

**Industria y Comercio**

SUPERINTENDENCIA

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

Rad: 00-084952- -00005-0000

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Fee: 2006-05-15 17:48:05 Dep: 2020 NUECREACIONES

Tra: 2 PATENTES

Eve: 1 REGISTRO

Act 328 COINFORMACION

Folios: 10

**FORMULARIO UNICO DE CORRECCIONES Y MODIFICACIONES
2000-F03**

1	SOLICITUD DE: ☐ Corrección de Error Material ☒ Modificación a una solicitud	
2 SOLICITANTE	Nombre: GENERAL MILLS MARKETING, INC Dirección: Number One General Mills Boulevard, P.O. Box 1113 Minneapolis, Minnesota. Estados Unidos de América Nacionalidad o Domicilio: Minneapolis, Minnesota Estados Unidos de América Lugar de Constitución: Estado de Delaware, Estados Unidos de América. Teléfono: 546 09 70 Fax: 547 31 70 E-mail: clientes@camyp.com	IDENTIFICACION C.C. ☐ NIT ☐ C.E. ☐ Otro ☐ Número: _____
3 REPRESENTANTE O APODERADO	Nombre: Emilio FERRERO Dirección: Carrera 4ª No. 72-35 Teléfono: 347 36 11 Fax: 211 86 50 E-mail: cavelier@cavelier.com	IDENTIFICACION C.C. ☒ NIT ☐ C.E. ☐ Otro ☐ Número: <u>438.019</u> TP <u>31.929</u>
4	Número de expediente: <u>00084952</u>	
5	Descripción de la corrección o modificación solicitada: Solicito inscribir el cambio de solicitante de la compañía THE PILLSBURY COMPANY a la compañía GENERAL MILLS MARKETING, INC y solicito que el trámite de la presente solicitud se haga a nombre de ésta última compañía.	
6	Comprobante de pago No. <u>06 - 32.727</u> Fecha: <u>3 de mayo de 2006</u>	
7	Anexos ☒ Comprobante de pago de la tasa por \$ 95.000 ☒ Poderes, si fuere el caso ☒ Documento que acredita la existencia y representación legal de las partes, cuando sean personas jurídicas.	
8	NOMBRE: EMILIO FERRERO	FIRMA: C.C. 438.019 de Usaquén T.P.A. 31.929

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5474

State of Minnesota

SECRETARY OF STATE

APOSTILLE
Convention de La Haye du October 5, 1961

1. Country: United States of America

This Public Document: Assignment with Representation and Power of Attorney

2. has been signed by: Brenda K. Popp

3. acting in the capacity of: Notary Public, State of Minnesota

4. bears the seal/stamp of: Brenda K. Popp, Notary Public, State of Minnesota

CERTIFIED

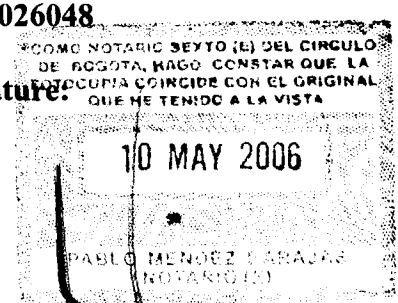
5. at: St. Paul, Minnesota

6. date: October 26, 2005

7. by: Secretary of State, State of Minnesota 8. T20051026048

9. Seal/Stamp:

10. Signature:



Mary Kiffmeyer
Secretary of State

Documento de Traspaso, Representación y Poder con autenticación notarial y Apostille para patentes, modelos de utilidad, diseños industriales, marcas de fábrica, nombres comerciales, enseñas, nombres de dominio, lemas comerciales registradas o pendientes de registro, licencias.

Assignment with Representation and Power- of- Attorney with notarial authentication and Apostille of granted or pending patents, utility models, industrial designs, trademarks, commercial names, trade emblems, domain names, slogans, licenses.

**DOCUMENTO DE TRASPASO,
REPRESENTACION Y PODER**

**ASSIGNMENT WITH REPRESENTATION AND
POWER OF ATTORNEY**

Yo, (nosotros), abajo firmado (s) THE PILLSBURY COMPANY

I (we), the undersigned THE PILLSBURY COMPANY

domiciliado (s) en 200 South Sixth Street, Minneapolis, Minnesota 55402-1464, Estados Unidos de América

of 200 South Sixth Street, Minneapolis, Minnesota 55402-1464, United States of America

aquí llamado (s) CEDENTE(s), propietario(s) de la(s) solicitudes de patente en Colombia como sigue: Expediente No. 00.082.960, correspondiente a "PRODUCTOS DE MASA DEL CONGELADOR AL HORNO; Expediente No. 00.069.322 correspondiente a "COMPOSICIÓN CONGELANTE; Expediente No. 00.084.952 correspondiente a "LLENANTES QUE CONTIENEN HUMEDAD NO BASADA EN EMULSION"

hereinafter the ASSIGNOR(s) owner of the patent applications in Colombia as follows: application No. 00.082.960, corresponding to "FREEZER TO OVEN DOUGH PRODUCTOS"; application No. 00.069.322 corresponding to "ICING COMPOSITION"; application No. 00.084.952 corresponding to "NON-EMULSION BASED, MOISTURE CONTAINING FILLINGS FOR DOUGH PRODUCTS"

declara(n) por el presente instrumento que cede(n) la(s) dicha (s) solicitudes de patente a GENERAL MILLS MARKETING, INC

declares by this document that assigns the mentioned patent applications to GENERAL MILLS MARKETING, INC.

sociedad organizada y existente bajo las leyes de

a corporation organized and existent under the laws of

domiciliada en Number One General Mills Boulevard, P.O. Box 1113, Minneapolis, MN 55440 Estados Unidos de América

and domiciled in Number One General Mills Boulevard, P.O. Box 1113, Minneapolis, MN 55440 United States of America

Y (si llamada la CESIONARIA). Por el presente acto, la CESIONARIA acepta dicho traspaso y nombra a EMILIO FERRERO, tpa. 31929; GONZALO PERDOMO, tpa. 831; LUZ CLEMENCIA DE PAEZ, tpa. 23555 y GERMAN CAVELIER, tpa. 832, domiciliados en la Carrera 4ª N° 72-35, Bogotá, Colombia, en obediencia a lo dispuesto en el parágrafo 1o del Artículo 543 del Código de Comercio, el primero como principal y los demás como suplentes, en su orden, como mis (nuestros) representantes en todos los asuntos de propiedad industrial con facultad para recibir notificaciones y nombrar apoderados judiciales o extrajudiciales. El primer representante suplente reemplazará al principal en caso de ausencia o impedimento temporal o definitivo de aquél. La misma regla se aplicará cuando el segundo representante suplente haya de reemplazar al primero, o el tercero al segundo. En tales casos, el representante principal, o el primero, o segundo suplente, en su caso, o ambos, declararán su intención de no ejercer la representación mediante declaración autenticada por Notario Público en Colombia, o por Notario u otro Funcionario Público, o Cónsul de Colombia, en el extranjero; y si se tratare de impedimento, con el certificado respectivo. Si alguno de los nombrados faltare definitivamente, el siguiente tomará su lugar. Cuando cesare la ausencia o impedimento del representante principal, o de su primero o segundo suplentes, en su caso, podrán ejercer la representación, en su orden, uno u otros según el caso, asumiéndola por el solo hecho de ejercerla, cesando en ese momento el ejercicio de la representación por el primero, segundo o tercer suplente en su caso.

(which in this document will be called the ASSIGNEE). The ASSIGNEE accepts the said assignment and in compliance with the terms of paragraph 1st. of Article 543 of the Commercial Code, do hereby appoint EMILIO FERRERO, tpa. 31929; GONZALO PERDOMO, tpa. 831; LUZ CLEMENCIA DE PAEZ, tpa. 23555 and GERMAN CAVELIER, tpa. 832, domiciled at Carrera 4ª N° 72-35, Bogotá, Colombia, the first as principal and the others as alternates, in the order of their appointment, as our representatives for all industrial property matters with faculty to receive notifications and to appoint attorneys in and out of Court. The first alternate shall replace the principal in case of his absence or of temporal or definitive impediment. The same rule will apply when the second alternate representative is to replace the first one, or when the third is to replace the first or second alternates in their turn, or both of them, second. In such cases, the principal representative, or the first or second alternates in their turn, or both of them, shall state their intention not to act as representatives through a declaration given before a Notary Public in Colombia, or before a Notary or another Public Official or a Colombian Consul abroad; and in case of impediment, the appropriate certificate shall suffice. If any of the appointees were to be definitely absent, the following alternate shall take his place. When the absence or impediment of the principal representative, or of the first or second alternate in their turn ceases, the representation can be taken again in their sequence, by the principal, the first or second alternate depending on case, and the mere fact or its exercise will suffice. The exercise of the representation by the first, second or third alternates in their turn shall end at such time.

Además, confiero (conferimos) poder a los abogados arriba nombrados, para obtener la protección de mi (nuestra) propiedad industrial y contra la competencia desleal, a cuyo efecto autorizo (amos) a los dichos apoderados para que me (nos) representen ante cualesquiera entidades o personas, ejerzan o no jurisdicción, especialmente ante las del orden administrativo, contencioso administrativo y judicial, así como los tribunales de arbitramento, en todo lo concerniente a los siguientes asuntos: a) Obtención de patentes de invención, modelos de utilidad y diseños industriales; el registro de marcas de fábrica, colectivas, defensivas de servicio, lemas comerciales, nombres comerciales, enseññas, nombres de dominio, variedades vegetales y denominaciones de origen; su renovación, traspaso, cambio de nombre o domicilio, cancelación voluntaria; y el registro de licencias de uso de esos derechos; b) Las acciones de competencia desleal, protección del consumidor, oposiciones u observaciones, cancelación administrativa o judicial, nulidad, medidas cautelares, concesión de licencias, la tutela, la protección de secretos industriales, y en general los juicios civiles, penales, administrativos o contencioso administrativos relacionados con estos derechos; acciones y procesos que promovamos o se nos promuevan. Y para que en todos los asuntos arriba determinados, puedan sustituir este mandato, transigir, conciliar, admitir los hechos del proceso, desistir, cancelar, recibir, renunciar, y ratificar los actos de agentes oficiosos.

o y firmado hoy _____
en _____

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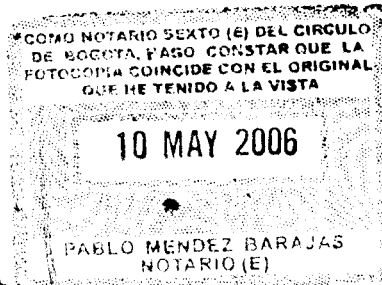
In addition, we grant a Power of Attorney in favor of the above named attorneys-at-law so that they may obtain the protection of my (our) industrial property and against the unfair competition, for which purpose I (we) authorize the said attorneys to represent me (us) before any authorities or persons, with or without jurisdiction, specially those administrative, administrative contentious and judicial, as well as before Arbitration Court, in all matters concerning the following: a) Obtainment of patents, utility models and industrial designs; the registration of trademarks, collective, defensive and service marks, slogans, commercial names, trade emblems, domain names, vegetal varieties and denominations of origin; its renewal, assignment, change of name or domicile, voluntary cancellation; and the registration of licenses of use of the above rights; b) Actions of unfair competition, protection to the consumer, oppositions or observations, administrative or Court cancellation, nullity, infringement, granting of licenses, the action for writ mandamus, the protection of trade secrets, and in general the civil, penal, and administrative suits relating to those rights; actions and suits instituted by me (us) or against me (us). And that in all the above matters they may substitute this Power of Attorney, compromise, conciliate, admit the facts of the case, desist, cancel, receive, resign, and ratify acts done by representatives without a power of attorney.

Given and signed this 26th day of October, 2005
in Minneapolis, Minnesota 55440, U.S.A.

921 
Cedente JANICE L. MARTURANO Assignor
Title: Vice President, Deputy General Counsel

THE PILLSBURY COMPANY

922 
Cesionario JANICE L. MARTURANO Assignee
Title: Vice President, Deputy General Counsel
GENERAL MILLS MARKETING, INC



142 144 / 5

CERTIFICADO NOTARIAL (INDIVIDUO)

A los _____ días del mes de _____
de 200__ ante mí, Notario Público o Funcionario Autorizado
de _____
compareció(eron) personalmente _____
a quien(es) doy fe de conocer y me consta que es(son) la(s)
persona(s) firmante(s) del documento que precede, y quien(es)
tiene(n) capacidad legal para otorgarlo

Notario Público o Funcionario Autorizado --Notary Public or Attesting Oficial

CERTIFICADO NOTARIAL (SOCIEDAD)

Hoy 26 de Octubre de 2005
Compareció(eron) ante mí
Janice L. Marturano
quien(es) conozco personalmente y que firma(n) este
documento en representación de la Sociedad/compañía
denominada THE PILLSBURY COMPANY

Certifico:

Que he visto los siguientes documentos:*

CERTIFICADO DE CONSTITUCION FECHADO
25 SEPTIEMBRE, 1935

2. Que dichos documentos prueban lo siguiente:

2.1. Que THE PILLSBURY COMPANY

es una Sociedad/Compañía legalmente constituida y existente
de acuerdo con las leyes del Estado de Delaware, Estados
Unidos de América

2.2. Que el domicilio de dicha Sociedad/Compañía es 200
South Sixth Street, Minneapolis, Minnesota 55402-1464, Estados
Unidos de América

2.3. Que el objeto u objetos para los cuales se otorga el presente
poder están comprendidos dentro del objeto social de la
mencionada Sociedad/Compañía.

2.4. Que el(los) Sr.(Sres.) JANICE L. MARTURANO
está(n) autorizado(s) para otorgar el presente Poder.

Ciudad MINNEAPOLIS

Estado MINNESOTA

Hoy 26 OCTUBRE de 2005

Notario Público o Funcionario Autorizado -- Notary Public or Attesting Oficial

NOTARIAL CERTIFICATE (INDIVIDUAL)

On this _____ day of _____
200__ before me, a Notary Public or Attesting Official of _____
personally appeared _____
to me known, and known to me to be the person(s) who
executed that foregoing document, and who has(have) legal
capacity to execute it.

NOTARIAL CERTIFICATE (CORPORATION)

On this 26th day of October, 2005
appeared before me
Janice L. Marturano
who(m) I know personally and who(m) signed this document as
representative(s) of the Corporation/Company named _____
THE PILLSBURY COMPANY

I certify:

1. That I have seen the following documents:*

**Chapter of Incorporation for The Pillsbury
Company and dated September 25, 1935**

2. That the above documents duly prove the following:

2.1. That The Pillsbury Company

is a Corporation/Company legally constituted and in existence
in accordance with the laws of Delaware, United States of
America

2.2. That the domicile of said Corporation/Company is 200
South Sixth Street, Minneapolis, Minnesota 55402-1464, United
States of America

2.3. That the purpose or purposes for which the present Power
of Attorney is granted are, comprised within the circulation
purposes set forth in the charter of the Corporation
Corporation/Company.

2.4. That Mr./Ms.(Messrs.) Janice L. Marturano
is(are) authorized to grant the present Power of Attorney.

City Minneapolis

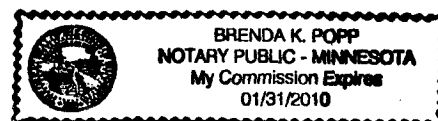
State Minnesota

This 26th day of October, 2005

Brenda K. Popp
BRENDA K. POPP

* Los documentos deben identificarse con fecha y origen

* Documents must be identified with date and origin



CERTIFICADO NOTARIAL (INDIVIDUO)

A los _____ días del mes de _____
de 200__ ante mí, Notario Público o Funcionario Autorizado
de _____
compareció(eron) personalmente _____
a quien(es) doy fe de conocer y me consta que es(son) la(s)
persona(s) firmante(s) del documento que precede, y quien(es)
tiene(n) capacidad legal para otorgarlo

Notario Público o Funcionario Autorizado --Notary Public or Attesting Official

CERTIFICADO NOTARIAL (SOCIEDAD)

Hoy 26 de Octubre de 2005
Compareció(eron) ante mí
quien(es) conozco personalmente y que firma(n) este
documento en representación de la Sociedad/compañía
denominada GENERAL MILLS MARKETING, INC

Certifico:

Que he visto los siguientes documentos:*

CERTIFICADO DE CONSTITUCION FECHADO 20
JUNIO, 1928

2. Que dichos documentos prueban lo siguiente:

2.1. Que GENERAL MILLS MARKETING INC.

es una Sociedad/Compañía legalmente constituida y existente
de acuerdo con las leyes de
DELAWARE, ESTADOS UNIDOS DE AMERICA

2.2. Que el domicilio de dicha Sociedad/Compañía es Number
One General Mills Boulevard, P.O. Box 1113, Minneapolis, MN
55440 Estados Unidos de América

2.3. Que el objeto u objetos para los cuales se otorga el presente
poder están comprendidos dentro del objeto social de la
mencionada Sociedad/Compañía.

