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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 06 - 30,874
FECHA : ABRIL 24 DE 2006

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
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Evo: 1 REGISTRO
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***** CONSIGNACION *****

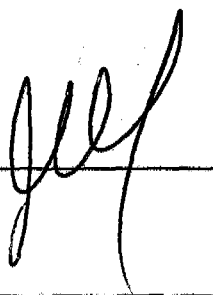
DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CAVELIER ABOGADOS	CONSIGNACION	BANCO POPULAR	050-00110-6	54929894	24/04/2006	29,522,500.00

***** CONCEPTO *****

CANT. RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-03 CAMBIO DE MODALIDAD Y MODIFICA	12 MARCAS Y LEHAS COMERCIALES	95,000.00
	TOTAL :	\$ 95,000.00

SON: NOVENTA Y CINCO MIL PESOS

RESPONSABLE :



RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

06 11346-801-008-8

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 00-82960

**EL EXTRACTO DE LA PRESENTE SOLICITUD DE PATENTE DE INVENCION
FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No 522, DE
FECHA 28 DE NOVIEMBRE DE 2002, EL TERMINO HABIL SEÑALADO POR
LA LEY EXPIRA EL 25 DE FEBRERO DE 2003.**

**NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de
publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el
examen de patentabilidad so pena de que la solicitud caiga en abandono, de
acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.**

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____ NO X _____

127

169

**SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISION DE NUEVAS CREACIONES**

2020

Bogotá, D.C.

Doctor

Emilio Ferrero
Apoderado

Oficio No. 1779

REFERENCIA: Radicación No. 00- 82960

**Trámite 002
Evento 001
Actuación 430
Folios 021**

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. DOCUMENTOS ESTUDIADOS.

- Capítulo descriptivo: folios 2 al 68
- Capítulo reivindicatorio: folios 69 al 81

Se acepta reivindicación de prioridad US 09/431.639 del 1 de Noviembre de 1999

2. OBJETO DE LA INVENCION.

Título: "Productos de masa del congelador al horno"

La invención se refiere a :

- Un producto de masa congelado no probado que comprende: a) Harina, agua y levadura b) Un sistema fermentador químico que comprende una pluralidad de ácidos de fermentación química que tienen diferentes rangos de temperatura dentro de los cuales ellos son activos como fermentadores químicos. El producto comprende una masa laminada, el sistema de fermentación química comprende por lo menos dos ácidos de fermentación química uno de ellos de actuación rápida (pirofosfato de sodio ácido) y el otro de actuación lenta (fosfato de sodio de aluminio). Las concentraciones de estos ácidos se encuentran en un rango comprendido entre 0.01% y 5.0% en peso. El producto de masa contiene un depresor del punto de congelamiento que es glicerol que se encuentra en una concentración comprendida en el rango entre 0.1% a 5 % en peso.
- Un producto de masa de tipo congelador al horno que comprende: a) harina, agua y levadura b) Un sistema fermentador químico que comprende una pluralidad de ácidos de fermentación que tienen diferentes rangos de temperatura dentro de los cuales ellos son activos como fermentadores químicos.

- El producto es una masa laminada. El sistema de fermentación química comprende por lo menos dos ácidos de fermentación química uno de ellos de actuación rápida (pirofosfato de sodio ácido) y el otro de actuación lenta (fosfato de sodio de aluminio). Las concentraciones de estos ácidos se encuentran en un rango comprendido entre 0.1% y 1.0% en peso. El producto de masa contiene un depresor del punto de congelamiento que es glicerol que se encuentra en una concentración comprendida en el rango entre 0.1% a 5 % en peso.
- Un producto de masa de congelador a horno que comprende harina, agua, levadura y un sistema de fermentación química que comprende una pluralidad de ácidos de fermentación química que tienen diferentes rangos de temperatura dentro de los cuales ellos son activos como fermentadores químicos y en donde en un primer estado el producto de masa es no probado y congelado y en un segundo estado el producto de masa es cocinado y tiene un volumen de por lo menos alrededor del 150 % del volumen del producto de masa cuando está en el primer estado y en donde el sistema fermentador químico causa un crecimiento controlado del producto de masa durante el ciclo de cocinado tal que el segundo estado del producto de masa puede lograrse sometiendo el producto de masa del primer estado a un ciclo de cocinado sin la intervención de deshielo y una etapa de prueba. El producto es una masa laminada. El sistema de fermentación química comprende por lo menos dos ácidos de fermentación química uno de ellos de actuación rápida (pirofosfato de sodio ácido) y el otro de actuación lenta (fosfato de sodio de aluminio). Las concentraciones de estos ácidos se encuentran en un rango comprendido entre 0.1% y 1.0% en peso. El producto de masa contiene un depresor del punto de congelamiento que es glicerol que se encuentra en una concentración comprendida en el rango entre 0.1% a 5 % en peso.
- Un método para preparar un producto de masa cocinado no probado comprende: a) Preparar un producto de masa no probado que comprende harina, agua, levadura y un sistema de fermentación química que comprende una pluralidad de ácidos de fermentación química que tienen diferentes rangos de temperatura dentro de los cuales ellos son activos como fermentadores químicos. b) Congelar el producto de masa no probado c) cocinar el producto de masa no probado en donde el sistema de fermentación química causa un crecimiento controlado del producto de masa. Antes de congelar el producto se prepara una lámina de masa en forma de tapete de masa con un espesor de 5 mm a cerca de 10 mm. La etapa de cocinado comprende hornear el producto de masa en un horno convencional, de convección o en horno microondas. Con este método se el producto de masa cocinado tiene un volumen que es de por lo menos 150% del volumen del producto de masa no probado. Con este método el producto de masa cocinado tiene un volumen que esta en por lo menos 250% del volumen del producto de masa no probado.
- Un método para preparar un producto de masa congelado no probado que comprende: a) preparar un producto de masa no probado que comprende harina, agua, levadura y un sistema de fermentación químico, b) congelar el producto de masa no probado. Este método también comprende la etapa de formar un laminado de la masa en forma de tapete de masa con un espesor de 5 mm a alrededor de 10 mm. Esta etapa del proceso se lleva a cabo antes de congelar el producto de masa.

3. CLARIDAD DE LA SOLICITUD.

De acuerdo a la Decisión 486 de la Comisión de la Comunidad Andina en su Artículo 30.- *"Las reivindicaciones definirán la materia que se desea proteger mediante la patente. Deben ser claras y concisas y estar enteramente sustentadas por la descripción"*; se hacen las siguientes observaciones al capítulo reivindicatorio:

La reivindicación independiente 1 describe un producto de masa congelado no probado, en esta reivindicación se debe indicar el o los tipo(s) de harina utilizados para realizar la preparación del producto y las proporciones en las que se encuentran los ingredientes principales o un rango entre los cuales se encuentren.

