1-10% of the weight of the food product and the
10 coating after the hot air cooking treatment, preferably 3-8% of the weight of the food product and the coating after the hot air cooking treatment and more preferably 3-6% of the weight of the food product and the coating after the hot air cooking treatment.

 Moreover, the risk of a product carrying tainted oil flavours will also be
15 reduced using this invention, leaving the product with an overall fresher cleaner more natural taste as compared with a pre-fried product.

 As mentioned above the optional pre-dusting composition, the batter composition, the coating composition and the oil form a coating of the food product. Typically the coating constitute 15-60% of the total weight of the end
20 product (food product plus coating) before subjecting the food product and the coating to the hot air cooking treatment and 15-60% of the total weight of the end product after subjecting the food product and the coating to the hot air cooking treatment. Moreover, the pre-dusting composition constitute 0.5-15% of the total weight of the coating. The ratio between the batter composition
25 and the coating composition is between 1 to 1 and 1 to 2. Thus, from equal amount of batter composition and coating composition up to twice as much are coating composition as are batter composition.

 After application of all the ingredients of the coating, the food product is totally covered by the coating. Preferably the coating is having uniform
30 thickness all over the food product.

 After the food product has been coated with the coating the food product and the coating is subjected to a hot air cooking treatment at such a temperature and for such a period of time that the coating is cooked while the

food product remains substantially untreated by the hot air cooking treatment. By doing so the process is simulating the process of pre-frying without the need to immerse the product in hot cooking oil. The hot air cooking treatment is typically performed in an impingement oven by injecting hot air through

5 nozzles directed towards the product. The air speed out from the nozzles is preferably between 15 m/s and 33 m/s, more preferably between 27 m/s and 32m/s. In the impingement oven gas burners are typically used for producing the hot air. The temperature of the hot air impingement cooking treatment is in the range of 190°C to 300°C, preferably 230°C to 290°C and more

10 preferably 270°C to 290°C. The period of time for the hot air impingement cooking treatment is in the range of 30s to 240s, preferably 30s to 180s and more preferably 50s to 120s. By passing the coated food product through an impingement oven at high temperature, 190°C to 300°C, preferably 230°C to 290°C and more preferably 270°C to 290°C, for a period of time, 30s to 240s,

15 preferably 30s to 180s and more preferably 50s to 120s, the coating is cooked but yet leaves the substrate in a raw uncooked condition, i.e. this is a pre-cooking stage. According to one embodiment of the present invention, the hot air in the hot air cooking treatment is applied on both the top and the bottom of the food product. Accordingly, the impingement oven is equipped

20 with first type of nozzles being arranged to direct hot air towards the top of the food product and a second type of nozzles being arranged to direct hot air towards the bottom of the food product. According to one embodiment of the present invention the air speed of the hot air applied to the top of the food product is different than the air speed of the hot air applied to the bottom of

25 the food product. This may e.g. be achieved by use of independent fans controlling the top and bottom air flows. Alternatively, a Louver system may be used to control the amount of air passing over the top or the bottom of the product. By applying a higher air speed on the top of the food product than on the bottom of the food product an over pressure on the top of the food product

30 may be achieved, this in order to prevent the food product moving around in the airstream. By applying a higher air speed on the bottom of the food product than on the top of the food product a drying effect on the bottom part of the food product may be achieved. Once the pre-cooking stage is finished

the product can be chilled or frozen and the cooking process can be finalized in a household type oven to give a crisp coated food product. Thus, subsequent to the step of subjecting the food product and the coating to the hot air impingement cooking treatment the coated food product can be

5 cooled.

According to an embodiment of the invention the method further comprises application of a colouring agent or a colour accelerant on the food product. The colour application is optional as it adds nothing to the textural and flavour characteristics of the product; however, it does make the product
10 look more appealing. For example, the colour application may be used for applying grill stripes to the coating or for applying a heterogenic surface browning to the coating.

According to an embodiment of the invention the method further comprises spraying a water mist on the food product prior to subjecting the
15 food product and the coating to a hot air impingement cooking treatment at such a temperature. The spraying of the water mist is normally performed directly before or directly after the application of the oil. The water is best applied using a spinning disc to atomise the liquid. The water is sprayed or dripped on to a spinning disc in a chamber above and beneath the product
20 transportation belt. This produces a cloud of atomized water which then totally covers the product. This allows the water to be applied on all sides simultaneously in order to control accurately the amount of water applied and to ensure even coverage. By spraying a water mist on the food product the juiciness of the coating can be controlled. Moreover, by spraying a water mist
25 on the food product weight loss of the food product may be limited.

It will be appreciated that the present invention is not limited to the embodiments shown. Several modifications and variations are thus conceivable within the scope of the invention.

CLAIMS

1. Method for preparation of a food product, comprising the steps
applying on the food product a batter composition,
5 applying on the food product a coating composition,
applying oil on the food product, wherein said batter composition, said
coating composition and said oil form a coating of the food product,
subjecting the food product and the coating to a hot air cooking
treatment in an impingement oven at such a temperature and for such a
10 period of time that the coating is cooked while the food product remains
substantially untreated by the hot air cooking treatment, wherein the
temperature of the hot air cooking treatment is in the range of 230°C to 290°C
and wherein the hot air in the hot air cooking treatment is applied on both the
top and the bottom of the food product.
15
2. Method according to claim 1, further comprising the step of applying on the
food product a pre-dusting composition, wherein the pre-dusting composition
is a part of the coating of the food product.
- 20 3. Method according to claim 1 or 2, further comprising the step of cooling the
coated food product subsequent to the step of subjecting the food product
and the coating to a hot air cooking treatment.
4. Method according to any one of the preceding claims, wherein the
25 temperature of the hot air cooking treatment is preferably 270°C to 290°C.
5. Method according to any one of the preceding claims, wherein the period of
time for the hot air cooking treatment is in the range of 30s to 240s, preferably
30s to 180s and more preferably 50s to 120s.
30
6. Method according to any one of the preceding claims, wherein the oil is
applied by spraying.

7. Method according to any one of the preceding claims, wherein oil is applied by spraying oil on all the sides of the food product simultaneously.

5 8. Method according to any one of the preceding claims, wherein the amount of oil applied on the food product is in the range of 1-10% of the weight of the food product and the coating after the hot air cooking treatment, preferably 3-8% of the weight of the food product and the coating after the hot air cooking treatment and more preferably 3-6% of the weight of the food product and the coating after the hot air cooking treatment.

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9. Method according to any one of the preceding claims, wherein the step of applying oil on the food product is performed after the step of applying on the food product a coating composition.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER INV. A23L1/03 A23L1/31 A23L1/315 A23L1/325 A23P1/08 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) A23L A23P		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, FSTA, BIOSIS, INSPEC		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 770 252 A (MCEWEN LAUREL [US] ET AL) 23 June 1998 (1998-06-23) cited in the application * column 2, lines 3-17; column 3, lines 28-44; column 4, lines 24 - column 6, line 14; claims 1-7 * -----	1-9
Y	US 5 266 339 A (SAMSON ALLAN D [US] ET AL) 30 November 1993 (1993-11-30) cited in the application * column 7, lines 27-37; examples 1-4; claims 1-13 * -----	1-9
Y	US 2004/241289 A1 (DAL SANTO SUSANA FISZMAN [ES] ET AL FISZMAN DAL SANTO SUSANA [ES] ET A) 2 December 2004 (2004-12-02) * example; claims 1-20 * ----- -/-	1-9
☒ 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 "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Georgopoulos, N

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International application No

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C(Continuation). 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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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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