2.4. Que el(los) Sr.(Sres.) JANICE L. MARTURANO
está(n) autorizado(s) para otorgar el presente Poder.

Ciudad MINNEAPOLIS

Estado MINNESOTA

Hoy 26 Octubre de 2005

Notario Público o Funcionario Autorizado -- Notary Public or Attesting Official

* Los documentos deben identificarse con fecha y origen

NOTARIAL CERTIFICATE (INDIVIDUAL)

On this _____ day of _____
200__ before me, a Notary Public or Attesting Official of _____
personally appeared _____
to me known, and known to me to be the person(s) who
executed that foregoing document, and who has(have) legal
capacity to execute it.

NOTARIAL CERTIFICATE (CORPORATION)

On this 26th day of October 2005
appeared before me Janice L. Marturano
who(m) I know personally and who(m) signed this document as
representative(s) of the Corporation/Company named _____
GENERAL MILLS MARKETING, INC

I certify:

1. That I have seen the following documents:*

**The Chapter of Incorporation for the General
Mills Marketing, Inc. and dated June 20,1928**

2. That the above documents duly prove the following:

2.1. That General Mills Marketing, Inc.

is a Corporation/Company legally constituted and in existence
in accordance with the laws of Delaware, United States of
America.

2.2. That the domicile of said Corporation/Company is
Number One General Mills Boulevard, P.O. Box 1113, Minneapolis,
MN 55440 United States of America

2.3. That the purpose or purposes for which the present Power
of Attorney is granted are comprised within the corporation
purposes set forth in the Charter of the mentioned
Corporation/Company.

2.4. That Mr./Ms. (Messrs.) Janice L. Marturano
is(are) authorized to grant the present Power of Attorney.

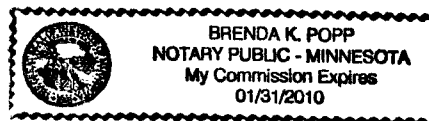
City Minneapolis

State Minnesota

This 26th day of October, 2005

Brenda K. Popp
BRENDA K. POPP

* Documents must be identified with date and origin



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TRADUCCIÓN OFICIAL No. 05.02/06b realizada por Diego Vargas, Traductor Oficial, Resolución No. 0001 de 1999 del Ministerio de Justicia y registrado ante el Ministerio de Relaciones Exteriores de Colombia.

A continuación se traducen los sellos y legalizaciones de un documento de cesión mediante el cual THE PILLSBURY COMPANY domiciliada en 200 South Sixth Street, Minneapolis, Minnesota 55402-1464, Estados Unidos de América, (aquí llamada la CEDENTE) propietaria de las solicitantes de patente en Colombia: Expediente No. 00.082.960 correspondiente a "PRODUCTOS DE MASA DEL CONGELADOR AL HORNO"; Expediente No. 00.069.322 correspondiente a "COMPOSICIÓN CONGELANTE"; Expediente No. 00.084.952 correspondiente a "LLENANTES QUE CONTIENEN HUMEDAD NO BASADA EN EMULSIÓN" declaran por el presente instrumento que cede dichas solicitudes de patente a GENERAL MILLS MARKETING, INC., domiciliada en Number One General Mills Boulevard, P.O. Box 1113, Minneapolis, MN 55440, Estados Unidos de América (aquí llamada la CESIONARIA). La CESIONARIA acepta dicho traspaso y otorga derechos de representación y poder a los Doctores Emilio Ferrero, tpa. 31929; Gonzalo Perdomo, tpa. 831; Luz Clemencia de Páez, tpa. 23555 y Germán Cavelier, tpa. 832, domiciliados en la Calle 14 No. 72-35, Bogotá D.C., Colombia.

Dado y firmado el 26 de octubre de 2005 en Minneapolis, Minnesota 55440, Estados Unidos de América.

COMO NOTARIO SEXTO (E) DEL CIRCULO
DE BOGOTA, HAGO CONSTAR QUE LA
FOTOCOPIA PRESENTE ES UNA COPIA ORIGINAL
QUE HE TENIDO A LA VISTA

10 MAY 2006

PABLO MENDEZ BARAJAS
NOTARIO (E)

Firma Ilegible

Cedente JANICE L. MARTURANO

Cargo: Vicepresidente, Asesor Legal General Suplente

THE PILLSBURY COMPANY

Firma Ilegible

Cesionario JANICE L. MARTURANO

Cargo: Vicepresidente, Asesor Legal General Suplente

GENERAL MILLS MARKETING, INC.

195 147

CERTIFICADO NOTARIAL (SOCIEDAD) por medio de la cual se certifica la firma de Janice L. Marturano en el anterior documento en representación de The Pillsbury Company y adicionalmente se certifica que la anterior es una sociedad actualmente existente y organizada de conformidad con las leyes del Estado de Delaware, Estados Unidos de América, que su domicilio es 200 South Sixth Street, Minneapolis, Minnesota 55402-1464, Estados Unidos de América y adicionalmente que la señora Janice L. Marturano está autorizada para otorgar el presente poder.

Dado y firmado en la ciudad de Minneapolis, Estado de Minnesota el 26 de octubre de 2005.

Firma Ilegible
BRENDA K. POPP

Sello:

BRENDA K. POPP
NOTARIO PÚBLICO MINNESOTA
Mi Comisión Vence
01/31/2010

CERTIFICADO NOTARIAL (SOCIEDAD) por medio de la cual se certifica la firma de Janice L. Marturano en el anterior documento en representación de General Mills Marketing, Inc. y adicionalmente se certifica que la anterior es una sociedad actualmente existente y organizada de conformidad con las leyes del Estado de Delaware, Estados Unidos de América, que su domicilio es One General Mills Boulevard, P.O.Box 1113 Minneapolis, MN 55440, Estados Unidos de América y adicionalmente que la señora Janice L. Marturano está autorizada para otorgar el presente poder.

Dado y firmado en la ciudad de Minneapolis, Estado de Minnesota el 26 de octubre de 2005.

Firma Ilegible
BRENDA K. POPP

Sello:

BRENDA K. POPP
NOTARIO PÚBLICO MINNESOTA
Mi Comisión Vence
01/31/2010

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Estado de Minnesota

SECRETARIO DE ESTADO

APOSTILLA

Convention de La Haye du Octobre 5, 1961

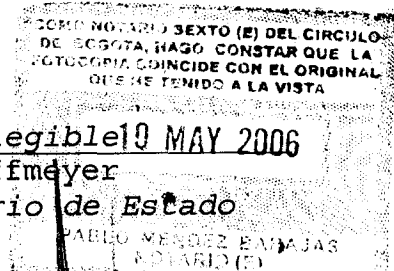
1. País: Estados Unidos de América
Este Documento Público: Cesión
2. ha sido firmado por Brenda K. Popp
3. actuando en calidad de: Notario Público, Estado de Minnesota
4. lleva el sello/estampilla de: Brenda K. Popp, Notario Público, Estado de Minnesota

Certificado:

5. en: St. Paul, Minnesota
6. fecha: Octubre 26 de 2005
7. por: Secretario de Estado, Estado de Minnesota
8. T20051026048
9. Sello:
10. Firma:



Firma ilegible 10 MAY 2006
Mary Kiffmeyer
Secretario de Estado



Es traducción fiel y completa de la cual se deja copia en esta oficina para su confrontación.

DVZ/ID-7748/WPCL002G/COLO 11346-801-008-8

Diego F. Vargas
DIEGO F. VARGAS Z.
TRADUCTOR E INTERPRETE OFICIAL
ESPAÑOL - INGLES - INGLES - ESPAÑOL
RES. 0001 DE ENERO 4 DE 1999
MINISTERIO DE JUSTICIA

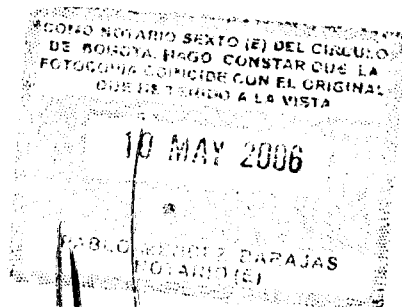
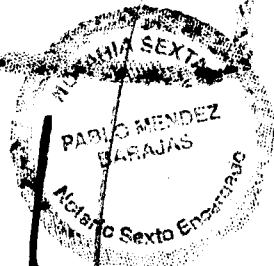
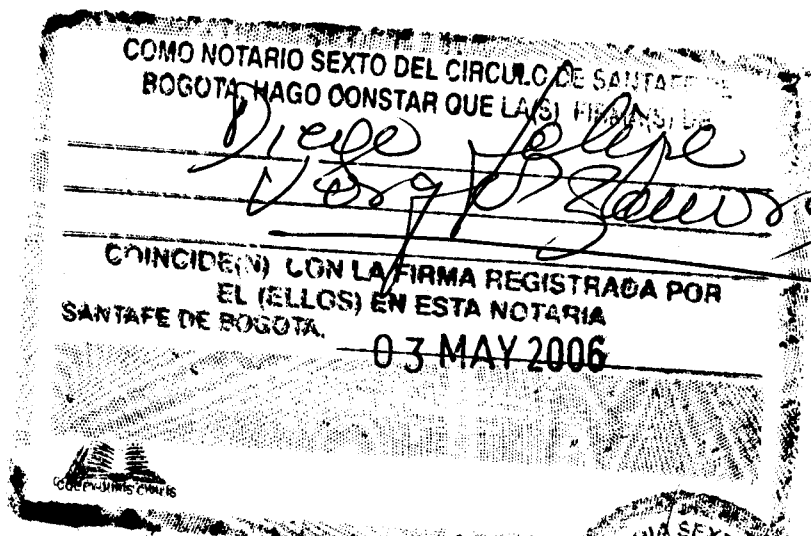
NO SE ASUME
RESPONSABILIDAD DEL TEXTO

2006 MAY -3 P 1:59

nos
JEFE DE LEGALIZACIONES
SANTAFE DE BOGOTA D.C.

MINISTERIO DE RELACIONES
EXTERIORES

90474-
Diego Vargas
CUYA FIRMA APARECE EN EL
DOCUMENTO DESEMPENA
LAS FUNCIONES INDICADAS



SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 06 - 32,727
FECHA : MAYO 3 DE 2006

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CAVELIER ABOGADOS	CONSIGNACION	BANCO POPULAR	050-00110-6	54928387	03/05/2006	36,423,500.00

***** CONCEPTO *****

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

SON: NOVENTA Y CINCO MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

Colo 11346-801-009-6

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 00-84952

**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 _____

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

2020

Bogotá, D.C.

Doctor

Emilio Ferrero
Apoderada

Oficio No. 2313

**REFERENCIA: Radicación No. 00- 84952
Trámite 002
Evento 001
Actuación 430
Folios 030**

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 63
- Capítulo reivindicatorio: folios 64 al 71

Se acepta reivindicación de prioridad US 09/436.307 del 8 de Noviembre de 1999.

2. OBJETO DE LA INVENCION.

Título: "Llenantes que contienen humedad no basada en emulsión, para productos de masa"

La invención se refiere a :

- Un producto de masa que comprende: a) una masa que tiene una primera actividad de agua y b) Un llenante que contiene humedad no basada en emulsión que comprende al menos dos ingredientes que impactan la actividad de agua y que tienen una segunda actividad de agua; la diferencia entre las actividades de agua es menor de aprox. 0.25. El producto de masa se refrigera o se congela. El diferencial entre la primera actividad y la segunda es menor de 0.20 o menor de 0.15. Al menos dos ingredientes que impactan la actividad de agua comprenden grasa y un agente de control de viscosidad éste último comprende almidón natural o modificado, proteína formadora de gel, hidrocoloide o una combinación de estas o es una goma hidrocoloide la cual esta presente en el llenante en una cantidad que va de aprox. 0.1% a aprox 5% y la grasa esta presente en el llenante en una cantidad de aprox 20% a aprox 60%. Al menos dos ingredientes que impacta la actividad de agua comprende grasa (contenido de 20 a 60%) y azúcar (10 a 50%). El llenante tiene un actividad de agua de al menos 0.725. El azúcar que contiene

- el llenante es dextrosa en un contenido entre 10 a 50% ; el llenante contiene un endulzador liquido en una concentración de 1 a 35%, un hidrocoloide que comprende alginato en una cantidad que va de 0.1 a 5%.
- Un producto de masa llenado con un llenante que contiene humedad no basada en emulsión, que como comprende desde aproximadamente 20% a aproximadamente 60% de grasa para pasteleria .
- Un método para desarrollar una formulación de un llenante para un producto de masa que comprende: a) Determinar una pluralidad de ingredientes para el llenante, b) Seleccionar una pluralidad de ingredientes para el llenante, c) Proporcionar al menos dos de una pluralidad de ingredientes para ajustar la actividad del llenante de tal forma que el diferencial entre la actividad e la masa y la actividad de agua del llenante es de aproximadamente 0.25 o menos. El producto de masa se refrigera , el producto es un rollo de canela que contiene grasa y azúcar.

Clasificación Internacional de Patentes: A21D 2/00

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:

A lo largo del capítulo reivindicatorio se utiliza el término "llenante" el cual se debería cambiar por el término "relleno" el cual es mas preciso para el producto que se describe.

La reivindicación 1 que presenta el producto de masa se encuentra de una forma muy general ya que los productos se deben definir en términos de sus composiciones y en esta reivindicación no se señalan las composiciones tanto de la masa como del relleno.

Las reivindicaciones 3 y 4 no son claras ya que la diferencia de la actividad de agua es una característica propia del producto pero no lo define. Al referirse a una primera actividad de agua y una segunda actividad de agua se debería indicar los componentes del producto de masa a los cuales se esta haciendo referencia.

En las reivindicaciones 6 a 8 y en la reivindicación 10; se estan mencionando los ingredientes que componen el producto de masa con algunas composiciones ; al mencionar estos ingredientes no se precisa en que parte del producto se pueden encontrar ya que tal como se define la reivindicación 1 el producto de masa comprende dos partes la masa y el relleno.

En las reivindicaciones 12 a 20 se define el relleno indicando que este contiene grasa, azúcar, endulzador liquido, goma hidrocoloide (alginato), estos mismos ingredientes se habian presentado en reivindicaciones anteriores cuando se presentaba el producto de masa; por lo tanto no es claro dentro de la solicitud si estos ingredientes se encuentran presentes también en la masa que forma parte del producto de masa ya que ninguna de la reivindicaciones presenta la composición de la masa.

Las reivindicaciones 21 a 28 no tienen lugar en la solicitud ya que si el producto de masa objeto de la solicitud, esta compuesto de la masa y el relleno y se definen los ingredientes que se encuentran en dicho producto no sería necesario de nuevo presentar el producto de masa relleno.

La reivindicación 29 presenta un método para desarrollar una formulación de un relleno para el producto de masa; el hecho de desarrollar una formulación es una actividad intelectual la cual no es materia patentable. De otra parte las reivindicaciones 30 a 33 hacen referencia en el preámbulo, al método pero en su parte característica se hace alusión al producto presentado; por lo tanto se les recuerda a los solicitantes que los procedimientos deben ser definidos en términos de los pasos o etapas que forman parte del procedimiento y no en términos de características del producto que se elabora con tal procedimiento.

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. Según los ajustes que se realicen a la solicitud, se debe tener en cuenta los cambios correspondientes en el título de la misma.

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:

N°	DOCUMENTO	TITULO	FECHA DE PUBLICACION
D1	US 4,721,622	Shelf stable, filled food and method of manufacture	1988-06-26
D2	US 4,774,095	Filling-containing dough-based products containing cellulosic fibrils and microfibrils	1988-09-27
D3	US 4,670,272	Thermostable Creme	1987-06-02
D4	US 4,234,611	Soft intermediate-moisture frozen puddings and fillings.	1980-11-18

Los documentos mencionados se anexan al expediente.