Las reivindicaciones 3 a 7 definen las condiciones del sistema fermentador químico el cual es uno de los componentes principales del producto de masa congelado no probado. Tal como aparece la descripción del sistema fermentador químico, en la reivindicación 1 numeral (b); se presenta de una forma muy general ya que se limita a definir el sistema como un conjunto de ácidos de fermentación química lo que le resta claridad y concisión a la reivindicación por lo tanto se sugiere tener en cuenta las condiciones especificadas en las reivindicaciones 3 a 7 y presentarlas en la reivindicación 1 para lograr claridad en la definición del sistema fermentador químico.

Otro de los componentes que forma parte del producto de masa congelado no probado es un depresor de punto de congelamiento el cual se presenta en la reivindicación 8 y es definido por las reivindicaciones 9 a 11. Las condiciones presentadas en estas últimas reivindicaciones se sugiere incluirlas en la reivindicación dependiente 8 para evitar la forma generalizada en la cual esta presentada esta última reivindicación.

En la reivindicación 12 se presenta un producto de masa de tipo congelador al horno y se encuentra definido de la misma forma que el producto anterior, por lo tanto se sugiere incluir las condiciones descritas en las reivindicaciones dependientes 13 a 20; para obtener mayor claridad en las reivindicaciones en las que definen el producto de masa tipo congelador al horno.

Tal como se presentan en la solicitud las reivindicaciones independientes 1 y 12 (y sus correspondientes reivindicaciones dependientes), no es clara la diferencia que existe entre el producto de masa congelado no probado y el producto de masa tipo congelador al horno; ya que se están definiendo exactamente igual.

La reivindicación 21 presenta un producto de masa de congelador al horno el cual en un primer estado el producto de masa es no probado y congelado y en un segundo estado el producto de masa es cocinado. A lo largo de esta reivindicación se están presentando características propias del proceso por el cual se obtiene el producto de masa lo cual no es correcto ya que los productos se definen en términos de sus características y los procedimientos se definen en términos de sus etapas y condiciones de las mismas. De otra parte las reivindicaciones dependientes 22 a 29 presentan características propias del producto de masa no probado y congelado, si en la reivindicación independiente 21 se enuncia que el producto en un primer estado es un producto de masa no probado y congelado. Dichas reivindicaciones dependientes no deberían presentarse en la solicitud ya esas condiciones se encuentran referidas en las reivindicaciones dependientes del producto de masa de congelador al horno.

En la reivindicación 30 se presenta un método para preparar un producto de masa cocinado no probado, en esta reivindicación en el numeral (a) presenta la preparación del producto de masa no probado el cual está definido en términos de las características del producto pero no está definiendo las características propias de la etapa de preparación de dicho producto. En los numerales (b) y (c) de esta misma reivindicación se deben presentar las condiciones en las cuales se llevan a cabo estas etapas del proceso.

La reivindicación dependiente 31 presenta una etapa del proceso que consiste en formar un laminado de masa, dicha etapa es intermedia a las etapas (a) y (b) presentadas en la reivindicación independiente 30; por lo tanto esta etapa debe estar incluida en la reivindicación 30. Las reivindicaciones 32 y 33 están presentando características propias del producto intermedio formado pero no definen características del procedimiento este aspecto le resta claridad a la solicitud.

Las reivindicaciones 34 a 36 presentan otra etapa del procedimiento en la cual se realiza el horneado del producto de masa y según lo establecido en las reivindicaciones se puede realizar en cualquier tipo de horno; por lo tanto esta etapa debe estar incluida dentro de las etapas del método de la reivindicación 30. Las reivindicaciones 37 a 39 nuevamente hacen referencia al método pero se caracterizan las reivindicaciones por medio de características del producto obtenido.

En las reivindicaciones 40 a 43 que presentan un método para preparar un producto de masa congelado no probado se deben tener en cuenta las indicaciones presentadas anteriormente.

De otra parte no es claro en la solicitud el hecho de presentar dos procedimientos en uno de los cuales se muestra la preparación de un producto de masa congelado no probado y otro procedimiento para preparar un producto de masa cocinado no probado cuando un procedimiento incluye el otro ya que la única diferencia que se presenta es en la etapa de horneado del producto; por lo tanto se debe aclarar en este sentido el objeto y alcance de la solicitud.

Las reivindicaciones deben presentar el preámbulo y la parte característica para proporcionar mayor definición tanto del producto como del procedimiento y para que el objeto de la solicitud se diferencie del estado de la técnica.

Según las observaciones anteriormente realizadas, la solicitud no cumple con el artículo 30 de la Decisión 486 y se deben realizar los ajustes necesarios para continuar con el trámite correspondiente de la solicitud.

4. DETERMINACIÓN DEL ESTADO DE LA TÉCNICA

Según la definición dada en el art. 16.- "Una invención se considerará nueva cuando no está comprendida en el estado de la técnica.

El estado de la técnica comprenderá todo lo que haya sido accesible al público por una descripción escrita u oral, utilización, comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida.

Sólo para el efecto de la determinación de la novedad, también se considerará dentro del estado de la técnica, el contenido de una solicitud de patente en trámite ante la oficina nacional competente, cuya fecha de presentación o de prioridad fuese anterior a la fecha de presentación o de prioridad de la solicitud de patente que se estuviese examinando, siempre que dicho contenido esté incluido en la solicitud de fecha anterior cuando ella se publique o hubiese transcurrido el plazo previsto en el artículo 40.” , se realizó la búsqueda de anterioridades en los archivos con que cuenta esta Oficina y se encontraron los siguientes documentos relacionados con la materia de la presente solicitud:

Nº	DOCUMENTO	TITULO	FECHA DE PUBLICACION
D1	US 5,804,233	Ice resistant frozen dough and method of making	1998-09-08
D2	EP 0620974 A2	Just bake frozen dough	1994-10-26
D3	US 4,230,730	Leavening Acid Composition	1980-10-28

6. EVALUACIÓN DE LOS REQUISITOS DE PATENTABILIDAD

El artículo 14 de la Decisión 486 de la Comisión de la Comunidad Andina establece que: “Los Países Miembros otorgarán patentes para las invenciones, sean de producto o de procedimiento, en todos los campos de la tecnología , siempre que sean nuevas, tengan nivel inventivo y sean susceptibles de aplicación industrial.”

En cumplimiento del artículo 14 de la Decisión 486, se procedió a evaluar los requisitos de novedad, nivel inventivo y aplicación industrial con el fin de establecer la patentabilidad de la invención reivindicada en la solicitud en estudio.

