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(21) International Application Number: PCT/FI97/00739 (22) International Filing Date: 1 December 1997 (01.12.97) (30) Priority Data: 964850 4 December 1996 (04.12.96) FI (71) Applicant (for all designated States except US): RAISIO YHTYMÄ OYJ [FI/FI]; Raisionkaari 55, FIN-21200 Raisio (FI). (72) Inventor; and (75) Inventor/Applicant (for US only): PAUKKUNEN, Veli-Matti [FI/FI]; Vanha Tampereentie 286, FIN-39500 Ikaalinen (FI). (74) Agent: OY JALO ANT-WUORINEN AB; Iso Roobertinkatu 4-6 A, FIN-00120 Helsinki (FI).		(81) Designated States: AU, BR, CA, CN, CZ, EE, FI, HU, IS, JP, KR, LT, LV, MX, NO, NZ, PL, RO, RU, SI, SK, TR, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>In English translation (filed in Finnish).</i>
(54) Title: METHOD FOR MAKING A BAKING PRODUCT (57) Abstract The present invention is related to the manufacture of a bakery product so that the baking step is carried out with the bakery product being enclosed in a wrapper material having at least a portion its surface area made permeable to moisture in a limited manner.		

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Method for making a baking product

The present invention relates primarily to a method of baking a bakery product, and additionally, the scope of the invention relates to the manufacture of a bakery product. In the present context, the term bakery product refers to a foodstuff product whose method of manufacture is chiefly dictated by the properties of the product's grain portion used, as the flour dough, for instance.

Conventionally, bakery products are baked using either so-called open-hearth baking or pan-baking. In open-hearth baking, the bakery product is made from a dough piece having a sufficient coherency for keeping the piece essentially in its intended shape until passed to the baking step. In contrast, pan-baking can be carried out using dough of essentially higher elasticity or otherwise lower coherency, because this baking technique is not so sensitive to the shape retention of the dough. As known, pan-baking can be carried out using either an open pan or a pan covered with a lid.

When baking in an open-hearth oven or open pan, an essential portion of the products surface is in immediate contact with the atmosphere of the oven. This imposes a significant moisture loss effect on the product during baking. Baking in a covered pan in turn makes the pan very tight, which almost completely prevents evaporation of moisture. Also known in the art are baking methods in which a covered pan is provided with a vent mechanism suitable for controlling the release of evaporated moisture. Such a method is described in, e.g., US Pat. No. 4,590,078.

In order to prevent excessive moisture loss of the product being baked, particularly during baking in an open-hearth oven, the baking process is generally accelerated by increasing the baking temperature. The higher baking

temperature obviously also speeds the release of moisture, but nevertheless gives a finished product of higher water content than that achievable using a lower baking temperature and respectively a longer baking time. A co-
5 factor related to this behaviour is the product crumb which forms faster at an elevated temperature, thus causing delayed removal of moisture from the product. A similar phenomenon may also occur during baking in open pans, however, in a lesser degree due to the smaller open sur-
10 face of the product being baked. An alternative method for delaying the moisture loss of the product during baking is to elevate the moisture content of the baking atmosphere surrounding the product. However, this method affects the crumb formation, thereby causing a less attractive look of the product; and the baking result may
15 also exhibit impaired quality in tasting tests. Crumb formation is even more incomplete in baking processes carried out in covered pans, which makes this baking technique suitable only for certain special applications, wherein the product form is the primary criterium and the
20 products are intended for an end use involving a post-treatment such as roasting.

It is an object of the present invention to provide a
25 baking method for bakery products suitable for improved control of moisture removal from the product during the baking process so that the end product properties are managed in a superior fashion over the prior art. Furthermore, the method permits control of the baking
30 step so that the desired properties of the end product can be attained in a repeatable manner. The repeatability of the baking outcome makes the method suited for industrial applications involving large-volume manufacture of baked products.

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It is a further object of the invention to provide a baking method also offering management of such dough

varieties which are based on raw materials not inherently rendering the baking properties that are required in conventional open-hearth baking. Dough gluten, which is a vital property affecting the bakeability of dough, is
5 determined by the cereal gluten, particularly its amount and quality. For instance, the use of oat and barley in bakery products is limited due to their inferior gluten properties. This is a significant drawback, because these grain varieties contain a plurality of constituents with
10 good nutritional properties. On the other hand, gluten is the main culprit of the celiac disease.