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 conceptúa:

El documento D1 presenta un alimento tipo snack que comprende un producto de panadería fabricado con cualquier tipo de masa y un relleno que se encuentra dentro de dicho producto; un empaque estéril que envuelve completamente el alimento. La masa y el relleno se formulan teniendo en cuenta que los valores de las actividades de agua de dichos componentes no causen deterioro del producto durante su almacenamiento. El agua contenida en los diferentes componentes del producto es equilibrada por medio de una capa intermedia entre la masa y el relleno la cual previene o minimiza la migración de agua entre los otros componentes del producto. En uno de los ejemplos que presenta el documento se encuentra el uso de los siguientes ingredientes para fabricar el relleno: Crema de leche, almidón de maíz, gelatina.

La anterioridad D2 presenta galletas con rellenos de frutas las cuales están compuestas de una masa que contiene harina y agua y un relleno saborizado que tiene valores de actividad de agua entre 0.2 a 0.6. El relleno comprende: una fase acuosa, azúcar disuelto en la fase acuosa y una red de fibrillas y microfibrillas de celulosa dispersas en la fase acuosa. Esta red funciona como un agente de control de flujo del relleno. De otra parte puede contener polioles humectantes tales como glicerol y/o ciertos hidrocoloides tales como pectinas de alto peso molecular, estos compuestos presentan bajas actividades de agua y baja viscosidad. El uso de estos hidrocoloides evita que el relleno se salga del producto durante el tiempo de almacenamiento. Dentro de la composición del relleno también se encuentran colorantes, acidulantes, preservantes, pedazos de frutillas. Para la elaboración de este producto se establecen valores de actividad de agua cercanos entre la masa y el relleno, con el fin de evitar la transferencia de humedad entre ellos.

La invención presentada en la anterioridad D3 hace referencia a un material que exhibe una textura cremosa, es termoestable y presenta buena estabilidad. Este material consiste de una mezcla de hidrocoloides, almidón modificado, albumina y jarabe de maíz. La crema puede contener además aditivos tales como agua polidextrosa, grasa, proteína (proveniente de albumina), emulsificantes, agentes saborizantes y sal.

Estas cremas exhiben bajos niveles de actividad de agua entre 0.6 a 0.7 y son termoestables bajo condiciones de horneado. Las cremas de la presente invención generalmente contienen altos niveles de jarabe de maíz y adicionalmente contiene hidrocoloides que sirven para estabilizar la crema debido a su alta capacidad para enlazar agua y las propiedades de formar gelosa altas temperaturas. Los hidrocoloides que puede ser usados para preparar dichas cremas pueden ser gomas naturales o sintéticas, alginato, goma de xantano o metilcelulosa, carboximetilcelulosa, hidroximetilcelulosa y otros compuestos similares.

La anterioridad D4 presenta alimentos que contienen niveles de humedad intermedios que presentan estabilidad microbiológica y son alimentos que se almacenan normalmente en refrigeración. Después de quitar los alimentos del refrigerador y tener el producto a temperatura ambiente: no se observa un deterioro del producto por el efecto que la proporción azúcar/agua presenta sobre los microorganismos. Los alimentos de esta invención son generalmente caracterizados por un alto contenido de azúcares, los azúcares utilizados tienen bajo peso molecular, principalmente dextrosa y fructosa. Los alimentos de esta invención presentan actividades de agua entre el rango de 0.75 a 0.90. Como un ejemplo de una composición de esta invención se tiene: 30% de agua, 50% de azúcar, 18% de grasa y en menor proporción, pero con mayor efectividad alginato, estabilizadores, emulsificantes y saborizantes.

De las anterioridades presentadas se puede observar que el producto de masa reivindicado en la solicitud es derivable del estado de la técnica ya que las anterioridades D1 y D2 presentan productos fabricados a base de masa, los cuales contienen un relleno y la relación entre los valores de la actividad de agua del relleno con respecto a la actividad de agua que presenta la masa es bajo ya que de ella depende la estabilidad del producto durante su almacenamiento y el confinamiento del relleno dentro del producto. De otra parte, el uso de hidrocoloides, en cremas que pueden ser utilizadas como rellenos, tales como gomas (alginatos), le proporcionan a los rellenos propiedades de fluidez y actividad de agua apropiados para contribuir a la estabilidad de producto también son conocidos en el arte previo según lo presentado en la anterioridad 3. De esta misma forma, las proporciones que se tengan en el producto de grasa y azúcar van a incidir en la estabilidad del producto a nivel microbiológico; por lo tanto tener en cuenta estas proporciones en la elaboración del producto también es un aspecto, que se deriva del arte previo.

Por lo tanto, la solicitud no cumple con el artículo 18 de la Decisión 486

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

Nº	DOCUMENTO	REIVINDICACIONES AFECTADAS	REQUISITO QUE AFECTA
D1	US 4,721,622	1 a 28	NIVEL INVENTIVO
D2	US 4,774,095	1 a 28	NIVEL INVENTIVO
D3	US 4,670,272	1 a 28	NIVEL INVENTIVO
D4	US 4,234,611	1 a 28	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 **15 FEB. 2007**

CONCEPTO TÉCNICO Nº 0221	EXAMINADOR TÉCNICO CÓDIGO 202064
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[45] **Date of Patent:** Jan. 26, 1988

3,922,353	11/1975	Bernotavicz	426/94
4,207,348	6/1980	Vermilyea et al.	426/243
4,517,203	5/1985	Levine et al.	426/94

FOREIGN PATENT DOCUMENTS

6845 of 1892 United Kingdom 426/275

Primary Examiner—George Yeung
Attorney, Agent, or Firm—Young & Thompson

[57] **ABSTRACT**

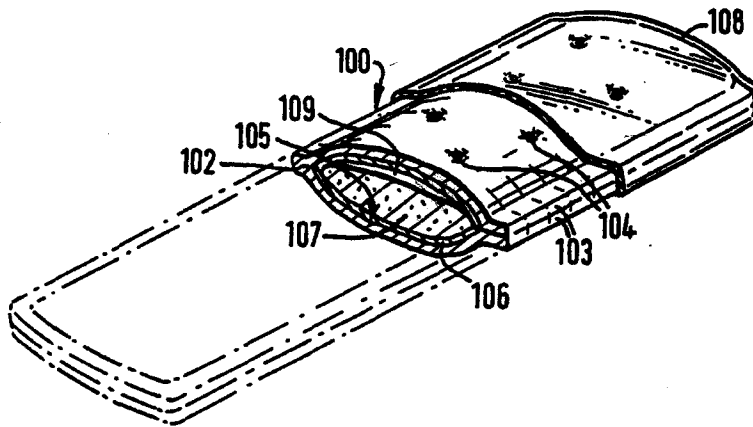
A snack food product comprises a filling (107) wholly enclosed in a bread-like casing (100), optionally with a barrier layer (106) disposed between the casing (100) and the filling (107). A sterile moisture-proof wrapping (108) wholly encloses the edible part (100, 106, 107) of the product. The snack food product (100, 106, 107, 108) is storable at normal temperature for long periods, e.g. several months. The product can be made by assembling the components before or after a shaped dough component is baked to form the bread-like casing (100) and can be prepared for consumption by a heating step carried out before or after the edible part (100, 106, 107) is removed from the wrapping (108).

3) constitible.

[51] Int. Cl.⁴ A21D 13/08
[52] U.S. Cl. 426/94; 426/128;
 426/283; 426/496; 426/556
[58] Field of Search 426/94, 95, 128, 496,
 426/275, 556, 283, 92

U.S. PATENT DOCUMENTS

22 Claims, 7 Drawing Figures



SHELF STABLE, FILLED FOOD AND METHOD OF MANUFACTURE

This invention relates to food products and is concerned, in particular, with precooked food products which are intended to provide satisfying and readily-consumable food items, involving minimal preparation for consumption. One or a number of food products according to this general concept can conveniently form all or a major part of a quick meal or snack; food products are usually regarded as "snack" items if they are intended to be eaten while held in the hand and if their preparation in order to be eaten merely involves the opening or removal of wrapping or packaging material. One form of snack product which is very widely known and used is the sandwich, in the closed form, consisting of a filling between two slices of bread. Sandwiches can be handled very conveniently both when being prepared for consumption and also while being eaten, because the bread provides the entire exterior surfaces and prevents the filling from contacting the hands. It is common practice, both in the home and in commercial locations supplying snacks, for sandwiches to be warmed or toasted in preparation for consumption, especially when the fillings are savoury in nature, because this enhances the flavour and other eating characteristics. However, the preparation of sandwiches requires a variety of component materials, all in a fresh state, and prepared sandwiches rapidly become stale. For these reasons, the commercial supply of sandwiches, whether plain or toasted, is labour-intensive, expensive and potentially wasteful, as usually preparation either takes place to order or it involves the immediate wrapping of individual sandwiches, although even packaged sandwiches deteriorate in a few days. Chilling or freezing can be used to store sandwiches for several days or months, respectively, but the wide variety of components in them react in different ways and such products are seldom if ever satisfactory when returned to ambient temperature for consumption.

In view of the high and increasing popularity of snack products, there is a considerable demand for a product which meets a number of criteria, which are not fulfilled by the conventional sandwich, and there is thus great commercial potential in the manufacture and supply of such a snack product. The main criteria to be satisfied by a product according to this concept are as follows:

- (1) the product should be microbially stable and therefore capable of storage;
- (2) the product should be storable at normal ambient temperature, so that the provision of special containers such as chill cabinets or freezers is unnecessary;
- (3) the product should remain in a satisfactory state, under ambient temperature storage conditions, for a substantial length of time, which can be regarded as a period of up to 3 months and, preferably, for a period of 4, 5 or 6 months or even longer;
- (4) preparation of the product for consumption, when removed from storage, should involve only very simple and easy steps, including the removal of the product from its wrapping or packaging material or vice versa and, if desired, a heating or cooking step, which can be carried out either before or after separation of the product from its wrapping or packaging material.

It has now been discovered that snack food products can be made which meet these criteria and which can

also have other desirable and advantageous features and, moreover, methods of manufacture of such products have also been devised, together with methods for the preparation of such products so as to make them ready for consumption.

According to an aspect of this invention, a snack food product comprises:

- (a) a bread-like casing made by subjecting a yeast-raised or other dough to a first heating step;
- (b) a filling located inside and wholly enclosed by the casing, the snack food product formed by the casing and the filling being subjected to a second heating step; and
- (c) a sterile moisture-proof wrapping wholly enclosing the snack food product, whereby the wrapped product is microbially stable and so is capable of storage at normal ambient temperature for a substantial length of time.

Preferably, the casing and the filling are formulated so that their respective moisture contents result in water activity values for these components which undergo no detrimental change during the period of storage. In one form of wrapped snack product of the invention, the water contained in the various components of the product is allowed to equilibrate throughout the product, the water activity values having been chosen so that this equilibration has no detrimental effect on the product. However, in a preferred form of the wrapped snack product of the invention, this is achieved by providing, between the inside surface of the casing and the filling, an intermediate edible barrier layer which prevents or minimises the migration of water between the other components of the product. Preferably, the water activity of the casing is in the range from 0.60 to 0.95 and, more preferably, in the range from 0.85 to 0.95. The water activity range for the filling may be from as low as 0.20 or 0.40 to 0.99 but is preferably in the range from 0.90 to 0.99. If provided, the barrier layer has a water activity which, as manufactured, is in the same range as that of the filling. The water activity of the optional barrier layer may change during storage, but it has been discovered that any such change need not significantly affect the water activity values of the casing and filling components nor the storage stability of the product.

According to another aspect of the invention, a method of manufacture of a storage-stable snack food product comprises:

- (a) forming a closable bread-like casing by shaping a yeast-containing or other dough;
- (b) subjecting the shaped dough piece to proving and then to a first heating step;
- (c) depositing a filling composition upon the shaped and heated dough piece;
- (d) closing the dough piece so that the filling composition is wholly enclosed within the casing;
- (e) subjecting the resultant closed product to a second heating step; and,
- (f) before or after the heat-treated product undergoes cooling to normal ambient temperature, wholly enclosing it in a sterile moisture-proof wrapping, whereby the wrapped product is rendered microbially stable and so is capable of storage at normal ambient temperature for a substantial length of time.

Where the snack food product formed by this method includes a barrier layer disposed between the inside surface or surfaces of the casing and the filling, such barrier layer is preferably provided by depositing a barrier composition upon the interior of the casing be-

fore carrying out step (c) above. A barrier composition can either have the requisite properties per se or can acquire them when the product undergoes the subsequent manufacturing steps. The barrier layer can also be such that its ability to preclude moisture migration is lost when the snack product is heated or otherwise treated to make it ready for consumption.

According to a further aspect of the invention, a method of manufacture of a storage-stable snack food product comprises:

(a) forming a bread-like casing by shaping a yeast-containing or other dough into a tubular component, which preferably is closed at one end;

(b) subjecting the tubular component to proving and then to a first heating step;

(c) inserting a shaped filling component into the tubular component before or after the first or both of the operations of step (b);

(d) closing the or both open ends of the casing so that the filling component is wholly enclosed within the casing;

(e) subjecting the resultant closed product to a second heating step; and

(f) before or after the heat-treated product undergoes cooling to normal ambient temperature, wholly enclosing it in a sterile moisture-proof wrapping, whereby the wrapped product is rendered microbially stable and so is capable of storage at normal ambient temperature for a substantial length of time.

In either embodiment of the method as set out above, both of the first and second heating steps can cause the dough pieces to undergo baking, i.e. a prebaking step followed by a final baking step, or one can be a baking step per se, while the other is a different kind of heating step, such as is effective to subject the products to retorting, pasteurization, sterilization or some other effect of heat treatment. If the components include a barrier layer and the mixture for forming this and the filling component are kept in a hot state after being made and heated, they can be processed into the filling component step (c) above by a co-extrusion process.

Where the snack food product formed by this latter method includes a barrier layer disposed between the inside surface or surfaces of the casing and the filling, such barrier layer is preferably provided by applying a barrier layer composition to the exterior surfaces of the shaped filling component before carrying out step (c) above. The barrier composition can again have any of the desirable characteristics indicated above.

According to another aspect of the invention, a method of preparation of a snack food product in accordance with this invention comprises removing the product from storage and heating it to a temperature suitable for consumption, the heating step being carried out before or after the wrapping is removed from the product. The heating step can be conducted at such a temperature and for such a time as to subject the snack food product to a cooking step, i.e. the product is not merely taken to an elevated temperature, but one or more of its components undergo modification involving irreversible changes.

Snack food products having a casing and a filling bonded together are disclosed in GB-A- No. 1510996 and comprise a ready-to-eat product in elongate form, having a casing of bread bonded to a core, i.e. the bond is sufficiently strong to prevent separation of the bread from the core during handling at ambient temperature. The bread casing can have its ends open or closed and,

in order to give the product a good storage life, this casing has a water content of less than 15% by weight. The filling has a good storage life, defined as a period of at least 6 months in hermetically-sealed packs at not more than 25° C. The bread casing preferably has a moisture content below 10% and most preferably below 5% by weight and the product can undergo a second baking step, i.e. in addition to that used in making the bread casing, in order to achieve such moisture contents. However, products prepared in this way can be hard and unappetizing and this manufacturing technique is entirely inapplicable to precooked unbonded products of the kind to which this invention relates.

Another problem with known products is caused by the diffusion of moisture from the filling to the casing during storage. Even with sterilized products tightly enclosed in moisture-proof wrappings, moisture can diffuse from the filling into the casing. This can make the casing unappetizing, whilst another possible disadvantageous effect is softening and loss of strength of the casing. Moreover, such casings are only partially restored to a satisfactory condition by subjecting the product to a baking step in preparation for consumption. In order to deal with the problem of moisture migration, DE-A- No. 2556254 describes the provision, between the filling and the casing of such a product, of an impermeable but water-soluble edible intermediate layer, made from film-forming substances used in the food and pharmaceutical industries, e.g. maize protein or sodium alginate.

In a product according to the invention, the casing is essentially bread-like and thus is made from a yeast raised or other bread dough, such as a soda-containing dough. It forms a complete enclosure for the filling component, so that it is desirable to provide apertures or other means in the casing for the escape from the enclosure of steam or vapour generated in manufacture. The moisture content of the dough from which the casing is made, the way this changes as manufacture proceeds and the resultant humidity of the casing component are such that, in the product, the water activity of the casing is from 0.60 to 0.95. Preferably, the water activity lies in the range from 0.85 to 0.95, and, more preferably, in the range from 0.88 to 0.93.