6.1. Evaluación de NIVEL INVENTIVO

De acuerdo al **art. 18.-** “Se considerará que una invención tiene nivel inventivo si para una persona del oficio normalmente versada en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica”. se conceptua:

En la anterioridad D1 se presenta un método para preparar un producto de panadería horneado a partir de masa que ha sido sometida a congelamiento. El volumen específico que presenta el producto es el mismo que el presentado por un producto que no ha sido sometido a congelamiento. El método incluye la preparación de una masa que contiene harina, agua y suficiente gas para que aumente el tamaño del producto a la temperatura de almacenamiento; el aumento es aproximadamente de 1 a 2.5 cm³ por gramo. Este producto se almacena aun temperatura por lo menos de 7 C. Etanol, glicerol y otros alcoholes o polioles se adicionan a la masa en una rango de concentración comprendido entre el 1.5 a 2% por peso de la masa.

Los compuestos nombrados anteriormente solubilizan algunas proteínas creando espacios para que se aloje el dióxido de carbono el cual se mantiene por la reducción en la formación de hielo dentro de la masa cuando esta es almacenada a temperaturas por debajo de los 0 C. La masa incluye una concentración de agua alrededor del 25% en peso. Los alcoholes presentan una depresión del punto de congelamiento.

En este documento se encuentra la preparación de masa para la producción de productos de panadería que utiliza polioles como depresores del punto de congelamiento al igual que en la invención de la solicitud en la cual se utiliza glicerol con el mismo propósito.

En la anterioridad D2 se utilizan agentes químicos que actúan en la expansión de la masa de productos de panadería en los cuales se encuentran fosfato de sodio y aluminio, fosfato de calcio monohidratado, sulfato de aluminio y sodio , pirofosfato ácido de sodio , tartrato de potasio , fosfato dicálcico,; entre otros. El agente químico óptimo para la expansión de la masa de acuerdo a la invención presentada en el documento D2 es una mezcla de soda para hornear y fosfato de aluminio y sodio en una proporción de 1:1.1; con un rango de 1:1.1 a 1:1.3. Se prefiere un exceso en peso de fosfato de sodio y aluminio para lograr el efecto deseado.

En la anterioridad D3 se encontró una mezcla de fosfato de sodio y aluminio en combinación con una sal compuesta de pirofosfato ácido y un metal alcalino. Otro componente de la mezcla es bicarbonato de sodio el cual produce el dióxido de carbono. La proporción de la mezcla encontrada fue de 1:3:8.

En los documentos anteriormente presentados se encuentra el sistema fermentador y depresor del punto de congelación que se derivan tanto del proceso como del producto que son objeto de la presente solicitud por lo tanto la no cumple con lo establecido en el artículo 18 de la Decisión 486.

En conclusión los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

Nº	DOCUMENTO	REIVINDICACIONES AFECTADAS	REQUISITO QUE AFECTA
D1	US 5,804,233	1 a 43	NIVEL INVENTIVO
D2	EP 0620974 A2	1 a 43	NIVEL INVENTIVO
D3	US 4,230,730	1 a 43	NIVEL INVENTIVO

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de la notificación de la presente comunicación. **En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.**

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2,literal e), del capítulo quinto del título primero de la circular única No. 10 de 2001.

ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe de la División de Nuevas Creaciones.

El anterior requerimiento fue notificado por fijación en lista, de fecha 08 FEB. 2007

CONCEPTO TÉCNICO Nº 0147	EXAMINADOR TÉCNICO CÓDIGO 202064
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US005804233A

United States Patent [19]

Lonergan et al.

[11] Patent Number: **5,804,233**[45] Date of Patent: **Sep. 8, 1998**[54] **ICE RESISTANT FROZEN DOUGH, AND METHOD OF MAKING**[75] Inventors: **Dennis Lonergan, Medina; Michelle Larsen, Woodbury; RoseBud Sierzant, Minneapolis, all of Minn.**[73] Assignee: **The Pillsbury Company, Minneapolis, Minn.**[21] Appl. No.: **642,703**[22] Filed: **Jun. 3, 1996****Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 477,216, Jun. 7, 1995, Pat. No. 5,672,369.

[51] Int. Cl.⁶ **A21D 2/18; A21D 6/00; A21D 10/02**[52] U.S. Cl. **426/19; 426/128; 426/524; 426/549; 426/62**[58] Field of Search **426/19, 62, 524, 426/128, 549, 27**[56] **References Cited****U.S. PATENT DOCUMENTS**

3,208,855	9/1965	Enoch et al.	99/90
3,435,632	4/1969	Fallin	62/322
3,450,542	6/1969	Badran	99/154
3,894,155	7/1975	Ono et al.	426/25
4,335,584	6/1982	Lernuzaux	62/388
4,366,178	12/1982	Reynolds et al.	426/393
4,374,151	2/1983	Lindstrom et al.	429/19
4,381,315	4/1983	Yong et al.	426/94
4,414,228	11/1983	Larson et al.	426/19
4,526,801	7/1985	Atwell	426/128

4,550,026	10/1985	Ando	426/316
4,743,452	5/1988	Felske et al.	426/19
4,847,104	7/1989	Benjamin et al.	426/549
5,059,432	10/1991	Berkowitz et al.	429/19
5,094,859	3/1992	Sluimer	426/19
5,171,590	12/1992	Sluimer	429/19
5,314,702	5/1994	Lewandowski et al.	426/128
5,366,744	11/1994	Drummond et al.	426/128
5,451,417	9/1995	Frey et al.	426/524
5,672,369	9/1997	Longeron et al.	426/128

FOREIGN PATENT DOCUMENTS

0620974	10/1994	European Pat. Off.
2657827	6/1978	Germany

OTHER PUBLICATIONS

American Association of Cereal Chemists, Inc., Edited by: Kulp, Karel; Lorenz, Klaus; and Brummer, Juergen; *Frozen & Refrigerated Doughs and Batters*, 1995, pp. vii and viii; 123-125; 250-253; 279.

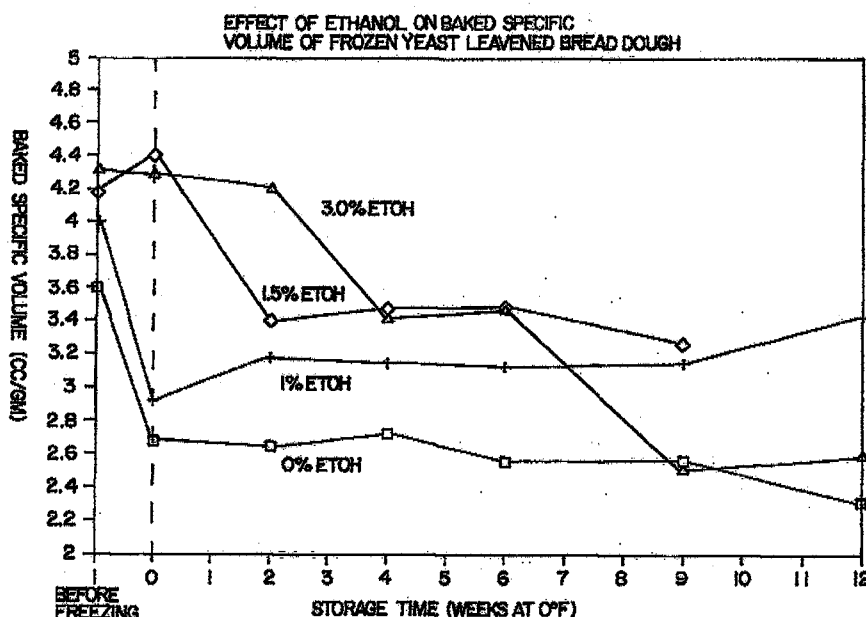
American Association of Cereal Chemists, Inc., Hosney, R. Carl; *Principles of Cereal Science and Technology, Section Edition*, 1986, 1994, pp. 267-268; 303-356; 374.