Controlled management of moisture release during baking is crucial in the baking of, e.g., bread inasmuch bread
15 is commonly known to gain improved taste qualities if the bread can be baked at a lower temperature and using a longer baking time than those permitted by prior-art baking methods, particularly those used in commercial production. Pastry products, such as rolls, in turn are sen-
20 sitive to excessive moisture loss of the product under baking conditions that otherwise in terms of baking temperature and time are known to give a good baking result.

The desirable goal of a controlled baking technique is
25 attained by virtue of a method according to the invention characterized in that the baking step is carried out having the bakery product sealed in a wrapper material in which at least a portion of the wrapper offers controlled permeability to moisture. Additionally, the scope of the
30 invention covers the manufacture of a bakery product starting from a dough piece so that each dough piece is placed in an individual wrapper having at least a portion its surface area made in a limited manner permeable to moisture, that the dough piece is allowed to rise, when
35 required, in said wrapper and that the dough piece is baked in said wrapper.

By virtue of the baking method according to the invention, benefits are gained already with conventional dough compositions therein that the moisture loss from the bakery product during baking occurs at a slower rate than in open-hearth baking or pan-baking. Resultingly, the baking temperature can be lowered and respectively the baking time extended, thereby rendering the desirable improvement in product taste. Moreover, additional advantages are available in conjunction with products conventionally made using open-hearth baking. In these products, a higher amount of liquid than was possible in the prior art can be used in the dough, because the dough piece will be handled enclosed in the wrapper, whereby such factors as the shape retention of the dough piece becomes irrelevant. The application contemplated herein is, e.g., baking of bread from a dough of particularly low paste viscosity, or alternatively, from a dough made using a low-gluten grain variety.

In the context of the present invention, the term "wrapper material" is used in general reference to a sheet or web of a thin paper- or film-type product offering the desirable properties. The wrapper material shall be of a kind qualified compatible with foodstuff use regulations, it must endure the temperatures applied in the baking processes of bakery products and it must offer a correct rate of moisture permeability for the baking process. Such a moisture permeability can be attained by an inherently porous structure of the wrapper material, or alternatively, the permeability properties may be made puncturing the wrapper material using spark-discharge techniques, for instance.

A suitable wrapper material has been found to be the casing material used in the curing of sausages. This casing is made from fibrous web, in practice, from a paper grade processed to fulfill the given quality criteria. The

desirable special properties of the web are obtained by impregnating viscose cellulose into the base web and then regenerating the cellulose. A variety of casing material suitable for use in the application of the invention is
5 manufactured by Visko Oy, Hanko, Finland, under trade marks Visko Standard, Visko EP and Visko X.

The wrapper material used in making a bakery product can be made exclusively from a wrapper product possessing the
10 above-described properties, or alternatively, the invention may be implemented so that each piece of bakery product is prior to its handling enclosed in a wrapper having only a portion of its surface area made permeable to moisture in a manner described above. Then, the other
15 portion of the wrapper can be of essentially similar material, however, being essentially nonpermeable. Such a modification may be advantageous in the manufacture of products with a high fat content, whereby the pan conventionally used to prevent the release of fat from the
20 product may be omitted.

The baking method according to the invention has even wider applications in manufacturing and handling processes of bakery products. As discussed above, the handling
25 properties of the bakery product dough piece can be made independent from its shape retention by enclosing each dough piece after its metering in an individual wrapper. Then, the product can travel also through a possible raising step enclosed in said wrapper into the
30 actual baking step.

Now, the raising and/or baking steps may be substantially outdistanced both temporally and spatially from the reduction of dough into a formed piece. The product can be
35 transported packaged in the wrapper, e.g., in a deep-frozen state to a retail store or directly to the consumer, whereby the raising and/or baking steps required

to prepare the finished product can be performed at either site.