The filling can be made from an extremely wide range of components and can be sweet or savoury in flavour and, in practice, of any specific composition, subject to the fact that it is capable of being heatsterilized or pasteurised. The water activity range may be from as low as 0.20 or 0.40 to 0.99 but is preferably in the range from 0.9 to 0.99, and more preferably in the range from 0.93 to 0.98 and most preferably around 0.95 to 0.96. It is also possible to use fillings with water activities within the broad range which are somewhat lower than the preferred values indicated. This applies especially to essentially acid fillings. Satisfactory snack products can have water activities in the range from 0.9 to 0.93 or 0.94, i.e. the lower part of the overall range, and such fillings have been found to be suitable for incorporation in products according to this invention and, especially, if they are so formulated as to have a pH in the range from 3.5 to 7.0. Certain fillings such as fermented sausages, salami and heavily salted fish will however have water activities in the range of 0.70 to 0.90 and some nut fillings such as pecan nuts and walnuts will have water activities of around 0.20. These latter fillings are preferably mixed with other filling

materials to provide water activities of, say, around 0.50.

The wrapping can be applied to the manufactured snack product before, during or after it undergoes cooling to ambient temperature. The wrapping also needs to be capable of withstanding heat-treatment, such as occurs in pasteurization, and can be of any suitable shape and form. For instance, it can be tubular and of such a size as to fit over the completed and generally elongated bar-like products, the ends of the wrapping then being closed around the product. Alternatively, the wrapping can be strip-shaped and can be applied by being helically wound round the product, again having the ends closed so as to achieve the desired complete containment of the product. Any moisture-proof impermeable sheet material suitable for sterilization and compatible with food products is suitable for use as the wrapping material. Essentially, the purpose of the wrapping is to provide the product with a protection which is proof against gases, liquids, especially moisture, light and micro-organisms, over a substantial length of time.

The barrier layer which is or may be incorporated in the product, between the casing and the filling, serves the purpose of preventing moisture migration in the desired way, so that the other components undergo only slight change in their water activity values during storage. The water activity of the barrier layer typically lies in the range from 0.9 to 0.99, although it may change during storage, typically to a lower value, but without any such change adversely affecting the water activities and therefore the storage stability of the other components of the product.

The snack food product of the invention preferably has the shape and appearance of an elongate closed sandwich, the bread casing being, in one embodiment, an integral hollow component or in another embodiment, two or more slices bonded at the edges, with the filling being disposed within the bread casing. The wrapped or packaged food products of the invention can be stored for several months at normal ambient temperature without deterioration, i.e. at least for 3 months and up to 6 months or longer, and can simply be heated, e.g. in a conventional or microwave oven just before eating. The products have sufficient stability so that no chemical nor microbial deterioration occurs during storage and they maintain an appetizing and attractive appearance after several months in a moist atmosphere at room temperature, e.g. 10° to 25° C., and under natural or artificial light. During the storage period, the migration of water from the filling to the casing is minimized or eliminated and no substantial change in relative humidity occurs.

In order that the various aspects of the invention can be fully appreciated, various preferred features of the products and processes according to the invention are described below and are also shown, by way of illustrative example only, in the accompanying diagrammatic drawings; also, embodiments of the invention are described in the appended Examples.

In the drawings:

FIG. 1 shows in flow-sheet form a number of embodiments of the processes of manufacture and preparation for consumption of the snack food products of the invention;

FIG. 2 shows in flow-sheet form a number of ways of carrying out the embodiment of the method of the invention in which assembly of the product components takes place before the baking step or steps;

FIG. 3 shows, also in flow-sheet form, a number of forms of apparatus and the consequent method stages involved in the addition to the bread casings of the inner components, in the various forms of pre-bake assembly in FIG. 2;

FIG. 4 shows in a similar style to FIG. 3, a number of ways of conducting embodiments of the method of the invention in which post-bake assembly of the components takes place; both of FIGS. 3 and 4 thus also show in diagrammatic and simplified form the types of apparatus for use in carrying out manufacture of products according to this invention;

FIGS. 5a to 5c show in perspective view, partly broken away, various stages of manufacture of a typical product according to this invention.

Referring to FIG. 1, one form of process of the invention involves the successive steps of mixing appropriately the bread dough ingredients, to form a yeast-containing dough for making the casing, followed by shaping the dough by any of a variety of means, proving the dough to allow the yeast to raise the dough and then subjecting the casings to a first heating step so as to effect partial baking and thereby deactivate the yeast and produce casings of the desired form. The filling mix ingredients are combined to form the filling and this is then deposited upon the casings. If these are made in open form, suitable for subsequent closure, the filling is deposited upon one part of the casing and this is then closed in the next step. Where a barrier layer is included in the product, this can conveniently be provided, as indicated on the left side of FIG. 1, by mixing together the barrier layer ingredients, if required, and depositing the barrier composition upon those surfaces of the open casings which will be inside the final products, before the filling is deposited on to the appropriate part of each casing. Where mixing of the bread dough ingredients is shown as the first step at the top of the flow-sheet, it will be appreciated that mixing and heat processing of the barrier layer ingredients will also take place and that these operations are notionally included in FIG. 1 prior to each of the four deposition steps shown. When closed, the casing is completely covered internally by the barrier layer, if provided, and the casing completely encloses the filling. A further heating step is then carried out, to effect final baking, and the products are then cooled and packaged in wrapping material, as indicated at the left side of FIG. 1, or these steps are carried out in the reverse order, as indicated at the right side. The products are then ready for storage. FIG. 1 also illustrates the simple steps needed when the products are to be consumed, which involve removing them from storage and subjecting the snack products, if desired, to a heating or warming step followed by removal of the packaging, as indicated at the left side of FIG. 1, or these two simple steps can be carried out in the reverse order, as indicated at the right side. In either case, the product is then ready for eating.

An alternative to this form of process is also included at the right side of FIG. 1. Shaping of the casing typically involves the formation of tubular components, which may be open at both ends or at one end. Instead of being deposited, portions of the filling, made by combining the filling mix ingredients, and designed to fit inside the shaped tubular casing components, can be shaped and inserted therein. If a barrier layer is desired, it can be applied to the shaped filling components. Whether or not provided with a barrier coating, the shaped fillings are then inserted into the casings and the

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open end or both open ends are then closed. The products then undergo the remaining steps of one or other of the various processes of manufacture and preparation for consumption already described.

Referring to the process illustrated diagrammatically in FIG. 2, this shows the successive units of apparatus and the steps involved in manufacturing snack food products comprising wrapped encased fillings having an optional intermediate barrier layer, using pallet-like or otherwise shaped casings which receive the barrier layer and then the filling by deposition steps, followed by pallet closure. In FIG. 2, the first three units of apparatus effect related operations on the dough which is used to manufacture the casing component of the product. As shown, a dough mixer to which the appropriate ingredients are supplied, as described in detail below, for instance in the Examples, produces the dough which is then transferred to an adjacent extruder or sheeting apparatus which forms the dough into a continuous flat and relatively wide layer by a sheeting-out operation. Reduction of the thickness of the dough sheet is then effected in the associated stretcher, the output from which is thus a dough of the appropriate consistency and other physical characteristics, in the form of an endless sheet of the desired thickness. This passes to a cutter where shaped components such as pallets are formed and are conveyed by continuous operation of the transport process involved throughout the apparatus to a panner, where the shaped pieces of dough are set out in the appropriate spatial location and relationship. Each pallet can consist of a single component or a multiple component of one or a number of casings of the eventual product. The various methods of the invention illustrated in flow sheet form in FIG. 2, from this point, can involve either operation upon a conveyor in the form of a steel oven band or, alternatively, operation upon a conveyor in the form of a waffle carousel. Essentially, each of these production components takes the form of a conveyor comprising an endless loop and traversing a path which may be vertical with a forward advancing run over part of the endless loop path or horizontal involving a forward advancing run over part or all of the path traversed by the carousel.

As indicated on the left in FIG. 2, the casing components on the conveyor are first subjected to a proving step and then to a part-baking step, so that if the dough is raised by the incorporation of yeast in it this occurs in the proving step and is brought to an end in the part-baking step. Addition of the inner component of each product then takes place at this point, as illustrated in more detail in FIG. 3 described below, following which forming of the product consisting of closing of the filled casing typically by the use of the mechanisms and procedures involved in wafer making technology takes place. The closed and filled casings are then subjected to a final baking step after which packing takes place, that is to say application to the products of the water-impermeable wrapping material which forms an essential component of the product for subsequent storage purposes. A final heating step is involved and in one embodiment of the invention this is indicated in the flow sheet on the left-hand side as a retorting step. This would typically involve packing of the products into wrapping material consisting of foil laminated with a plastics material such as a polyamide (e.g. "Nylon") or polyethylene which is then capable of being subjected to a sterilization operation by heat treatment. Sealing of the packages can take place after insertion of the prod-

ucts into the retortable enclosures in the packing step per se, as division of the enclosing operation into separate packing and sealing steps enables steam or other vapour to escape from the packaged products prior to closure of the packages and their submission to the retorting step. After this, the products are taken through a cooling step prior to being packaged with others in cartons in a final cartoning step.

An alternative to a retorting step is an IR heating step in which infra-red radiation is directed against the packaged products before or after a sealing step and this has the effect of treating the surface of the product including therefore the wrapping material itself, the depth of effect of the IR heating step being dependent upon the intensity at and time during which it is carried out. Thus both a retorting step and an infra-red heating step are alternative forms of final heating step in the sequence of operations involved in manufacturing the products of the invention. After the IR heating step and the subsequent sealing step, if this has not been carried out prior to the IR heating step, again the products are subjected to cooling prior to final cartoning for transport and storage.

The pre-bake assembly operations so far described in relation to FIG. 2 involve proving and part-baking of the bread-like casings before addition of the inner components. In a number of alternative ways addition of the inner components can take place before the proving and baking steps, as indicated on the right hand side in FIG.

2. As the cut dough portions pass through the panner on to the oven band or waffle carousel, addition of the inner components takes place. In the embodiment illustrated on the right hand side of the flow sheet of FIG. 2, the assembled components then undergo forming, packing, proving, baking and optionally, a sealing step before undergoing final cooling and cartoning. These steps are essentially similar to those already described in connection with the embodiments illustrated on the left hand side of the flow sheet, with the exception that the baking step can be conducted so as to effect both deactivation of the yeast in the dough after proving and the requisite microbial stabilization of the products prior to the wrapping and sealing operations. As a further alternative, after forming of the assemblies in the way already described, proving followed by baking can take place before the packing step and in this case, a packing operation can be followed by what may be regarded as a pre-sealing operation in which the products are inserted into the immediate wrapping materials without these being closed until the subsequent final sealing step is undertaken. In this sequence of steps, a final retorting step can also be carried out.

In all of the embodiments described so far, microbial stabilization can be provided in other ways than the essentially heat-treatment operations of infra-red heating and retorting. For example, irradiation for instance with beta particles can be employed for this purpose, instead of a heating step.

As regards the addition of the inner materials in the various embodiments of pre-bake assembly modes of the process of the invention, described above in relation to FIG. 2, a number of methods are illustrated in FIG. 3, which shows in highly diagrammatic form and side view a number of apparatus units in relation to a conveyor indicated at the lower part of FIG. 3 and advancing from left to right as there shown. The dough pieces or pallets in appropriately registered spatial arrangement on the conveyor may have undergone proving

and part-baking as indicated on the left hand side of FIG. 2 or may have been placed in appropriately registered form, directly after leaving the panner, on to the oven band or waffle carousel or other component comprising the conveyor. The layer used as the barrier component of the products is obtained by subjecting the appropriate ingredients to treatment in a mixer followed by a holding tank and then a cooker/cooler unit which is again followed by a holding tank. Then at an appropriate place in the path of forward movement of the conveyor with the dough pieces thereon, discrete measured quantities of the layer composition are deposited on to the dough pieces. In a similar operation, the filling component is produced by supplying the requisite ingredients to a mixer which is also followed by a holding tank, followed in its turn by a cooker/cooler unit and a further holding tank. Deposition of measured quantities of the filling material on to the dough pieces already having received the barrier layer can then take place, typically at the next station after the one where the depositor for the layer material operates. As an alternative to internal addition, in the pre-bake assembly operation of the apparatus and process of the invention, both the layer and filling compositions can pass through the mixer, holding tanks and cooker/coolers directly to a co-extruder apparatus, where the two compositions are deposited simultaneously on to the dough pieces in the appropriate mutual arrangement.

An alternative to pre-bake assembly is postbake assembly and this is illustrated diagrammatically, by a preferred embodiment shown in FIG. 4. As indicated at the lower part of the figure, the apparatus units and the steps carried out in them proceed from left to right and are initiated by the appropriate processing operations on the layer component, the filling component and the dough. The latter is then formed into shaped casing bodies, for instance by having coated mandrels or spikes, the coating being provided with a suitable non-stick material, such as polytetrafluoroethylene, e.g. "TEFLON", so that a plurality of bread casings are formed on the mandrels. These casings therefore are essentially tubular with a closed end, as first formed, the opposite end still containing the mandrel and therefore being open. The bread casing components on the mandrels are then taken through successive proving and baking stages to a further stage where the spikes or mandrels are extracted and the bread casings are then ready for insertion into their open ends, of the inner components of the products.

The processing of the filling will typically involve a chilling or freezing operation and then the filling components and the layer components are brought together by one of a number of techniques typically involving enrobing, dipping or co-extrusion. This therefore results in the production of assembled inner components and layer components which are then introduced into the proved and baked bread casings, following which the assembled products pass to a bread sealing station in which the open ends of the bread casings which have been formed on the spikes or mandrels are closed. Packing and an optional gas flushing step can follow sealing of the bread casings. Gas flushing is essentially control of the atmosphere in which the products are contained, the atmosphere being provided by an appropriate gas or mixture of gases. Typical gases are CO₂ and N₂ which are essentially inhibiting gases which have the effect of displacing any oxygen present so that a number of organisms such as putrifying bacteria are precluded from

growth. In other gas flushing steps, the flushing gas comprises oxygen which is then present in the package at a predetermined level. In addition to incorporation into the post-bake assembly illustrated in FIG. 4, a gas flushing operation can be incorporated between packing and IR heating in the steps indicated in the pre-bake option shown in FIG. 2. Reverting to FIG. 4, following the packing and optional gas flushing steps, the products are subjected to a final heat treatment, cooling and cartoning.

The appearance of the product at various stages in the process described in relation to FIGS. 2 and 3 is shown in FIGS. 5a, 5b and 5c.

FIG. 5a shows a shaped bread pallet 100 comprising two similar elongated shallow halves 101 joined along a central line 102. Each half 101 of the pallet 100 includes a peripheral flange 103 and closure of the pallet by hinging about the line 102 brings the flange 103 of one half 101 into contact with the flange 103 of the other, so that the pallet 100 can be closed to form the exterior casing of the product. The halves 101 of the pallet 100 or at least the half 101 which is intended to be uppermost after closure are/is preferably provided with vapour escape holes, such as are shown at 104. The interior surfaces 105 of the pallet halves 101 can be provided with an integral barrier layer 106, which can if desired extend over the mutually-contacting surfaces of the flanges 103.

FIG. 5b shows the closed casing 100, with the flanges 103 in contact and the barrier layer 106 covering the entire interior surfaces 105. The filling deposited upon the open pallet before closure to make the casing 100 is shown at 107 and a moisture-proof sterilizable food-compatible wrapping 108 is provided fully around the snack food product and, in this condition, the product is capable of storage, without refrigeration or deep-freezing, for extended periods of time, i.e. from 3 to 6 months or longer. A space 109 may be formed between the filling 107 and the part of the casing 100 containing the vapour escape holes 104.

FIG. 5c shows the product when separated from the wrapping 108 and heated ready for consumption. The barrier layer 106 may melt into the casing 100 or the filling 107 or both in this step and also the filling 107 may expand into contact with the casing 100, so that the vapour space 109 disappears.

The wrapping and sealing of the products in sterile envelopes or other packaging materials is preferably carried out under an appropriate inert atmosphere, e.g. N₂ or CO₂.

EXAMPLE 1

I. A bread-like dough was prepared by blending the following ingredients in a MORTON mixer:

Ingredients	Weight (g)
Wholemeal flour	500
Dried gluten	50
Salt	9
Fat	30
Yeast	30
Milk powder	7
Sugar	9
Water	310
Ascorbic acid soln (1%)	3.25
Sodium diacetate (flavouring)	1

Mixing took place for 4 min, at high speed at 25° C. The dough was then raised for 20 min at 30° C., shaped upon bars into tubular form and then heated for 14 min at 210° in an oven.