Primary Examiner—Helen Pratt

Attorney, Agent, or Firm—Aleya Rahman; Janal M. Kalis

[57] **ABSTRACT**

The present invention includes a method for making a bread dough that remains unfrozen at a temperature as low as 0 degrees Fahrenheit and that has a specific volume and flavor, when baked after storage at freezing temperatures, that is substantially the same as bread baked from a nonfrozen dough not subjected to storage. The present invention also includes a pre-proofed, uncooked dough that is provided with improved storage stability.

19 Claims, 9 Drawing Sheets

Exp-00-82960

ICE RESISTANT FROZEN DOUGH, AND METHOD OF MAKING

This application is a continuation-in-part of U.S. application Ser. No. 08/477,216 filed Jun. 7, 1995 now U.S. Pat. No. 5,672,369.

BACKGROUND OF THE INVENTION

The present invention relates to a method for making a dough that is substantially ice-free at a temperature as low as 0° F. (-18° C.) and a product baked from the dough. The present invention also relates to a method for making a dough storable at freezing temperatures that bakes to a bread having a specific volume that is about the same as a bread baked from a dough that has never been frozen.

In making bakery items, for example, bread, rolls, pastry, etc., a multi-step process is used. The process is labor and machinery-intensive and is also time consuming. Dough can be produced in one of several conventional manners, for example, by the sponge method or the straight-dough method. In the sponge method, yeast, yeast food, water, some flour, and sucrose are mixed and then held to allow the yeast time to begin fermentation and to produce carbon dioxide and ethanol. Thereafter, remaining flour, some additional water, and minor dry ingredients are mixed with the preceding blend to form the dough, after which the dough is processed, for example, by sheeting or other known processing techniques. After forming the dough into its final form, the dough is proofed and then subsequently cooked, for example, by baking or frying.

The sponge method of dough preparation is generally considered to be better because this method makes a dough of better flavor and is considered a "standard" dough-making procedure. However, the sponge method takes longer than other dough-making procedures. The entire process, including proofing, can take up to eight hours.

Another dough manufacturing process is a straight-dough process. The straight-dough process includes a step of mixing all of the flour, minor dry ingredients, water, yeast food and yeast. The dough is mixed and fermented for zero to sixty minutes, readied for forming, cut and formed into an appropriate shape and then proofed. One advantage of the straight-dough method is that it is quicker than the sponge method and requires less equipment. It generally does not make a bread of the same flavor and generally does not provide the same quality as bread made by the sponge method. Even though the straight-dough method is quicker than the sponge method, this method can take up to four hours to complete sufficient proofing.

A third process of manufacturing dough is a continuous process. Typically, a pre-ferment, comprising a fermented slurry of yeast, water, yeast food and some sugar and flour is combined with remaining dough ingredients, continuously mixed, cut into the appropriate size and shape and proofed. This particular method of dough manufacture is infrequently used because it is considered by the industry to produce a low quality, low-flavor baked product and is equipment intensive.

The above processes have been used for a number of years, both in industry and in the home in simplified forms. As described, the processes are equipment and time intensive. There has been a recent interest in providing fresh-baked products to consumers, as is evidenced by an increased number of in-store bakeries. These bakeries provide fresher products than those delivered from a plant to the store. The time and equipment necessary to produce such

products on site is somewhat prohibitive, however. It would, therefore, be desirable to eliminate the dough preparation and final proofing steps at the store, leaving it to the bakery to merely bake or otherwise cook the product.

Frozen doughs made by the methods described have become increasingly popular for consumers over the past decade. This popularity is related to improvements in organoleptic properties of breads made with frozen dough. These improvements are due, in part, to retention of yeast viability and retention of gassing power during a frozen storage of a dough.

There remain, however, areas where improvements have not been forthcoming. One of these areas relates to a reduction in stability of a dough matrix after freezing and thawing the dough. This reduction in stability typically produces a baked bread product having a specific volume that is less than a bread made with non-frozen dough. This bread with reduced specific volume has a "doughy" flavor and mouthfeel. Baked bread quality, exhibited by features such as texture, consistency and specific volume, deteriorates because of the shipping and storage conditions, particularly freeze-thaw cycles of the frozen dough.

One attempt to solve problems with frozen bread doughs is described in U.S. Pat. No. 4,374,151. This patent relates to a use of a melting point depressant in a frozen, pre-proofed, uncooked bread dough. The expressed function of the melting point depressant in the frozen dough is to permit the dough to quickly soften in the oven as the temperature rises, permitting better oven spring during cooking. One of the described melting point depressants was ethanol.

Another patent addressing frozen dough problems is European Patent Application 84308045.8, filed Nov. 20, 1984. This Application relates to a method for producing yeast-leavened frozen pastry products which can be removed from the freezer and baked without the necessity of having to undergo further proofing or leavening. To eliminate the need for a lengthy thawing and proofing step prior to baking, the Patent Application described a slow freezing step.

SUMMARY OF THE INVENTION

The present invention includes a method for making a baked bread from a dough subjected to freezing temperatures. The baked bread has a specific volume substantially the same as bread made from a dough not subjected to freezing temperatures. The method includes preparing a dough containing at least flour and water and sufficient leavening gas to provide a specific volume at storage temperatures in excess of between about 1 to 2.5 cc per gram. The product is stored at a temperature that is less than about 45° F. (7° C.). Ethanol, glycerol or other alcohols or polyols are added to the dough in amounts that range from about 1.5% to about 2% by weight of the dough. The dough is stored in a container. The container has a volume at least equal to the volume of the dough product. The container volume, in excess of the dough product, contains about 95% by volume of carbon dioxide gas.

The present invention also includes a system of maximizing specific volume in a bread baked from dough subjected to freezing temperatures. The dough has a matrix of gas cells defined by the dough. The system includes a dough that includes a water component. The dough also includes a quantity of ethanol, glycerol or other alcohol or polyol in a concentration effective to partially swell and/or solubilize proteins within the dough defining the gas cells. These swollen and solubilized proteins are believed to promote

expansion of the gas cells. Because the partial pressure of carbon dioxide in the air cells of the dough is typically greater than the partial pressure of carbon dioxide outside the dough, carbon dioxide has a tendency to migrate from within the dough to outside the dough. In addition, since carbon dioxide is also soluble in the aqueous phase of the dough, when the water in the dough freezes, carbon dioxide escapes from the dough since carbon dioxide is not soluble in ice. To counteract these effects, carbon dioxide is provided in the container in a quantity effective to minimize an escape of carbon dioxide from the dough.