On the other hand, if the product is processed closer to its final qualities in an integrated system, essential benefits over the prior art are obtained in the process after the baking step. For instance, baked the product may be delivered in its wrapper, that is, as a ready-packaged product almost immediately after baking to a retail store or directly to the location of the end user. Herein, among other benefits, the cooling steps required in conventional processes prior to packaging may be omitted. Furthermore, the postfermentation of the product in the wrapper continues in an advantageous manner, and still further, the shelf-life, that is, the good-until date of the product may be extended. When desired, the postbaking behaviour of the product may be affected by a separate posttreatment step, wherein the properties of the wrapper are modified into a more advantageous direction in terms of postfermentation and/or storage. For instance, the goal of such a posttreatment may be to reduce the moisture permeability of the wrapper from the value of optimal moisture permeability rate required during baking.

When applied to breadmaking, for instance, the invention may be carried out by metering the dough piece into its protective wrapper using extrusion techniques. While the wrapper itself may have any shape suited for the specific application, a tubular casing is an advantageous form in concurrent manufacturing processes. In order to take into account the expansion of the product during the raising and baking steps, a suitably large volume of space must be reserved for the dough piece in the wrapper. As a guideline, about 1/4 of the wrapper overall volume is filled by the dough piece in breadmaking. After the partial filling, the tubular casing can be transferred to the

subsequent steps either cut to constant lengths, or alternatively, as a continuous coil of tubular casing if the transport is to be performed over a greater distance.

- 5 The scope of the invention also covers the manufacture of pan-baked products, wherein the product is sealed as such in the wrapper, and this combination is placed in a pan and baked therein. Such a baking technique is applicable to, e.g., baking of fat-containing products or when the
- 10 product is desired to have a given finished form. After baking, the product is removed from the pan and submitted to delivery and sales without being removed from its wrapper.
- 15 As mentioned above, the present invention makes it possible to perform baking at a temperature lower than that of conventional baking techniques. Generally, the baking temperature can be lowered by about 5 - 15 °C. Such a lower baking temperature allows about 10 % longer baking
- 20 time.

Claims:

1. A method of baking a bakery product enclosed in a wrapper, c h a r a c t e r i z e d in that the baking
5 step is carried out having the bakery product sealed in a wrapper material having a least a portion out its surface area made permeable to moisture in a limited manner.
2. A method as defined in claim 1, c h a r a c t e r -
10 i z e d in that a wrapper material is used offering limited permeability to moisture over its entire area.
3. A method as defined in claim 1 or 2, c h a r a c -
t e r i z e d in that the bakery products are baked each
15 sealed separately in its individual wrapper.
4. A method as defined in any of claims 1-3, c h a r -
a c t e r i z e d in that a fibrous web material is used
as the wrapper.
20
5. A method as defined in claim 4, c h a r a c t e r -
i z e d in that a wrapper material is used made from a fibrous web treated with an agent affecting the moisture permeability properties of the material.
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6. A method as defined in claim 5, c h a r a c t e r -
i z e d in that a fibrous web material containing regenerated viscose cellulose is used as the wrapper.
- 30 7. A method of making a bakery product from a dough piece principally consisting a mixture of a flour component with a liquid component, c h a r a c t e r i z e d in that each said dough piece is placed in an individual wrapper having at least a portion thereof made in a
35 limited manner permeable to moisture, that the dough piece is allowed to rise in said wrapper if so required and that the dough piece is baked or prebaked in said

wrapper.

8. The method as defined in claim 7, c h a r a c -
t e r i z e d in that after baking the bakery product is
5 transported sealed in its wrapper to the location of end
distribution and/or use.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 97/00739

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B65D 81/34, A21B 3/13

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

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Minimum documentation searched (classification system followed by classification symbols)

IPC6: B65D, A21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, CLAIMS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0240071 A2 (UNILEVER NV), 7 October 1987 (07.10.87), page 1, line 14 - line 16, claims 1-5, example III --	1-8
X	WO 9107861 A1 (GENERAL MILLS, INC.), 30 May 1991 (30.05.91), page 11, line 14 - line 22 --	1-4,7-8
X	GB 1550000 A (UNILEVER LIMITED), 8 August 1979 (08.08.79), page 1, line 21 - line 27, claim 1 --	1-3,7-8
A	EP 0368601 A2 (UNITED BISCUITS (UK) LIMITED), 16 May 1990 (16.05.90), column 2, line 24 - line 33, figure 1, claim 1 --	1-8

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

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Information on patent family members

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