A cheese filling composition was prepared by mixing and heating the following ingredients (% by weight)

Cream cheese	40
Double cream	20.8
Milk	20.8
Ground onions	6.4
Salt	0.56
Spices	0.11
Maize starch	3.12
Gelatin	3.20
Water	4.8
Total	100

The filling mixture was then sterilized, frozen, divided into pieces to suit the bread casings and then dip-coated in a pan containing molten cheese. The cheese coating on the frozen filler pieces was about 2-4 mm thick. The pieces were inserted into the precooked bread casings and the latter were sealed, so that the coated filling was completely enclosed by the bread casing. Then the food products were sealed in sterile pouches under nitrogen.

EXAMPLE 2

A dough for making French bread was prepared from the following ingredients:

Ingredients	% by weight
Wheat flour	63
Yeast	3
Salt	1.5
Sugar	1.5
Fat	2
Water	29
Total	100

The dough was formed into casings and precooked as in the previous Example.

A filler composition was prepared from the following ingredients:

Ingredients	Weight (g)
Yoghurt	583
Dried cream	153
Dried onion	25
Modified starch	33
Salt	10
Pepper	0.3
Dextrose monohydrate	40
Disodium dihydrogen pyrophosphate	2.5
Fat	150
Emulsifier	5
Gelatin	25
Water	25
Cooked bacon	108
Grated cheddar cheese	134

A barrier layer was prepared to the following recipe:

Ingredient	% by weight
Casein	25
Fat	25
Water	45

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Ingredient	% by weight
Emulsifier	1
Lactic acid	1
Salt	2
Emulsifying salts	1

The filling was totally enclosed within the barrier layer by the use of a co-extruder, for example a co-extruder manufactured by Theon Company or Hutt GmbH, to produce a "rope" of covered filling. This rope was then "pinched" to form discrete elongate portions each having the barrier layer sealed to itself at both ends, with a portion of the filling included within the coating formed by the barrier layer. The portions were then combined with the bread dough in the manner described in Example 1, the bread being pre-cooked as described in Example 1 before combination.

The water activities of the components of the food products of Examples 1 to 4 were as follows:

Example 1:	pre-cooked bread shells	0.93
	cheese filler	0.96
	molten cheese	0.95
Example 2:	pre-cooked bread shells	0.93
	filling	0.93
	barrier layer	0.95

The above figures represent the water activities in the final product, after manufacture but before storage.

We claim:

1. A snack food product comprising:

(a) an outer casing of a bread material having a water activity in the range from 0.60 to 0.95;

(b) a filling component wholly enclosed by said casing and having a water activity in the range from 0.90 to 0.99, said casing and said enclosed filling having been rendered temporarily sterile; and

(c) a sterile moisture-proof wrapping wholly enclosing said casing and said filling contained therein; said product being microbially stable and having a long shelf life at ambient temperature, said casing and said enclosed filling being microbially unstable when devoid of said wrapping.

2. A product according to claim 1, wherein said casing has a water activity in the range from 0.60 to 0.95.

3. A product according to claim 2, wherein said casing and said filling have respective moisture contents selected so as to result in water activity values for the casing and the filling within each corresponding said range and which undergo no substantial change during storage of the wrapped product.

4. A product according to claim 3, wherein said water activity values of the respective casing and filling components are selected within each said range so that equilibration of the water contained in the casing and in the filling takes place throughout the product without adversely affecting the product.

5. A product according to claim 1, and an intermediate, edible barrier layer serving to restrict migration of water between said casing and filling components of the product, said barrier layer being disposed between said casing and said filling.

6. A product according to claim 1, wherein said casing is an integral hollow component encasing said filling component.

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7. A product according to claim 1, wherein said bread material comprises flour and yeast.

8. A method of manufacture of a storage-stable snack food product comprising a filling wholly enclosed in an outer casing component, comprising the steps of:

- (a) forming an outer casing by shaping a piece of bread dough;
- (b) subjecting said shaped dough piece to a proving step;
- (c) depositing a filling composition upon said shaped dough piece;
- (d) closing said dough piece such that said filling composition is wholly enclosed within said casing;
- (e) heating said casing and enclosed filling to ensure their temporary sterilization and to impart to said enclosed filling a water activity in the range from 0.90 to 0.99, said casing having a water activity in the range from 0.60 to 0.95; and
- (f) wholly enclosing said casing and enclosed filling in a sterile moisture-proof wrapping, said wrapped product thus being microbially stable and having a long shelf life at ambient temperature, said casing and enclosed filling being microbially unstable when devoid of said wrapping.

9. A method of manufacture of a storage-stable snack food product comprising a filling wholly enclosed in an outer casing component, comprising the steps of:

- (a) forming an outer casing by shaping a piece of bread dough into a tubular component;
- (b) subjecting said tubular component to a proving step;
- (c) inserting a shaped filling component into said tubular component;
- (d) closing at least one end of the casing so that the filling component is wholly enclosed within said casing;
- (e) heating the resultant said casing and enclosed filling to ensure their temporary sterilization and to impart to said enclosed filling a water activity in the range from 0.90 to 0.99 said casing having a activity in the range from 0.60 to 0.95; and
- (f) wholly enclosing said casing and enclosed filling in a sterile moisture-proof wrapping, said product thus being rendered microbially stable and having a long shelf life at ambient temperature, said casing and enclosed filling being microbially unstable when devoid of said wrapping.

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10. A method according to claim 8, wherein an edible barrier layer is provided between the casing and the filling by disposing upon the interior of the casing, prior to said depositing step, a composition capable of forming a barrier to moisture.

11. A method according to claim 9, wherein an edible barrier layer is provided between the casing and the filling by depositing upon the exterior of the shaped filling component, prior to said inserting step, a composition capable of forming a barrier to moisture.

12. A method according to claim 11, wherein said composition capable of forming a barrier to moisture and said filling component are prepared by co-extrusion.

13. A method according to claim 9, wherein said tubular component is closed at one end prior to said inserting step.

14. A method according to claim 8, wherein said shaped dough piece is subjected to a preliminary heating step prior to said depositing step.

15. A method according to claim 14, wherein said heating steps are effective to bake said dough.

16. A method according to claim 9, wherein said wrapping is tubular in form and its ends are closed after being fitted over or around said product.

17. A method according to claim 16, wherein said wrapping is an elongated strip which is wound helically about said product.

18. A method according to claim 8, wherein said product is subjected to a gas flushing at least prior to said wrapping step.

19. A method according to claim 18, wherein said gas flushing step is effective at least to control at a predetermined level the amount of oxygen in the completed product.

20. A method according to claim 8, wherein said casing is pallet-shaped and comprises two elongated halves joined along a central plane, the filling being deposited upon at least one half, the casing being closed by mating edges of the respective halves to close said casing.

21. A method according to claim 20, wherein a composition capable of forming a barrier to moisture is applied to at least one said half of said casing before the filling is deposited.

22. A method according to claim 8, wherein said dough comprises flour and yeast.

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United States Patent [19]
Kleinschmidt et al.

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[54] **FILLING-CONTAINING, DOUGH-BASED
PRODUCTS CONTAINING CELLULOSIC
FIBRILS AND MICROFIBRILS**

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426/579

[58] **Field of Search** 426/94, 573, 577

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[57] **ABSTRACT**

Filling-containing, dough-based products, in particular
fruit-filled cookies, having good eating quality and fla-
vor release are disclosed. These products comprise a
crumb or dough and a low water activity filling associ-
ated with this crumb or dough. The filling comprises an
aqueous phase having sugar dissolved therein and a
thixotropic cohesive network of fibrils and microfibrils
dispersed therein. The network of fibrils and microfi-
brils functions as a flow control agent which permits the
filling, and dough forming the crumb, to be co-baked.

16 Claims, 2 Drawing Sheets

FILLING-CONTAINING, DOUGH-BASED PRODUCTS CONTAINING CELLULOSIC FIBRILS AND MICROFIBRILS

TECHNICAL FIELD

This application relates to fillings, in particular filling-containing, dough-based products having good eating quality such as fruit-filled cookies.

Low water activities (i.e., below 0.6) are often needed in baked goods to keep them crisp and crunchy. However, crisp baked goods are often mouth-drying. Fat based creme fillings can be used to provide an additional lubriciousness during eating. An example of such products are sandwich cookies where the creme filling is positioned between two crisp cookie crumbs.

Fat typically comprises about 33% of a creme filling. Replacement of fat with a nonfat ingredients could reduce the calories of such fillings by 15 to 20% on a weight basis. In addition, the display of flavor volatiles from such fillings is usually affected by the presence of the fat. Fillings which do not contain fat can be more suitable for display of flavor volatiles from certain flavor systems.

A prominent example of such nonfat systems are fruit fillings used in "thumb print" type cookies. These thumb print cookies comprise a fruit based material which fills a depression formed in the cookie crumb. Traditional fruit fillings for such cookies are made from fruit preserves or jellies. Unlike creme fillings, the flavor display from these aqueous solutions is controlled by gelling agents such as pectin.

Preserves and jellies used in fruit fillings have a relatively high water activity and a relatively low viscosity. This results in a rapid dispersion of the filling in the mouth when eaten, thus providing a desirable eating quality. However, this can also cause the fruit filling to flow when co-baked with the dough that forms the cookie crumb. The crumb also becomes soft due to the release of liquid from the filling during and after baking.

Starches or gums can be added to preserves or jellies used in fruit fillings for flow control during baking. However, the use of starches or gums as flow control agents creates a filling that is gummy and tacky after baking. This causes the filling to disperse much more slowly in the mouth. The result is reduced eating quality and flavor release in the fruit-filled cookie. Accordingly, it would be desirable to have a flow control agent for fruit fillings which does not reduce the eating quality of the fruit filled cookie after baking.

The crispness of the cookie crumb can be increased by reducing the moisture content of the filling, thus lowering its water activity. However, in the case of preserves or jellies, this typically requires increasing the sugar content which can create a much higher viscosity filling. This relatively high viscosity filling disperses much more slowly in the mouth with a resulting reduced eating quality. In addition, these low moisture, low water activity fillings still need a flow control agent to enable them to be co-baked with the dough. Accordingly, it would be desirable to provide a low water activity fruit filling which also has a relatively low viscosity.

BACKGROUND ART

U.S. Pat. No. 4,341,807 to Turbak et al. (assigned to ITT), issued July 27, 1982, describes food products containing a suspension of microfibrillated cellulose as a

thickener, flavor carrier and suspension stabilizer. Food uses specifically taught include fillings, crushes, soups, gravies, puddings, dips, toppings and other food products. See in particular Example 6, which discloses the use of this microfibrillated cellulose in preparing fruit fillings and crushes.

Turbak, "Microfibrillated Cellulose—A New Composition of Commercial Significance," *Tappi, 1984 Non-Woven Symposium*, page 121, describes the use of this microfibrillated cellulose in reduced calorie jams and jellies, reduced calorie foods, and low and reduced calorie spreads. This use in low calorie food products appears to be based on microfibrillated cellulose as a nondigestible thickener.

DISCLOSURE OF THE INVENTION

The present invention relates to flavored-fillings having an a_w value of from about 0.2 to about 0.6. The fillings comprise: (1) an aqueous phase; (2) sugar dissolved in the aqueous phase; and (3) from about 0.1 to about 5% by weight of the filling of a thixotropic cohesive network of cellulosic fibrils and microfibrils dispersed in the aqueous phase. The present invention particularly relates to filling-containing dough-based products such as fruit-filled cookies. These products comprise: (a) a crumb (or dough for forming this crumb) comprising flour, shortening and water; and (b) the flavored filling defined above associated with the crumb or dough.

A key aspect of the present invention is the network of cellulosic fibrils and microfibrils present in the filling. This network of fibrils and microfibrils functions as a flow control agent in the filling. This permits the filling, and the dough forming the crumb, to be co-baked. Even after baking, the filling disperses rapidly in the mouth which results in a good flavor release.

This network of fibrils and microfibrils is especially useful in fillings which optionally contain edible polyol humectants such as glycerol and/or certain edible hydrocolloids such as high methoxy pectins. Use of the polyol humectants provides fillings which have a low water activity and a relatively low viscosity. Use of certain hydrocolloids prevents syneresis, i.e. the physical "squeezing" or release of liquid from the filling during and after baking so that the crumb remains relatively crisp and firm. Because the network of fibrils and microfibrils imparts some stringiness to the filling as it is pulled apart, high methoxy pectins are preferred hydrocolloids since they reduce or prevent such stringiness when processed appropriately, as well as providing an eating quality essentially equivalent to preserves or jellies.

The fillings of the present invention are particularly useful in dough-based products such as fruit-filled cookies. However, if desired, these fillings can also be used in other, nondough-based products which require a filling or jelly-type component. Examples of such products include chocolate enrobed filling products, peanut butter and jelly products, and the like.

A. BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a photograph of a portion of a filling made according to the present invention at 500× magnification.

FIG. 2 is a greatly enlarged representation of what a portion of the network of cellulosic fibrils and microfi-

brils is believed to look like in the fillings of the present invention.

B. DEFINITIONS

As used herein, the term "dough" refers to a cohesive mass comprising at least flour, shortening and water which has not been baked.

As used herein, the term "crumb" refers to a cohesive mass comprising at least flour, shortening and water which results from dough that has been baked.

As used herein, the term "sugar" refers to a mono- or disaccharide, or a mixture of mono- and/or disaccharides.

"Monosaccharides" and "disaccharides" as used herein are compounds well known in the art. Monosaccharides have the empirical formula $(CH_2O)_n$, where n is equal to or greater than 3. The carbon skeleton of the common monosaccharides is unbranched and each carbon except one bears an $-OH$ group; the remaining carbon is generally combined in an acetal or ketal linkage. Disaccharides consist of two monosaccharides joined by a glycosidic linkage.

By "baking" herein is meant radiant, conductive, or convective exposure to energy of a type which imparts thermal energy to the product being baked. It thus includes conventional, convection, dielectric and microwave oven baking.

The term "water activity" (a_w) is used herein in its usual context to mean the ratio of the fugacity of water in the system being studied (f) to the fugacity of pure water (f_0) at the same temperature. The water activity of products herein can be measured using well-known physiochemical techniques and commercially available instruments.

As used herein, the term "comprising" means various compatible components can be formulated together. The term "comprising" encompasses the more restrictive terms "consisting essentially of" and "consisting of".

C. FILLING

1. General Description and Sources

Fillings used in the present invention basically comprise an aqueous phase in which are dissolved or dispersed various key components such as sugars and the thixotropic network of fibrils and microfibrils, as well as optional components such as humectants, hydrocolloids, coloring, preservatives, acidulants (e.g., citric acid), fruit particles (e.g., seeds), etc. An important characteristic of this filling is its water activity (a_w value). The water activity of the filling is determined by its moisture content, as well as various components dissolved or dispersed in the aqueous phase. The fillings of the present invention are generally characterized as having a relatively low water activity, i.e. below about 0.6. For fillings of the present invention, the a_w values can range from about 0.2 to about 0.6. Preferably, the a_w value of the filling is close to that of the dough (or crumb) to avoid the transfer of moisture therebetween.

Another important characteristic of the fillings used in the present invention are their viscosity. The viscosity of the filling is important for eating quality because mouth moistness is inversely proportional to the viscosity. The fillings used in the present invention are generally characterized as having a relatively low viscosity. In this regard, the viscosity of the fillings used in the present invention usually ranges from about 5,000 to about 60,000 centipoise. Preferably, the viscosity of

fillings used in the present invention ranges from about 10,000 to about 40,000 centipoise.

The viscosity values of fillings used in the present invention are based on rotational viscometry measurements at 10 seconds⁻¹. This particular measurement was chosen as reflecting the shear forces in the mouth to which the filling is subjected during eating. A detailed description of the method for measuring the viscosity of fillings according to the present invention is as follows:

A Rheometrics RFS 8400 fluids spectrometer is used for rotational viscosity measurements. The spectrometer is run in the parallel plate mode using a 25 mm radius plate with a 2.00 mm gap setting in a 25° C. water bath. A steady shear, rate scan from 0.1 to 100 sec⁻¹ is also used. Five data points per decade of shear are collected. Each data point is an average of a reading in the clockwise and counterclockwise directions. Data for each reading is collected over a 0.1 min. period and is preceded by a 0.1 min. conditioning period. The reading at 10 sec⁻¹ is taken as the viscosity of the filling.

A particularly important component of fillings used in the present invention is sugar. In addition to providing sweetness, sugar controls, to a certain extent, the water activity and textural feel of the filling. Suitable sugars for use in fillings of the present invention include sucrose, dextrose, invert sugars, maltose, fructose, high fructose corn syrup and mixtures of these sugars. At low water activities (below about 0.45), sugars such as sucrose tend to crystallize out of solution with a resulting undesirable textural feel. Accordingly, for fillings having relatively low a_w values, fructose and high fructose corn syrup are preferred since these sugars tend not to crystallize out of solution.