The present invention also includes a method for substantially preventing a formation of ice crystals in bread dough when the dough is stored at temperatures as low as 0° F. while maintaining a specific volume and flavor, when baked, that is at least as acceptable as a conventional leavened bread baked from a dough that has not been frozen. The method includes preparing a dough with a hydrophobic plasticizer. Solutes having colligative freezing point depressant effects such as sucrose, ethanol, and and solutes having non-colligative freezing point depressant effects, such as maltodextrin are added to the dough in concentrations up to three times greater than concentrations in doughs not subjected to freezing temperatures. The dough is stored in an atmosphere enriched in carbon dioxide at a temperature as low as about 0° F. (-18° C.).

The present invention also includes a dough product that is resistant to ice crystal formation at a temperature as low as 0° F. (-18° C.). The dough product includes a hydrophobic plasticizer and a sucrose concentration that is up to three times greater than the concentration in conventional dough.

The present invention further includes a kit that includes the dough of the present invention and a container wherein the dough is stored at a temperature as low as 0° F. in the container under an atmosphere that is substantially carbon dioxide.

DESCRIPTION OF DRAWINGS

FIG. 1 is a graph showing functional relationships between baked specific volume of bread and storage times of dough having different levels of ethanol.

FIG. 2 is a graph showing functional relationships between baked specific volume of bread and storage times of dough having different levels of ethanol and with a package being flushed with a gas containing 99% carbon dioxide.

FIG. 3 is a graph showing functional relationships between baked specific volume of bread and storage times of dough having different levels of ethanol and carbon dioxide.

FIG. 4 is a graph showing functional relationships between baked specific volume and proofed specific volume for doughs containing 1.5 weight % ethanol and frozen in environments containing air or carbon dioxide.

FIG. 5 is a graph showing functional relationships among baked specific volumes for products stored in containers having different carbon dioxide levels with the products each having 1.5% added ethanol.

FIG. 6 is a graph showing functional relationships between baked specific volume and storage time with the gaseous environment containing different gases.

FIG. 7 is a graph showing functional relationships between baked specific volume and storage times for chemically leavened croissants with the gaseous environment being carbon dioxide or air.

FIG. 8 is a graphical illustration of a synergistic effect of a combination of ethanol or glycerol added to bread dough

and carbon dioxide on specific volume of baked bread made from the dough.

FIG. 9 illustrates a graphical view of a baked specific volume for the ice-resistant dough of the present invention as compared to the baked specific volume of an unfrozen dough.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention includes a method for making dough that can be stored at freezing temperatures, and which, when baked, provides a baked product having organoleptic qualities similar to a product baked from a dough that has not been subjected to freezing temperatures. This desirable outcome is accomplished by sustaining an amount of carbon dioxide that is present in the dough throughout the proofing, freezing and storing of the dough. The method comprises providing a system which stabilizes and protects the gas cells that are formed when the dough is mixed and proofed. By strengthening and protecting these gas cells, the carbon dioxide generated in the dough remains within these cells, providing desired final baked product qualities.

The method of the present invention stabilizes and enhances gas cell structure of the dough by a use of alcohol or other polyol to solubilize proteins within the dough. The solubilized proteins provide strength to the gas cell walls while permitting the gas cells to expand, thereby enhancing carbon dioxide retention within the dough matrix. The enhanced expandability of the gas cells in the dough also enhances the ability of the gas cells to expand during baking, resulting in a product having a desirable specific volume. The method further stabilizes carbon dioxide retention within the dough upon freezing, by packaging the dough in a carbon dioxide environment.

The concentration of carbon dioxide present in the cell matrix of the dough is additionally maintained by substantially reducing a formation of ice within the dough, even when the dough is stored at temperatures below 0° C. Typically, formation of ice upon freezing a dough adversely affects the dough matrix and its carbon dioxide content in several ways. First, ice crystals cause structural damage to the dough matrix by physically rupturing the gas cells present near an ice crystal. Second, carbon dioxide is not soluble in ice, so when water in the dough freezes, the carbon dioxide dissolved in the water escapes from the dough. Another way in which ice formation adversely affects the dough is by dehydrating the dough. Ice crystals can form inside an air cell in the dough through vapor phase deposition as the temperature of the dough decreases during freezing. These ice crystals within the air cells deplete the dough of water. Upon thawing and/or baking, the air cell ice crystals melt, but the water does not reabsorb back into the dough. The result is, in effect, a dough with a lower water content. As described in U.S. Pat. No. 4,374,151, doughs with reduced water contents do not provide as desirable baked specific volumes because the reduced water containing dough is stiffer and less extensible.

The method of the present invention reduces the deleterious effects of ice by substantially reducing ice formation within the dough. Because ice crystal formation is greatly reduced, gas cells are less likely to rupture and lose carbon dioxide trapped in the cell. Furthermore, the carbon dioxide which may be solubilized in the aqueous phase of the dough remains dissolved in the dough and is not released by the dough. This feature is enhanced by the carbon dioxide environment in which the dough is packaged. Additionally,

19



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84 Just bake frozen dough.

57 The invention concerns a frozen dough which does not need to be thawed and proofed prior to baking, which includes a specific leavening system consisting of sodium or potassium hydrogencarbonate and a leavening acid wherein sodium or potassium hydrogencarbonate is present in the amount of from 3.2% to 3.7% and the leavening acid is present in such an amount as to completely neutralize the hydrogencarbonate.

EP 0 620 974 A2

Exp. 00-82960

FIELD OF THE INVENTION:

The invention relates to a frozen dough and processes of preparing baked products from the frozen dough.

BACKGROUND OF THE INVENTION:

A great variety of frozen dough products have been offered to a consumer in order to minimize the time and the effort of baking the products from "scratch" and to provide the convenience of extended storage time. Commercially available frozen dough products must be "proofed" prior to baking. "Proofing" is the time required for yeast in a dough to produce sufficient amount of carbon dioxide gas to give correct height, volume, and structure in a baked product. Generally, an end user of a frozen dough product is inconvenienced by the need to thaw and proof the product prior to baking. The time required for thawing and proofing is at least 2-4 hours.

Use of chemical leavening agents in place of yeast obviates the need for proofing, but it detracts from the texture, flavor, and structure associated with proofed dough products. An illustrative example is provided by a comparison of a biscuit or Irish soda bread (chemically leavened; unproofed) with a bread loaf, a dinner roll, or a bread stick (yeast leavened; proofed). Proofed products are lighter, less dense, less chewy, more porous, more aerated than chemically leavened unproofed products. With regard to flavor and aroma, it has been found as part of the present invention that mere addition of a yeast flavor compound to a chemically leavened product does not attain the flavor and aroma of a proofed product.

In some processes described in the art, proofing is carried out (at least to some extent) by a manufacturer of frozen dough products, prior to freezing, so as to minimize or eliminate the need for proofing by the end user. See for example U.S. Patents 4,847,104 and 4,966,778 to Benjamin et al. The resultant dough is termed "pre-proofed" frozen dough. A serious drawback of these processes is that they call for special expensive ingredients, e.g. flour containing more than 16% protein. Even more importantly, such processes, at best, shift the burden of proofing from the end user to the manufacturer, increasing production time and cost and, ultimately, increasing cost to consumer. A frozen dough is desirable which does not need to be proofed by either the end user prior to baking or by the manufacturer prior to freezing, yet when baked is substantially similar to a proofed product in texture, flavor, structure, and aroma.

Accordingly, it is an object of the present invention to produce a frozen dough product which does not need to be proofed prior to baking.

It is another object of the present invention to provide a frozen dough which does not need to be proofed yet when baked is substantially similar to a proofed baked product with regard to its flavor, volume, texture, structure, and aroma.

It is still another object of the invention to provide a baked product which is chemically leavened (and thus does not require proofing) yet is substantially similar in appearance, aroma, flavor, and texture to a proofed baked product.

It is yet another object of the invention to provide a process of preparing a baked product from a frozen dough wherein the process does not include thawing or proofing steps.

The above objects are accomplished by the present invention which includes a "just bake" frozen dough containing:

(a) yeast at a level of from 2% to 20%; and

(b) a chemical leavening agent consisting of sodium or potassium hydrogencarbonate and a leavening acid, wherein the hydrogencarbonate is employed in the amount of from 2.5 to 4% and the leavening acid is present in the amount sufficient to completely neutralize the hydrogencarbonate.

The term "just bake" (which is a registered trademark of Van den Bergh Foods Co.) as used herein means that the frozen dough of the invention may be taken out of the freezer and baked, without thawing and/or proofing, to obtain a baked product which is substantially similar in appearance, texture, structure, flavor, and aroma to a baked product which was proofed. The consumer needs only to transfer the frozen product from a freezer to a heated oven. The manufacturer does not need to carry out the proofing either. Yet the baked product obtained from the frozen dough of the invention substantially resembles a proofed baked product in appearance, taste and smell. Any product that is usually yeast raised may be prepared from the frozen dough of the invention which does not need to be raised (i.e. proofed) prior to baking. Traditional proofed products include bread loaves, rolls (e.g. dinner rolls or sandwich rolls, or cinnamon rolls) and bread sticks, and the frozen dough of the invention is particularly suitable for the preparation of such products.

The invention also includes a process of preparing a baked product substantially similar to a proofed baked product which process is carried out in the absence of a proofing step.

All weight percentages, unless indicated otherwise, are by weight of flour contained in the raw dough prior to freezing. All ratios are by weight of the ingredients.

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DETAILED DESCRIPTION:

The frozen dough according to the invention contains as a first essential ingredient a chemical leavening agent.

10 According to the invention, the term "chemical leavening agent" means a mixture of sodium or potassium hydrogencarbonate with one or more leavening acids. Examples of suitable leavening acids include but are not limited to sodium aluminum phosphate, monocalcium phosphate monohydrate, sodium aluminum sulfate, sodium acid pyrophosphate, dicalcium phosphate, glucono delta lactone, and potassium hydrogen tartrate, and mixtures thereof. One or more leavening acids may be combined with sodium or
15 potassium hydrogencarbonate to form the chemical leavening agent included in the invention. In order to provide sufficient volume in a baked product, yet avoid alkaline or acidic taste, preferred chemical leavening agent according to the present invention is a mixture of baking soda (sodium hydrogencarbonate) with sodium aluminum phosphate. The optimum chemical leavening agent according to the invention contains a mixture of baking soda and sodium aluminum phosphate in a weight ratio of at least 1:1.1; typically, the
20 ratio is in the range of from 1:1.1 to 1:1.3. In other words, an excess by weight of sodium aluminum phosphate is employed.

It should be understood that the ratio of baking soda to a leavening acid depends on the particular leavening acid employed, but in any event the amount of leavening acid is such that hydrogencarbonate is completely neutralized. The hydrogencarbonate is included in the inventive dough in the amount of from
25 2.5% to 4%, preferably in the amount of from 3.2% to 3.7% in order to optimize the volume of the product yet avoid alkaline taste.

The frozen dough of the invention includes yeast as a second essential ingredient. Although not wishing to be bound by this theory, it is believed that yeast in the inventive dough does not act as a leavening agent (since the dough does not have to be proofed prior to baking); rather, yeast is added in order to
30 impart to a baked product prepared from the inventive dough the flavor and aroma of a proofed baked product. The frozen dough according to the invention includes yeast at levels typical or greater than those found in yeast-leavened frozen doughs, i.e. 2% to 20%, preferably 4% to 18%. This combination of a full level of yeast and a full level of chemical leavening is key to obtaining the required product quality with regard to taste, flavor and appearance. Traditional frozen dough for preparation of proofed products does
35 not include chemical leavening at levels employed herein; the traditional dough either omits chemical leavening or includes very small amounts of chemical leavening. Yeast included in the inventive dough may be compressed yeast, instant dry yeast, active dry yeast, frozen yeast. Preferred yeast according to the invention is compressed yeast which was found to result in improved stability of frozen dough. The dough according to the invention includes flour, water, and fat in effective amounts to prepare the dough. The flour
40 in the present invention may be any finely comminuted meal of any cereal grain or edible seed or mixtures as are typically used in baking. Examples of suitable flours are wheat flour, barley flour, rye flour. Wheat flours are most typically used in baking. Preferred flour used in the preparation of inventive dough is bread flour. Bread flour is a milled, enriched blend of select hard red spring wheats, which generally contains in excess of 10.5% protein and is obtained from straight or long patent flours.

45 Bread flour has high absorption and good mixing tolerance. Preferably in order to obtain improved structure in a baked product, the inventive dough includes at least 15%, by weight of total flour, of high gluten flour. The term "high gluten" as used herein means long patent flour made from high protein (i.e. greater than 11% protein, preferably 13.5-15% protein). The most preferred high gluten flour included in the inventive dough is long patent flour made from high (13.8-14.2%) protein hard spring wheat. Preferred
50 amount of high gluten flour is from 15% to 30%, preferably in order to optimize structure yet avoid excessive cost the amount is from 20% to 30%.

Water is added to flour and fat in order to prepare the dough. The precise amount of water depends on the type of yeast included. Typically, from 40% to 75% of water is employed, preferably from 45% to 65%. Using less than 40% of water will result in poor processing (tearing/breaking) and an excessively dry baked
55 product. Using more than 75% of water will result in excessively sticky dough and a gummy baked product.