The amount of sugar present in fillings used in the present invention depends on a number of factors. A particularly important factor is the water activity of the filling. Generally, as the sugar content is increased, the water activity of the filling is lowered. Usually, sugar comprises from about 20 to about 80% by weight of the filling. Preferably, sugar comprises from about 55 to about 65% by weight of the filling for a_w values closer to about 0.6 and from about 20 to about 50% by weight of the filling for a_w values closer to about 0.2.

The fillings used in the present invention are flavored with either naturally derived or synthetically derived materials. Basically, any suitable water-soluble or dispersible flavor can be used in the fillings of the present invention. These fillings can be non-fruit type, or preferably fruit-type flavors. Suitable non-fruit flavors include mint, barbeque, cheese, pizza, tomato sauce, etc. Suitable fruit flavors include, strawberry, raspberry, blueberry, boysenberry, apple, cherry, grape, orange, banana, pineapple, Kiwi, mango, etc., The flavoring is present at a flavor-enhancing amount. What will constitute a "flavor-enhancing amount" will depend on the flavoring used, the flavor effects desired and like factors well within the skill of those knowledgeable in the art.

The aqueous, sugar-containing compositions which comprise the fillings of the present invention can be derived from a number of sources. Natural sources of fillings typically provide, in addition to the aqueous sugar-containing composition, a flavoring material. However, suitable fillings can also be obtained by dissolving the appropriate amount of sugar in water and then adding suitable natural or synthetic flavoring(s). Fruit juices and fruit juice concentrates are a preferred source of fruit-fillings for the present invention. Although these juices and juice concentrates naturally

165
187

contain sugars, additional sugar typically needs to be added. The aqueous sugar-containing compositions used in fruit-fillings of the present invention can also be obtained by boiling down a mixture of fruit and edible humectants.

2. Network of fibrils and microfibrils

In addition to sugar, the aqueous phase of the fillings used in the present invention has dispersed therein a thixotropic cohesive network of cellulosic, substantially water-insoluble fibrils and microfibrils. This network is shown at a magnification of 500 $\times$ in FIG. 1 and is indicated by numeral 10. At this magnification, only fibrils indicated by numeral 12 are visible. The microfibrils which are present in network 10 are visible only at magnifications much greater than 500 $\times$.

A representation of what a portion of network 10 is believed to look like, at a magnification much greater than 500 $\times$, is shown in FIG. 2. The fibrils which comprise this network are again indicated by numeral 12. The fibrils 12 basically constitute the "reinforcing rods" of network 10. The fibrils can vary in length, but are usually within the range of from about 10 to about 1,000 microns. The majority of these fibrils typically have a length of from about 100 to about 250 microns.

Fibrils 12 are comprised of rope-like bundles of microfibrils. The surface of the fibrils usually has exposed microfibrils which are indicated by numeral 14. It is believed that these exposed microfibrils 14 cause fibrils 12 to adhere together to form network 10. (It is believed that this adherence is due to hydrogen bonding between the fibrils and microfibrils.) Although the microfibrils are often still attached to the fibrils, it is believed that, in certain instances, unattached microfibrils can form portions of network 10.

The microfibrils also vary in length, but are generally shorter than the fibrils. Typically, the microfibrils have a length of from about 1 to about 100 microns. Another key difference between the fibrils and microfibrils is their diameter. Fibrils typically have a diameter of from about 0.1 to about 2 microns. By contrast, microfibrils typically have a diameter of from about 0.025 to about 0.1 microns.

This network of fibrils and microfibrils has a relatively large surface area. Generally, the surface area of this network is greater than about 100 m²/g. Typically, the surface area of this network ranges from about 100 to about 170 m²/g. This relatively large surface area appears to be important to the flow control properties of this network in the filling. For example, freeze-drying of the fibrils and microfibrils, which reduces the surface area due to hydrogen bonding, causes the network to be poorly or nonfunctional as a flow control agent in the filling.

The surface area of the fibrils and microfibrils is measured by a Quantasorb instrument (Quantachrome Company, Syosset, N.Y.). This measurement involves a monolayer nitrogen adsorption analysis of a dried sample at three different partial pressures, i.e. a three point B.E.T. analysis. The dried sample is obtained by drying an aqueous suspension of the fibrils and microfibrils with ethanol and acetone, followed by critical point drying with carbon dioxide. See Dawes, *Biological Techniques for Transmission and Scanning Electron Microscopy* (2d. Edition 1979), pp 231-39, which describes techniques for critical point drying of materials.

An important characteristic of this network of fibrils and microfibrils is the fact that it is thixotropic. In the absence of mechanical shear, the fibrils and microfibrils

form a cohesive network in the filling. This network imparts a sufficiently high viscosity and yield point to the filling that is not affected at up to baking temperatures, i.e. up to about 100° to about 120° C. As a result, this network prevents flow of the filling during baking, i.e., the network functions as an effective flow control agent.

By contrast, when subjected to even moderate mechanical shear, this network is easily disrupted with a resulting lowering of the viscosity of the filling. In particular, the shear forces generated in the mouth during eating of the filled products of the present invention is sufficient to disrupt this network. The resulting lowering of the yield point of the filling makes it disperse rapidly in the mouth and creates a desirable moistness impression. This rapid mouth dispersion also provides good flavor release from the filling.

The cellulosic fibrils and microfibrils which form the thixotropic cohesive network can be obtained from various sources. A preferred source is microfibrillated cellulose prepared according to the method disclosed in U.S. Pat. No. 4,374,702 to Turbak et al, issued Feb. 22, 1983, which is incorporated by reference. In this method, cellulosic pulp or other unregenerated fibrous cellulose is added to a liquid suspending media which swells the cellulose. This liquid suspension is repeatedly passed through a small diameter orifice in which the mixture is subjected to a large pressure drop (at least 3,000 psi) and a high viscosity shearing action, followed by a high viscosity decelerating impact. This converts the cellulosic starting material into a suspension of microfibrillated cellulose. See also U.S. Pat. Nos. 4,481,076 and 4,481,077 to Herrick, issued Nov. 6, 1984, which disclose other methods for obtaining microfibrillated cellulose and which are incorporated by reference. Microfibrillated cellulose can also be obtained commercially from ITT Rayonier, a subsidiary of the assignee of these patents, as a spray dried powder or moist cake which can optionally contain other ingredients such as dextrin, sucrose or sorbitol.

Another method for obtaining cellulosic fibrils and microfibrils useful in the present invention is by bacterial fermentation of a sugar containing solution. Particularly suitable sugar containing solutions include coconut milk (Nata de Coco) or pineapple (Nata de Pina) solutions. A bacteria culture acts on the sugar solution to spin out a mat of cellulosic fibrils and microfibrils. This mat can then be redispersed in the aqueous phase of the filling to form the desired network of fibrils and microfibrils.

The network of cellulosic fibrils and microfibrils is dispersed in the aqueous phase in an amount of from about 0.1 to about 5% by weight of the filling. At least about 0.1% by weight of this network is needed to provide an effective flow control agent for the filling when baked. At levels much above 5% by weight, this network can cause the filling to have too high a viscosity. Preferably, this network is dispersed in the aqueous phase in an amount of from 0.3 to about 2% by weight of the filling.

3. Polyol Humectants

An optional, but preferred component of fillings used in the present invention is an edible polyol humectant. As used herein, the term "edible polyol humectant" refers to a polyol compound, other than a sugar, which is safe for food use, has an affinity for water, and provides a stabilizing action on water present in fillings used in the present invention. Use of polyol humectants

permits the fillings of the present invention to have a relatively low water activity without substantially increasing their viscosity. Suitable polyol humectants for use in fillings of the present invention include glycerol, sorbitol, propylene glycol, and 1,3-butanediol. Sorbitol is a particularly preferred humectant for use in fillings of the present invention.

The edible polyol humectant is dissolved in the aqueous phase in an appropriate amount. The amount of humectant used is primarily dependent on the water activity desired in the filling. For low water activity fillings, higher amounts of humectant are typically included. Generally, the humectant is included in an amount of from about 5 to about 50% by weight of the filling. Preferably, the humectant is included in an amount of from about 10 to about 35% by weight of the filling.

4. Edible Hydrocolloids

Another optional, but preferred component included in fillings used in the present invention are certain edible hydrocolloids. As used herein, the term "edible hydrocolloid" refers to long-chained polymers safe for food use which dissolve or disperse in water to give a thickening or viscosity-producing effect, i.e. gelling. Inclusion of these edible hydrocolloids prevent syneresis of liquid from the filling, especially after baking. This permits the crumb formed from the dough to remain relatively crisp or firm, rather than becoming soft or soggy.

The hydrocolloids which have been found to be useful in the fillings of the present invention are starches, xanthan gum, and high methoxy pectins. The particularly preferred hydrocolloid for inclusion in fillings of the present invention are the high methoxy pectins. Pectins consist chiefly of galacturonic acids which are partially methoxylated and which are joined in long chains having a high molecular weight (M.W.), typically from about 20,000 to about 40,000. Pectins are usually classified by their degree of methoxylation (D.M.). High methoxy pectins used in fillings of the present invention have D.M. values greater than about 50.

The reason high methoxy pectins are preferred for use in fillings of the present invention is to reduce or prevent stringiness. It has been found that the network of cellulosic fibrils and microfibrils used in fillings of the present invention impart some stringiness to it as it is pulled apart. This is believed to be the result of the fibrils and microfibrils adhering together into long strings due to hydrogen bonding forces under conditions of differential flow. It is believed that pectin gel domains that form in the filling interrupt such differential flow so that long strings of fibrils and microfibrils cannot be formed.

The amount of hydrocolloid used in fillings of the present invention is dependent on various factors, including the particular hydrocolloid used. The amount included should be sufficient to prevent or retard syneresis of liquid from the filling after baking, as well as to optimize eating quality. However, the amount used should not be such that the viscosity of the filling is increased to the point where it substantially affects eating quality. Generally, the hydrocolloid is dissolved or dispersed in the aqueous phase in an amount of from about 0.1 to about 1% by weight of the filling. When high methoxy pectins are used as the hydrocolloid, they are preferably included in an amount of from about 0.2 to about 0.5% by weight of the filling.

The hydrocolloid can be dissolved or dispersed so that the filling has an essentially homogeneous phase. However, when pectin is used, the hydrocolloid is preferably irregularly dispersed throughout the filling as a multiplicity of lumps or domains of pectin gel. When in the form of lumps, the pectin gel is particularly effective in reducing stringiness. These lumps of pectin gel typically have a size ranging from about 0.5 to about 3 mm. and many are sufficiently large so that they can be sensed by the tongue. These lumps give the desirable impression that the filling contains pieces of fruit and provide an eating quality essentially equivalent to preserves or jellies.

D. DOUGH

A major portion of the filling-containing products of the present invention is typically represented by a dough which forms a crumb on baking. This dough comprises at least flour, shortening, and water. Other optional ingredients such as emulsifiers (dough conditioners), leavening agents, corn syrup solids, sweetener, salt, and the like can also be included. Generally, cake (e.g., brownie), cookie and cracker-type doughs which provide, after baking, a low water activity (0.6 or less) crumb can be used in the filling-containing products of the present invention. However, preferred doughs are those which form a cookie-like texture upon baking.

1. Flour

Any type of flour which is suitable in cake, cookie and cracker-type doughs can be used in the present invention. For example, suitable flours include wheat flour, rye flour, corn flour, cottonseed meal, and sorghum flour. Preferably, wheat flour is used in preparing the dough of the present invention. This flour can be bleached or unbleached. Because the flour constitutes a major ingredient of the dough, the percentages of the remaining ingredients are referred to on a flour weight basis (FWB).

2. Shortening

In addition to flour, the dough comprises shortening. Fats which can be used as the shortening component can be any of the usual fat stocks employed in preparing liquid, fluid, plastic, or solid shortenings. Various fats such as cottonseed oil, soybean oil, lard, palm oil, and other vegetable, animal and marine fats, or mixtures thereof, either unhydrogenated or in various stages of hydrogenation, can be used. Suitable shortenings can also be formulated with nonabsorbable, nondigestible fatty acid esters of polyols, in particular sucrose polyesters, disclosed in U.S. Pat. No. 4,005,196 to Jandacek et al., issued Jan. 25, 1977, which is incorporated by reference.

The amount of shortening used in the dough can vary widely depending upon the characteristics desired. Usually, the amount of shortening used is such that the dough of the filling-containing product, when baked, is not excessively tender. Usually, the amount of shortening present in the dough can range from about 30 to about 55% by FWB. Preferably, the amount of shortening ranges from about 40 to about 45% by FWB.

3. Water

In addition to flour and shortening, the dough also contains a suitable amount of water. Generally, the amount of water incorporated in the dough is such that the dough forms a cake-like, cracker-like, or preferably cookie-like, texture when baked. For cracker-type doughs, the amount of water present is such that the a_w value of the baked crumb is typically from about 0.1 to

about 0.5, and preferably from about 0.2 to about 0.3. For cookie-type doughs, this a_w value can range from about 0.25 to about 0.8, preferably from about 0.45 to about 0.6. Usually, the amount of water used in the dough ranges from about 20 to about 35% by FWB.

4. Emulsifiers

The dough also desirably includes emulsifiers. These emulsifiers are frequently referred to as "dough conditioners" because they are used to control the consistency of the dough. Suitable emulsifiers include mono- and diglycerides of fatty acids, sucrose partial fatty acid esters, sorbitan esters of fatty acids, polyoxyethylene sorbitan esters of fatty acids, propylene glycol esters, polyethylene glycol esters, ethoxylated mono- and diglycerides, fumarated esters of monoglycerides or their alkali metal salts, alkanoyl lactylates or their metal salts, lecithins, and the like. Preferred dough conditioners include sorbitan monostearate (Span 60), polyoxyethylene sorbitan monostearate (Tween 60), propylene glycol monostearate, glycerol lactopalmitate, sodium stearoyl fumarate, calcium stearoyl-2-lactylate, ethoxylated monoglycerides and lecithin. The amount of emulsifier can be varied to obtain the dough properties desired. These emulsifiers are typically used at from about 0.1 to about 5% by FWB. However, higher or lower amounts can be used if desired.

5. Leavening Agent

The dough also can include a leavening agent. Non-yeast leavening agents include a source of carbon dioxide such as sodium bicarbonate or potassium bicarbonate, alone or in combination with a leavening acid such as monocalcium phosphate, dicalcium phosphate, sodium acid pyrophosphate, sodium aluminum sulfate, sodium aluminum phosphate, potassium acid tartrate and the like. Preferably, an active dry yeast is used as part of the leavening agent for cracker-type doughs. The amount of leavening agent used depends on the particular agent employed and the leavening characteristics desired.

6. Sweetener

Especially for cake and cookie dough systems, a sweetener is typically included. Suitable sweeteners include sucrose, invert sugar syrups, brown sugar, corn syrup solids, fructose, dextrose (glucose), honey, molasses, maple syrup and the like. Particularly preferred sweeteners are sucrose, fructose and corn syrup solids. The amount of sweetener included typically depends upon the type of dough desired (cookie dough, cake dough or cracker dough), as well as the sweetness desired.

7. Optional Ingredients

Other optional ingredients which can be included in the dough are milk products such as whole milk, skim milk, buttermilk, whey, concentrated milk products (condensed or evaporated milk), dried milk products, nonfat milk powder, dry whole milk, modified whole milk and the like, egg products, including egg whites and egg yolks, spices, cocoa products, flavors such as vanilla, salt, color additives, preservatives, antioxidants and the like.

8. Dough Making

The dough can be prepared by standard techniques in the art for making cookie, cake or cracker-type doughs. See Matz et al., *Cookie and Cracker Technology* (2d Ed. AVI Publishing Co., 1978), pp. 166-75, for standard techniques for preparing cracker doughs. Typically, the dry ingredients such as the flour, salt, corn syrup solids, etc. are mixed together. The shortening and emulsifiers

are co-melted and the mixed with the dry ingredients. Any yeast, sweetener and water are then mixed in with the mixture of dry ingredients plus shortening-emulsifier to form the finished dough.

Particularly suitable doughs for use in the present invention provide storage-stable, dual-texture cookie crumbs. The "laminated" version of these cookie doughs are disclosed in U.S. Pat. No. 4,455,333 to Hong et al., issued June 19, 1984, which is incorporated by reference. The laminated cookie doughs of Hong et al. combine different doughs to produce a cookie crumb having storage-stable, crisp and chewy textures. This is accomplished by distributing through the crumb-continuous matrix discrete regions of crumb containing readily crystallizable sugar and discrete regions of crumb containing a crystallization-resistant sugar. The result is a storage-stable plurality of textures, the regions containing crystallized sugar providing a crisp texture and the regions containing uncrystallized sugar providing a chewy texture.

In addition, U.S. Pat. No. 4,503,080 to Brabbs et al., issued Mar. 5, 1985, (herein incorporated by reference), discloses a similar storage-stable, dual-textured cookie crumb where the discrete regions of chewy texture contain a readily crystallizable sugar, plus a polyol crystallization inhibitor. U.S. Pat. No. 4,344,969 to Youngquist et al., issued Aug. 17, 1982, (herein incorporated by reference) discloses yet another method for preparing such cookie crumbs from a single-dough where sugar crystallization is controlled by enzyme activity. Manipulation of water activity is one means used for activating and inactivating the enzymes of selected portions of the cookie crumb. Thus, sugar and/or starches in the areas where the enzyme is active are converted into mixtures which are non-crystallizing, or crystallization-resistant, while the crystallization behavior of sucrose is preserved in those areas where the enzyme is inactive. The resulting dough and subsequent crumb areas after baking have storage-stable, crisp and chewy textures, respectively.

The dough for providing these dual-texture cookie crumbs can be made by using any of the methods disclosed in the above Hong et al., Brabbs et al., and Youngquist et al. patents. The preferred cookie doughs are made by the process of preparing a first cookie dough from cookie ingredients containing a crystallization-resistant sugar such as sucrose, or solution thereof, optionally an effective amount of a sugar crystallization inhibitor for the sucrose, preparing a second cookie dough containing sucrose or solution thereof, and substantially enveloping the first dough within a layer of the second dough, thereby forming a ready-to-bake, laminated dough structure, which, when baked yields a dual textured cookie crumb.

Sugar, flour, water and shortening, when combined in almost any reasonable proportions, will produce a dough that can be baked to form a cookie crumb—the classic "sugar cookie". Of course, the sweetness, texture and similar organoleptic properties of the cookie crumb will depend upon the ratio of sugar/flour/water/shortening. In general, any cookie recipe which produces an organoleptically acceptable cookie crumb can be used in the present invention.

E. METHOD FOR MAKING FILLING-CONTAINING PRODUCTS

The filling-containing, dough-based products of the present invention are formed by appropriate combina-

tion of the previously described flavored-fillings with a dough. The flavored-filling is formed from an aqueous sugar containing composition, which can optionally contain an edible polyol humectant. In the case of fruit fillings, juice concentrate plus added sugar is a preferred source for such aqueous sugar containing compositions. The cellulosic fibrils and microfibrils are dispersed in this sugar/humectant containing composition at high shear to form the appropriate thixotropic cohesive network. Hydrocolloids such as high methoxy pectins can be optionally dispersed or dissolved before, during or after the fibrils and microfibrils are dispersed in the filling. Alternatively, the sugar/humectant containing composition of cellulosic fibrils and microfibrils can be blended with a second sugar/humectant containing composition which has the hydrocolloid. Once the fibrils and microfibrils, and optional hydrocolloid, are dissolved or dispersed, the filling is then boiled to adjust its water activity to the desired value. After boiling, optional ingredients such as flavors, colors, fruit particles, edible acids, buffers, and the like can then be added. When formed, the filling typically has a pumpable consistency at a temperature from about 75° to about 95° F. (from about 24° to about 35° C.).

In order to form lumps or domains of pectin gel in the filling, a different method from that described above needs to be used. In this method, the pectin is dissolved in an aqueous sugar/humectant composition and then permitted to gel. This gel is then broken up into lumps having the appropriate size. These pectin gel lumps are then gently blended or folded into a viscous sugar/humectant gel containing the cellulosic fibrils and microfibrils. Typically, from about 30 to about 70% by weight pectin gel lumps are blended with from about 70 to about 30% by weight of the fibril/microfibril gel.

This pumpable filling can be used to prepare a variety of filling-containing, dough-based products by standard methods well known in the filled-cookie art. In the case of "thumb print" type cookie products, the dough is formed into appropriate pieces which are then stamped or imprinted with a depression for receiving the filling. The filling is then pumped or added to this depression. The filling of the present invention can also be used to prepare products where the dough partially surrounds the filling. For these products, the filling and dough are typically co-extruded such that the dough encloses the filling. Examples of such products are bar-type cookies of the "Fig Newton"-type.

Once the filling is associated with the dough, this raw product can then be baked to form the finished (baked) filled product. Temperature conditions suitable for forming other baked goods can be used in preparing the baked filled products of the present invention. Typically, the raw filled product is baked at a temperature of from about 275° to about 400° F. (from about 135° to about 204° C.), for from about 5 to about 15 minutes. Preferably, the raw filled product is baked at a temperature of from about 325° to about 375° (from about 163° to about 191° C.), for from about 8 to about 12 minutes. The particular baking conditions employed depend upon the size of the filled product, the amount of doneness desired, the particular oven used, and like factors. If desired, the dough can be baked to form the crumb before the filling is included in the product.

SPECIFIC METHODS FOR MAKING FRUIT-FILLED COOKIE PRODUCTS OF THE PRESENT INVENTION

The following illustrates specific methods for preparing fruit-filled cookie products according to the present invention:

Step 1: Forming Fruit-Filling

EMBODIMENT 1

A fruit filling is prepared by blending together two sugar/humectant containing compositions which have the following ingredients:

Ingredients	First Composition (g.)	Second Composition (g.)
Apple juice concentrate	112	112
Fructose (crystalline)	153	153
Sorbitol (crystalline)	77	77
MFC-VG sucrose*	3.5	—
High methoxy pectin**	—	0.7
Citric acid	1.75	1.75
Natural strawberry flavor	2.62	2.62
Food color	q.s.	q.s.
Total	349.87	347.07
Water Activity	0.52	0.53

*Microfibrillated cellulose, ITT Rayonier Forest Products

**Herbstreith NS-2, D.M. of 60-65%.

The MFC-VG (or pectin) are mixed with 60 g. of the fructose and then stirred well. The apple juice concentrate is then added and the resulting composition brought to a boil. The remaining fructose and sorbitol are added and then mixed at the highest speed in an Osterizer mixer for 5 minutes. The citric acid is then added and the resulting composition boiled in a microwave until the a_w value is 0.53 (approximately 4 minutes). The strawberry flavor and food color is then added and thoroughly mixed in. The two resulting compositions are blended together while above the pectin gelation temperature (approximately 170° F. (77° C.)) to form the filling.

EMBODIMENT 2

A fruit filling is prepared from the following ingredients:

Ingredients	Amount (g)
Apple Juice Concentrate	112
Fructose (crystalline)	152.4
Sorbitol (crystalline)	77
MFC-VG sucrose*	3.5
High Methoxy Pectin**	0.7
Citric Acid	1.8
Natural Strawberry Flavor	2.6
Food Color	q.s.
Total	350.0
Water Activity	0.53

*Microfibrillated cellulose, ITT Rayonier Forest Products

**Herbstreith NS-2, D.M. of 60-65%.

The MFC-VG and pectin are mixed with 60 g. of the fructose and then stirred well. The apple juice concentrate, sorbitol and remaining fructose is then added and the resulting composition brought to a boil in a microwave (approximately 2 minutes). This boiled composition is mixed at the highest speed in the Osterizer mixer for 5 minutes. The citric acid is then added and the resulting composition boiled in a microwave until the a_w value is 0.53 (approximately 3 minutes). The straw-

United States Patent [19]
Chen et al.

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[54] **THERMOSTABLE CREME**

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[58] **Field of Search** **426/330.1, 572, 564, 426/659, 568, 94, 439, 613, 661, 573, 578, 330**

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[57] **ABSTRACT**

Thermostable cremes having exceptionally low water activities can be produced by dispersing a hydrocolloid in corn syrup; dispersing a modified starch and albumin in the colloidal dispersion; aerating the dispersion; and cooking the dispersion. These cremes exhibit excellent texture while offering the advantages of an extended shelf life.

36 Claims, No Drawings

THERMOSTABLE CREME

BACKGROUND OF THE INVENTION

The present invention relates to thermostable cremes having low levels of water activity. Water activity has become a major concern to those in the food industry since foodstuffs with low water activities generally have longer shelf-lives than foodstuffs with relatively higher levels of water activity. In addition, many high moisture products with high water activities are microbiologically unstable.

The water activity of a food is defined as the partial vapor pressure of water in the food divided by the saturation vapor pressure of pure water at the temperature of the food. Water activity can be considered to be a measure of the tendency of a material to allow moisture to migrate out of the material to its surrounding environment. Water activity can be determined by placing a sample in a container, which is then sealed, and after equilibrium is reached, determining the relative humidity above the sample.

Cremes known in the prior art generally have high moisture levels and high levels of water activity (A_w of 0.8-0.9). One problem with such cremes is that when they are combined with another food product having a lower level of moisture, such as a pastry, the disparity in moisture promotes the transmission of water from the creme into the food product of lower moisture. When the other foodstuff is a pastry, this transmission of moisture can cause the pastry to become soggy.

While high moisture cremes having a low water activity have been produced by adding various humectants, cremes produced in this manner have not been thermostable. The importance of producing a high moisture creme having a low water activity and thermal stability is especially important in the production of creme-filled pastries where the filling is added to dough prior to baking, as opposed to adding the filling after baking. Accordingly, there is a need for a high moisture creme which is thermostable and exhibits low levels of water activity.

SUMMARY OF THE INVENTION

The present invention relates to a thermostable creme comprising an aerated mixture of a hydrocolloid, a modified starch, an albumin and corn syrup. The creme can additionally contain such additives as water, polydextrose, fat, protein other than albumin, emulsifiers, flavoring agents and salt. These cremes exhibit relatively low levels of water activity (A_w of 0.6-0.7), even at high water content, and are thermostable under normal baking conditions. The ability to retain relatively low water activity at high moisture levels allows the texture to be controlled independently of water activity.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

This invention relates to an edible material which exhibits a creamy texture, thermostability, and shelf stability. The material comprises an aerated mixture in which structure forming and temperature stabilizing polymers including modified starch, protein and gums are dispersed, aerated and stabilized in a low moisture syrup system.

The cremes of the invention can be used in a number of products including fried pie cookies, creme puffs,

dual-textured pastries, etc. These cremes can be combined with various pastry doughs and, upon baking, result in creme-filled pastries having excellent dual-textures. Due to the low water activity of the creme, the pastry resists loss of its dual texture from the migration of moisture into the pastry dough portion.

The thermostable cremes of the present invention generally contain high levels of corn syrup. In producing the cremes, a hydrocolloid, a modified starch and an albumin are dispersed and hydrated in the corn syrup. Optionally, modifying amounts of water, polydextrose, fat, protein (other than albumin), emulsifiers, flavorings and salt can be added.

Corn syrups are concentrated water solutions of partial hydrolysates of starch. Corn syrups can be classified on the basis of D.E. values. The term D.E. is used herein to refer to the reducing sugars content of the dissolved solids in starch hydrolysates expressed as percent dextrose, as measured by the Luff-Schoorl method (NBS Circular C-40, page 195 as appearing in "Polarimetry Saccharimetry, and the Sugars" by Fredrick J. Bates and Associates). Generally speaking, the corn syrup for use in the present invention has a D.E. value of from about 24 to about 70. Preferably, the D.E. value is from 42 to about 62. Since corn syrups contain dextrose, maltose, and higher oligosaccharides derived from starch by acid or enzyme hydrolysis or by the combination of the two, another basis for characterization of the corn syrup is with respect to the content of individual saccharides. For example, one particularly preferred corn syrup for use in the present invention is a high fructose corn syrup. The use of corn syrup—especially when the corn syrup is a mixture of syrups, one of which is high fructose corn syrup—allows the production of cremes having low levels of water activity. The amount of corn syrup needed to form the cremes is at least an amount sufficient to disperse the remaining ingredients therein. Generally the corn syrup is from about 50 to about 90 percent by weight of an unflavored creme. Preferably, the corn syrup is from about 55 to 81 percent by weight of an unflavored creme. With increasing amounts of corn syrup, the water activity of the creme decreases, the bulk density of the creme decreases and the creme tends to thin out. With lower levels of corn syrup, the creme is more viscous and has higher levels of water activity.

In addition to the corn syrup, the creme contains a hydrocolloid. Hydrocolloids serve to establish the structure of the creme due to their high water binding capacity and the gel-forming properties at high temperatures. The hydrocolloids which can be used to prepare the cremes of the present invention can be natural or synthetic gums and include such colloids as carrageenan, guar gum, alginate, xanthan gum and the like or methylcellulose, carboxymethylcellulose, ethylcellulose, hydroxypropyl methylcellulose, micro-crystalline cellulose and the like. Two particularly preferred hydrocolloids are micro-crystalline cellulose products of FMC Corporation known under the tradenames Avicel™ RC-591 and Avicel# RC-611. RC-591 is a white, water dispersible powder with a particle size such that less than 0.1 percent is retained on a 60-mesh screen, and is known to be made up of 89 parts micro-crystalline cellulose and 11 parts sodium carboxymethylcellulose. RC-611 is made up of 85 parts micro-crystalline and 15 parts of sodium carboxymethylcellulose. Micro-crystalline cellulose is listed in the Fourth

Supplement to the Food Chemicals Codex, First Edition by the National Academy of Sciences-National Research Council as: Cellulose, Microcrystalline (cellulose gel). The amount of hydrocolloid that is dispersed in the corn syrup can vary widely; however, amounts of from about 0.5 to 4 percent by weight of an unflavored creme have been found to be suitable. Preferably, from about 2 to 3 percent by weight is used.

The modified starches can be pre-gelatinized or non-gelatinized. Preferred modified starches for use in the invention are modified, non-gelatinized starches which are cold water hydratable. Modified starches of this type are known and commercially available. One such starch is commercially available under the tradename MIRA-GEL™ (A. E. Staley Manufacturing Co.). Modified starches of this type hydrate in water at ambient temperature, first forming a thick, smooth consistency and then setting to a resilient, colloidal gel structure. Pre-gelatinized starches, by comparison, also thicken in water without heat. If one chooses to employ a non-gelatinized modified starch which is not cold water hydratable, it is preferred that the starch have a Brabender viscosity (CML-B-191) from about 100 to about 500 Brabender units, preferably from about 150 to about 400 Brabender units at 95° C. A suitable modified, non-gelatinized starch is commercially available under the tradename NATIONAL FRIGEX™ (National Starch and Chemical Corp.).

While the amount of modified starch that is used in the present invention can vary, amounts from about 2 to 6 percent by weight of the unflavored creme have been found to be sufficient. Preferably from about 3 to about 4 weight percent is used.

Protein in the form of albumin (preferably egg albumin), is also present in the creme composition of the invention in an amount from about 0.1 to about 5 percent by weight of the unflavored creme, preferably from about 2 to about 4 percent by weight of the unflavored creme. Proteins other than albumin can also be present, provided the total amount of protein does not exceed about 5 weight percent. Other proteinaceous materials which can be present include, for example, non-fat milk solids, water-soluble soy protein derivatives, gelatin and sodium or calcium caseinate.

Fat may be used to further modify the texture of the creme and serve as a flavor carrier. The fat can be high in unsaturation or can be a saturated fat. Unsaturated fats give a softer texture to the creme while the use of saturated fats provides a harder texture. Examples of such unsaturated fats include safflower oil, sunflower oil, cottonseed oil, soybean oil and corn oil. The saturated fats that can be used include the hydrogenated oil products of coconut, olive, corn, cottonseed, peanut, etc. While the melting points of the fats will generally vary according to the degree of saturation, fats having a Wiley melting point of 90°-110° F. are preferred. One particularly preferred fat is a 92° F. Wiley melting point partially-hydrogenated coconut oil sold under the trademark Hydrol 92™ by SCM Corporation. Generally, the fats are added in amounts of from about 0 to about 20 percent by weight of an unflavored creme.

Emulsifiers may be added to the cremes to induce the formation of a stable emulsion. Among the more suitable emulsifiers are hydroxylated lecithin and mono, di- or polyglycerides of fatty acids, such as monostearin and monopalmitin.