The dough of the invention includes an effective amount of fat. "Fat" and "shortening" are used interchangeably herein. Shortening may be any oil or higher melting fat which is suitable for use in baked products. Shortenings contribute flavor and texture to the baked goods. Butter and/or margarine is suitable

United States Patent [19]

Lauck

[11] 4,230,730

[45] Oct. 28, 1980

[54] LEAVENING ACID COMPOSITION

[75] Inventor: Robert M. Lauck, New City, N.Y.

[73] Assignee: Stauffer Chemical Company,
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[63] Continuation of Ser. No. 741,265, Nov. 12, 1976, abandoned.

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[56] References Cited

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2,550,491	4/1951	McDonald	426/551
3,205,073	9/1965	Blanch et al.	426/653
3,297,449	1/1967	Baker et al.	426/551
3,311,448	3/1967	Blanch et al.	423/306
3,411,872	11/1968	Post et al.	423/306
3,501,314	3/1970	Kichline et al.	426/653 X

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[57] ABSTRACT

A new leavening acid composition is provided comprising a potassium modified 1:3:8 sodium aluminum phosphate, the calcium modified derivatives or mixtures thereof in combination with an alkali metal acid pyrophosphate such as sodium acid pyrophosphate. The leavening action of the combination in biscuits using a slow sodium acid pyrophosphate is slower than the action of either ingredient alone. The compositions are useful in leavening baked goods and especially refrigerated canned biscuits.

11 Claims, No Drawings

Exp-00-82960

LEAVENING ACID COMPOSITION

This is a continuation of application Ser. No. 741,265 filed Nov. 12, 1976 now abandoned.

The present invention relates to an improved leavening acid system for use in baked goods and particularly for use in refrigerated canned dough compositions.

BACKGROUND OF THE PRESENT INVENTION

Refrigerated canned doughs are generally compositions packaged in foil surfaced fiber containers having vent holes or other means to allow gas to escape therefrom (U.S. Pat. Nos. 1,811,772 and 2,478,618). As the dough is proofed in the container, carbon dioxide is generated from the leavening system which expands the dough in the container and drives out the oxygen. The expanded dough seals the container. An internal gas pressure is required to maintain the seal and to keep the oxygen out of the container. The gas pressure must remain after refrigeration to maintain the seal. Failure to maintain the pressure will cause the dough to spoil due to bacteriological action which can spoil the biscuits and, in some instances, cause excessive gas pressure to be generated sufficient to cause the containers to rupture. The dough must also retain sufficient leavening to allow the product to rise when baked.

The leavening systems used in refrigerated canned doughs must be specifically adapted to satisfy certain criteria. The leavening system must develop gas at a slow enough rate initially to allow for mixing and handling. If too much gas is released during mixing, not enough will remain for sealing of the container (proofing). If a large amount of gas is generated after mixing but before the dough is placed in the can, the dough can puff causing problems in putting the proper dough weight into the container. After proofing, the containers must retain the internal pressure. Some leavening systems have been known to not maintain the pressure within the container upon refrigeration. In essence, the leavening system must provide the right amount of gas at various times from mixing to final baking.

Sodium acid pyrophosphate (hereinafter SAPP) has been found to be especially well suited to the needs of preleavened packaged doughs and is widely used for that purpose. The addition of minor amounts of K^+ , Ca^{++} , and Al^{+++} to the SAPP during manufacture permits the controlled retardation of the rate of reaction of the SAPP with the sodium bicarbonate in the baking system (Phosphorus, A.D.F. Toy, Comprehensive Inorganic Chemistry, Vol. 2, Chapter 20, 1973). A SAPP/bicarbonate leavening system fulfills the gas generation requirements for canned doughs.

However, the so-called "pyro" taste generally is considered objectionable.

The so-called "pyro" taste has been described as (1) a sensation that there is a coating on the roof of the mouth, (2) an astringent aftertaste and (3) a dry feeling that persists on the teeth for several minutes. It would be desirable to reduce the quantity of "pyro" used while maintaining the good properties which the pyrophosphate provides.

Also, the sodium acid pyrophosphate is only sufficiently slow for use in preparing refrigerated doughs if a mixing temperature about 18° – 21° C. (65° – 70° F.) is maintained in the mixing bowl. This is accomplished by pumping a refrigerated liquid through a jacketed mixing

bowl. Avoidance of the requirement would be a desirable improvement.

Another well known leavening agent in the baking industry is sodium aluminum phosphate (hereafter SALP). It finds use in baking powders, self-rising mixes, preleavened pancake flours and mixes, prepared biscuit mixes, and prepared cake mixes. (See U.S. Pat. Nos. 2,550,491, 3,109,738, 3,041,177, 3,096,178).

Crystalline sodium aluminum phosphate (or SALP) was first disclosed in the U.S. Pat. No. 2,550,490, and an early baking powder composition incorporating SALP was disclosed in U.S. Pat. No. 2,550,491. U.S. Pat. No. 2,550,490 specifically discloses a SALP with a $Na:Al:PO_4$ mole ratio of 1:3:8 (hereinafter 1:3:8 SALP). Since that time, several modifications of sodium aluminum phosphate have been developed which give different reactivities and performance characteristics. These include a dehydrated SALP, U.S. Pat. No. 2,957,750; a 3:3:8 SALP, U.S. Pat. No. 3,223,479; a 3:2:8 SALP U.S. Pat. No. 3,501,314, a 2:3:6 SALP, U.S. Pat. No. 3,574,536; an amorphous SALP, U.S. Pat. No. 2,995,421; a 3:3:9 SALP, U.S. Pat. No. 3,726,962 and a continuous crystallization of SALP, U.S. Pat. No. 3,311,448. The SALP's of commerce include 1:3:8 SALP and 3:2:8 SALP.

Several proposals have been made in the past for improving the properties of sodium aluminum phosphate, particularly the flow characteristics and dust properties.

In U.S. Pat. No. 3,205,073 to Blanch et al. there is provided a potassium modified sodium aluminum acid phosphate having decreased hygroscopicity. This result is accomplished by modifying the original sodium aluminum phosphate molecule before, during or after preparation with the introduction of potassium. The potassium is explained as replacing hydrogen atoms in the crystalline lattice of sodium aluminum phosphate. For example, in Example 8, Blanch et al. disclose the preparation of potassium modified sodium aluminum phosphate by reacting potassium hydroxide along with phosphoric acid and soda ash. An improvement over U.S. Pat. No. 3,205,073 is U.S. Pat. No. 3,411,872 to Post et al. which attempts to improve the flow characteristics of Blanch et al.'s potassium modified sodium aluminum phosphate by incorporating the potassium ions in a solvent suspension of an alkanol.

A further improvement in SALP is disclosed in U.S. application Ser. No. 671,769, filed Mar. 30, 1976 to R. Benjamin et al. In that application, a specific ratio of sodium and potassium is used to prepare a potassium modified SALP. The improved SALP product is characterized by increased density and reducing dusting properties. A calcium treated SALP having improved handling characteristics and useful as a leavening agent in moist doughs and liquid batters is disclosed in U.S. Application Ser. No. 703,872, filed July 9, 1976 to Benjamin et al. The calcium treated SALP can be prepared by contacting a slurry of SALP or potassium treated SALP with a calcium compound followed by granulating the calcium treated product while drying such that a majority of the granulated particles are less than 840 micron (through 20 mesh) and at least 90% less than 2000 micron. There is provided granulated complex aluminum phosphate granules with at least a calcium rich outer surface. These products, as leavening acids, show improved holding and storage characteristics in moist doughs and liquid batters.

While 1:3:8 SALP is a well known leavening acid with no flavor problems, the use of 1:3:8 SALP in canned biscuits to replace the SAPP to overcome the flavor problem has not been successful. 1:3:8 SALP has been considered "too fast" for canned doughs. Under normal processing conditions, the use of 1:3:8 SALP leads to failure due to the bursting of cans caused by bacterial growth. Proper internal pressure cannot be maintained after refrigeration. SALP (slow acting) or 3:2:8 SALP, has been used in combination with SAPP at a 25/75 percent ratio of a refrigerated dough containing large amounts of solid shortening (U.S. Pat. No. 3,879,563). The biscuits are taught to be more of the homemade variety. Since the 3:2:8 SALP is slower acting than the other commercially available SALP, the 1:3:8 SALP, and since SAPP is known to be faster than either SALP, the combination of 3:2:8 SALP and SAPP does not provide teachings on how to overcome the problem of using 1:3:8 SALP in refrigerated canned doughs.

Potassium sorbate can also be added as a dough conditioner. The potassium sorbate apparently decreases mixing time and apparently increases the storage stability of the dough product (See U.S. Pat. No. 3,556,798).

It would be desirable to provide a leavening system which requires less SAPP. It would also be desirable to increase the effectiveness of 1:3:8 SALP as a leavening acid in refrigerated doughs.

BRIEF DESCRIPTION OF THE INVENTION

In accordance with the present invention, there is provided a new leavening acid composition which can be used in leavening canned refrigerated dough comprising a potassium modified 1:3:8 sodium aluminum phosphite or the calcium modified derivatives thereof or mixtures thereof in combination with an alkali metal acid pyrophosphate. Unexpectedly, this leavening acid in combination with sodium bicarbonate produced gas at a rate slower than at least the fastest ingredient and, in many cases, slower than either leavening acid ingredient separately. When using a slow sodium acid pyrophosphate, the combination meets the criteria for leavening acid for canned refrigerated doughs, namely low gas development upon mixing, ability to develop gas to seal the cans, and the ability to maintain pressure in the cans when refrigerated. This biscuit leavening acid combination is relatively insensitive to temperature and can be used at a dough temperature of up to about 26° C. (80° F.) thus eliminating the need for the extensive refrigeration of the mixing bowl as presently required. Since the leavening systems of the present invention provide a gas release rate which is slower than at least the fastest, and since 1:3:8 SALP and SAPP are available in various grades ranging from fast to slow, it is possible by the present invention to provide tailor-made leavening systems to satisfy the particular needs of a baking system.

DETAILED DESCRIPTION OF THE INVENTION

The alkali metal acid pyrophosphate used in the present invention can be either sodium or potassium acid pyrophosphate and mixtures thereof. The preferred pyrophosphate for use in the invention is sodium acid pyrophosphate, hereinafter SAPP, though this usage is not intended to be so limited but only for purposes of explanation.

SAPP is prepared by the controlled thermal decomposition of monosodium phosphate. By varying the conditions of humidity and temperature as well as the amount of cations added and the particle size during processing, SAPP's for varying reactivities can be prepared. Most of the commercially prepared SAPP's contain added minor amounts of K⁺, Ca⁺⁺, and Al⁺⁺⁺. These additives permit the controlled retardation of the rate of reaction of the SAPP with the sodium bicarbonate in the baking system. (See Phosphorus, A.D.F. Toy, *ibid*).

It is preferred for use in the present invention in canned refrigerated doughs to utilize a slow acting SAPP such as SAPP No. 4, available from Stauffer Chemical Company, Westport, Connecticut. By slow is meant evolving less than 30% by weight of the total CO₂ at two minutes and less than 35% CO₂ after ten minutes in a doughnut dough reaction rate test at 27° C. (81° F.). The doughnut dough reaction rate test is an analytical method used for reactivity studies of baking acids. The test procedure involves reacting the acid (SAPP) with sodium bicarbonate while the reactants are suspended in a moist doughnut dough at a temperature of 27° C. ± 0.5° C. The proportions of acid (SAPP) and bicarbonate employed are those which are capable of theoretically liberating 200 cc. of CO₂ gas at 0° C. The remainder of the ingredients are outlined in a paper on reaction rate testing which appeared in *Cereal Chemistry*, Vol. 8, American Association of Cereal Chemists, St. Paul, Min., 1931, pp. 423-33. Other uses in other baked goods may require a faster leavening rate. In those instances, a SAPP with a different reactivity can be used. Medium reactivity rate SAPP's are also known which evolve less than about 34% CO₂ at two minutes and 40% CO₂ at ten minutes. Any SAPP's with reaction rate above the medium are considered fast. The differentiation between slow, medium and fast is approximate. Variation in definition is possible depending on interpretation. The characterization is generally intended only as guidelines for the selection of the proper SAPP for the desired end result. By varying the rate of reactivity of the SAPP used, the leavening system of the present invention can be tailored to a desired use. Also, refrigeration can be used to slow down the rate of gas release allowing for the use of a slightly faster grade of SAPP.

It is also known that the rate of gas release of SAPP is dependent on the calcium present in the mix. If the milk is removed from the product being made, such as milkless biscuits, a SAPP with a slower rate of gas release must be used. Variance in results can be noted because of a variance in the calcium content. These factors are easily determined by one skilled in the art.

The potassium-modified SALP which is used in the composition of the present invention can be prepared by any of a number of prior art processes such as those mentioned hereinbefore. Illustrative of these are Blanch et al., U.S. Pat. No. 3,205,073 and Blanch et al., U.S. Pat. No. 3,311,448.

However, it is preferred to utilize the potassium modified 1:3:8 SALP prepared in accordance with the process outlined in the copending application to Benjamin et al., ser. No. 671,769, filed Mar. 30, 1976 now U.S. Pat. No. 4,054,678. In accordance with this process, food grade phosphoric acid having a concentration of about 85.0 to about 88.0 weight percent H₃PO₄ is contacted with a sufficient amount of potassium ion to provide an analysis of about 0.5 to about 1.2 weight percent K₂O in