Many blends of emulsifiers are commercially used and readily available. For example, it may be desirable

to provide a controlled hydrophilic-lipophilic balance (HLB) as with a lipophilic emulsifier such as glyceryl monostearate or sorbitan monostearate with a hydrophilic material such as Polysorbate 60. When a blend of emulsifiers is used, the HLB value should be from about 8 to about 13 because this range is more hydrophilic and forms oil in water emulsions. HLB values from 1 to 8 should be avoided since this range is more lipophilic and may provide undesirable properties to the product. A particularly preferred emulsifier is octaglycerol mono-stearate marketed by SCM Corporation under the trademark Santone 8-1-S™. Emulsifiers are generally added in conventional amounts, for example about 0.01 to about 2 percent by weight of an unflavored creme and preferably from about 0.1 to about 0.2 percent.

While water is not required, aside from being inherently present in various ingredients, it may be desirable to increase the moisture level of the creme which is generally from about 10 to about 22 percent. Preferably, the moisture level is about 15 percent. While the amount can vary, preferably the water can be added in amounts of from 0 to about 10 weight percent of the unflavored creme.

Various food grade acidulents may be added to the creme according to one's taste preferences. Examples of such acidulents include fumaric, phosphoric, tartaric, malic and citric acid. Preferably, citric acid is used.

Flavoring agents can be added to the cremes to impart various flavors to the creme. While the amount of such flavoring agents will vary, generally such agents are added in amounts of from about 0 to about 10 weight percent of the flavored creme. Suitable flavoring agents can be employed to impart vanilla, creme, chocolate, cheese, butter, coffee, fruit, mint, vegetable or other flavors.

Aside from the above ingredients, other additives may be dispersed in the corn syrup. Such additives are generally present in conventional amounts to impart their characteristic effects to the creme. Typical of such additives are salt (0 to about 2.5 weight percent) and polydextrose (0 to about 10 weight percent). Other ingredients which can be employed in conventional amounts include food colors, polyols, vitamins and minerals.

The manner in which the various ingredients are combined is critical to the obtainment of the desired properties in the creme. Initially, the hydrocolloid is dispersed thoroughly in the corn syrup, which is preferably of the high-fructose variety for a sweet creme. A corn syrup with a D.E. of about 42 is preferred for use in the preparation of a savory creme. Any convenient mixing device can be employed to disperse the hydrocolloid in the corn syrup, provided that a thorough dispersion is obtained.

After the hydrocolloid has been thoroughly dispersed, the modified starch, albumin and other proteins, if present, are added to the dispersion, again with thorough mixing. The dispersion is aerated to impart the desired texture. Aeration can be achieved by using a high speed mixer to disperse the hydrocolloid, modified starch and albumin.

After the ingredients have been combined, the dispersion is cooked. The cooking time and temperature required to develop the desired texture in the creme will depend largely upon the type of modified starch used in the formulation. When a cold water hydratable starch such as MIRA-GEL™ 463 or a pre-gelatinized starch

is employed, the desired texture can be developed using a relatively short cooking cycle, e.g. about 10 minutes, at a temperature of about 60°-80° C. When an ungelatinized starch that is not cold water hydratable is employed, a longer cooking cycle, e.g. about 1 hour at 70° C. to 80° C., is required to develop the desired texture.

After cooking, the fat and emulsifier, if present, are added as desired to modify the texture. Flavor additives may also be added to the dispersion at this point using the fat as a carrier. Flavor additives that are heat stable, such as a salt, can be added prior to the cooking cycle.

The cremes of the present invention can be used to produce a variety of foodstuffs. Particularly preferred foodstuffs are creme-filled bakery products such as puff pastries, creme puffs, fried pie cookies, and various other dual-textured pastries. If desired, particulate food materials may be incorporated into the cremes of the invention. As merely exemplary of such materials, one can mention chocolate chips, butterscotch chips, dried fruit bits, nuts and the like.

The following examples further illustrate various features of the present invention but are intended in any way to limit the scope of the present invention.

In the following examples, all parts and percents are by weight unless specified otherwise. In the examples, "HFCS" indicates high fructose corn syrup and "CS" indicates corn syrup.

EXAMPLE 1

A thermostable creme was prepared from the following ingredients.

Ingredient	%
HFCS (42)	63.5
CS (62 D.E.)	17.7
Egg White	5.0
Miragel 463	5.0
Polydextrose	3.0
Fat	3.0
Avicel RC-591	2.0
Salt	0.6
Citric Acid	0.1
Emulsifier	0.1
	100.0

To a suitable vessel equipped with a mechanical mixer and containing 63.5 parts of high fructose corn syrup (42% conversion) was added 2 parts of Avicel™ RC-591. The ingredients were mixed vigorously for approximately 10 minutes. As the dispersion was continuously mixed, 5 parts of egg white, 5 parts of MIRAGEL™ 463, 0.1 parts of citric acid, and 0.6 parts of salt were added. Next, 17.7 parts of corn syrup (62 D.E.) and 3 parts polydextrose were added. The dispersion was allowed to mix for an additional 5 minutes. With continued mixing, the vessel containing the dispersion was immersed in a steam bath for approximately 10 minutes. Thereafter, the mixing was continued and 3 parts of fat (Hydrol 92™) along with 0.1 parts of an emulsifier (Santone 8-1-S™) were added to the cooked dispersion. After about 3 minutes the mixing was stopped to yield a creme having a water activity of approximately 0.68.

EXAMPLE 2

A thermostable creme was prepared from the following ingredients:

Ingredient	%
CS (42 D.E.)	57.2
Fat	15.0
Water	10.0
Polydextrose	5.0
Egg White	4.0
Miragel 463	4.0
Salt	2.5
Avicel RC-591	2.0
Emulsifier	0.2
Citric Acid	0.1
	100.0

To the same type of vessel as used in Example 1 and containing 10 parts water and 40.04 parts corn syrup (42 D.E.) was added 2 parts of Avicel™ RC-591. The ingredients were mixed vigorously for approximately 10 minutes. Next, 4 parts egg white solids, 4 parts MIRAGEL™ 463, 2.5 parts salt and 0.10 parts citric acid were added to the dispersion. Thereafter, 5 parts polydextrose and 17.16 parts of corn syrup (42 D.E.) were added to the dispersion which was then mixed for 5 minutes. The vessel was immersed in a steam bath for approximately 5 minutes. 15 parts of fat (95° F.) and 0.20 parts of an emulsifier (Santone 8-1-S™) were added and the contents of the vessel were mixed for 3 minutes to yield a creme base. Cheese powder was then mixed in the creme base in a 1:9 ratio of powder to creme. The cheese flavored creme had a water activity of 0.70.

What is claimed is:

1. A thermostable edible creme having a water activity of about 0.7 or less which is produced by the process which comprises dispersing a hydrocolloid in corn syrup thereby forming a colloidal dispersion; dispersing in the colloidal dispersion albumin and a modified starch selected from the group consisting of pre-gelatinized starches, non-gelatinized cold water hydratable starches and non-gelatinized starches having a Brabender viscosity from about 100 to about 500 Brabender units, wherein the dispersion comprises from about 50 to about 90 percent by weight of corn syrup, from about 0.5 to about 4 percent by weight of hydrocolloid, from about 2 to about 6 percent by weight of modified starch, and from about 0.1 to about 5 percent by weight of albumin; aerating the dispersion; and cooking the dispersion for about five minutes to one hour at a temperature of from about 60° C. to 80° C.

2. A thermostable edible creme as claimed in claim 1 wherein the corn syrup has a dextrose equivalence of from about 24 to about 70.

3. A thermostable edible creme as claimed in claim 1 wherein the corn syrup is high fructose corn syrup.

4. A thermostable edible creme as claimed in claim 1, wherein the corn syrup has a dextrose equivalent of about 42.

5. A thermostable edible creme as claimed in claim 1, wherein the creme has a water activity of from 0.6 to 0.7.

6. A thermostable edible creme as claimed in claim 1, wherein the process additionally comprises adding a fat and an emulsifier to the dispersion after cooking.

7. A thermostable edible creme as claimed in claim 6 containing:

(a) from about 50 to about 90 percent by weight of corn syrup;

United States Patent [19]

Kahn et al.

[11] 4,234,611

[45] Nov. 18, 1980

[54] SOFT INTERMEDIATE-MOISTURE FROZEN PUDDINGS AND FILLINGS

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[21] Appl. No.: 24,128

[22] Filed: Mar. 26, 1979

Related U.S. Application Data

[62] Division of Ser. No. 917,379, Jun. 20, 1978, which is a
division of Ser. No. 871,995, Jan. 24, 1978, Pat. No.
4,145,863, which is a division of Ser. No. 763,613, Jan.
28, 1977, Pat. No. 4,146,652.

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[58] Field of Search 426/573, 334, 658, 578,
426/579, 661, 575, 321

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[57]

ABSTRACT

Microbiologically stable foods which are usually kept at
freezer temperature, but which can be maintained at
room temperature and refrigerator temperature for an
extended period of time, are prepared by controlling
their sugar/fat content.

An example of a composition of this invention is a pud-
ding containing 30% water, 50% sugar, 18% fat and
minor but effective amounts of alginate, stabilizer, emul-
sifier and flavoring. This product is semi-soft at freezer
temperature and possesses the microbiological stability
requisite for storage at room temperature for an ex-
tended period of time without spoilage. Further, this
product may contain from about 10 to about 30 p.p.m.
of a quinine salt.

21 Claims, No Drawings

SOFT INTERMEDIATE-MOISTURE FROZEN PUDDINGS AND FILLINGS

CROSS-REFERENCE

This application contains subject matter divided out of U.S. patent application Ser. No. 917,379, filed June 20, 1978, U.S. patent application Ser. No. 871,995, filed Jan. 24, 1978 now U.S. Pat. No. 4,145,863, and U.S. patent application Ser. No. 763,613, filed Jan. 28, 1977, now U.S. Pat. No. 4,146,652 and is also a continuation-in-part of said applications.

BACKGROUND OF THE INVENTION

A recent development in the food industry is the emphasis on intermediate-moisture foods which have the faculty of being stored and marketed in a substantially non-refrigerated condition. These foods were designed to avoid the need to be packaged in a hermetically sealed container and commercially sterilized or maintained in a frozen or refrigerated state throughout the period of distribution and storage by the consumer.

The intermediate-moisture foods are based on the principle of reducing the availability of water in the food for microbial growth. The availability for spore germination and microbial growth is closely related to its relative vapor pressure, commonly designated as water activity. It was found that the use of a wide variety of water-soluble solutes, or osmotic agents, has the effect of depressing the water activity of the foods to levels at which most bacteria will not grow.

The water activity of a food is defined as the partial pressure of water in the food divided by the saturation pressure of water at the temperature of the food. The water activity can be determined by placing a sample in a container which is then sealed, and after equilibrium is reached, determining the relative humidity above the sample. Most products of this type have between 10 to 40% moisture, and a water activity between 0.65 and 0.9.

An early application of the technique of controlling water activity was for animal foods. For example, U.S. Pat. No. 3,202,514, issued Aug. 24, 1965, discloses an animal food having 15 to 30% moisture and 15 to 35% water-soluble solids, principally sugar, with a proteinaceous meaty substance. Subsequently, other foods were formulated with an intermediate-moisture content, such as egg products (U.S. Pat. No. 3,640,731, issued Feb. 8, 1972), pancake batter (U.S. Pat. No. 3,753,734, issued Aug. 21, 1973) and whippable bases for confectionary use (U.S. Pat. No. 3,958,033, issued May 18, 1976). The water content and water activity of these foods are brought to as low a value as practical to insure their long-term stability without refrigeration. The main difficulty with these foods is that their low-moisture content may detract from their palatability, texture and mouth-feel. This technique therefore has found its greatest commercial applicability in the pet-food market where palatability requirements are not as stringent.

It is of course desirable to be able to avoid refrigeration and freezing of food products to reduce the cost involved, and particularly for the consumer, to avoid the inconvenience of unpacking, handling, and then defrosting the typically rock-hard frozen foods. However, freezing is an extremely safe and suitable technique for long-term storage and provides the manufacturer with great leeway in incorporating any of a wide

variety of ingredients in foods which would otherwise be short-lived.

Accordingly, a class of intermediate-moisture foods has been found in accordance with application Ser. No. 763,613, filed January 28, 1977, now U.S. Pat. No. 4,146,652 and application Ser. No. 871,995, filed Jan. 24, 1978, now U.S. Pat. No. 4,154,863 which combines the convenience of the freezing method of storage sought by manufacturers with the ease of handling desired by consumers. Such foods are normally stored at freezer temperatures, but upon removal from the freezer can be more readily handled because they retain a flexible consistency, are non-crystalline and spoonable within about 5 to about 15 minutes, and can be left at room temperature for an extended period of time as they possess the requisite microbiological stability.

The foods of the invention are generally characterized by a high sugar content, usually at least equal in weight to the amount of water present, in order to provide microbiological stability. The sugars employed have a low molecular weight, being primarily dextrose and fructose, which comprise together at least about 50% and preferably at least about 75% of the total sugar content. Sucrose has a sweetness between that of fructose and dextrose. The fructose, which is sweeter than the dextrose, is preferred since it has a lesser tendency to crystallize and cause apparent hardness. For most foods, particularly where the food comprises an emulsion, it is preferred that the fats used, if any, include partially unsaturated fats which tend to provide superior flow properties and nutritional advantages, although less stable than saturated fats. The fat content is usually less than the water content in order to form a stable oil-in-water emulsion; the water content is preferably at least about 25% greater than the fat content.

The use of bacteriostatically effective amounts of sugar, however, imparts excessive sweetness to the ultimate food product. The problem of excessive sweetness has arisen previously in conjunction with the development of artificial sweeteners, and certain bitterness principles have been incorporated in such products to mask the undesirable taste. It was disclosed in U.S. Pat. No. 3,934,047, issued Jan. 20, 1976, that addition of aluminum potassium sulfate, naringin or a combination thereof to artificial sweeteners such as the saccharines or the cyclamates, or to higher caloric sweeteners such as sucrose, effectively reduced the perceived sweetness and bitter after taste of the artificial sweetener. It was postulated that the bitterness agent reduces the duration of sweetness, and presumably alters the manner in which sweetness is perceived.

In connection with neutralizing the bitter after taste of saccharine or saccharine salts, it was disclosed in German Pat. No. 2,060,634, issued Dec. 9, 1970, that the addition of about from 0.2 to 2.0 by weight percent of one or more substances having a bitter taste results in masking of the lingering bitterness associated with saccharine. Quinine sulfate and magnesium sulfate are specifically recommended as additives for use in this regard.

Such bitterness principles as quinine, theobromine and caffeine have also been advanced for use as flavor factors in synthetic and natural chocolate compounds and chocolate-flavored beverages to impart a bitter taste to the resultant foodstuff. U.S. Pat. No. 2,835,592, issued May 20, 1958, and U.S. Pat. No. 3,102,815, issued Sept. 3, 1963, are illustrative of such disclosures.

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Further flavor modifiers which impart a bitterness to the compounds in which they are incorporated are disclosed in U.S. Pat. No. 3,647,482, issued Mar. 7, 1972, to Yueh, and U.S. Pat. No. 4,006,261, issued Feb. 1, 1977, to Pickenhagen et al. Yueh's patent discloses the use of ribonucleotides, ribonucleosides and their deoxy analogues to reduce or eliminate the bitter after taste associated with saccharine or saccharine salts, or compositions containing these sweeteners. Pickenhagen et al. disclose the use of compositions of theobromine in combination with cyclic dipeptides to impart bitterness and astringency properties to various foodstuffs, especially cocoa products, animal foods, beverages, pharmaceutical preparations and tobacco products.

In U.S. Pat. No. 3,371,543, issued Feb. 13, 1973, the use of theobromine, caffeine or naringen to impart bitterness to nitrogen-based flavor intensifiers is disclosed.

It is an object of the present invention to provide a class of foods which are normally maintained at freezer temperature, but which possess the requisite microbiological stability for storage at refrigerator or room temperatures for an extended length of time without spoilage.

It is another object of the present invention to provide an improved bacteriostatic intermediate moisture food product which is ready for use at freezer temperature, the perceived sweetness of which has been reduced through the addition of a bitterness factor.

It is a further object of this invention to accomplish the above-specified reduction in sweetness perception through the use of certain quinine salts.

Other objects, and advantages, of this invention will be apparent from the ensuing specification and examples.

THE INVENTION

The present invention is directed to microbiologically stable intermediate-moisture foods and other products which are normally maintained at freezer temperature. The principles and techniques which have been developed for intermediate-moisture foods are applicable to the present invention, as modified in the manner explained herein below. Many of the foods of this invention are maintainable at freezer temperature in a condition ready for immediate use. After removal from the freezer the foods may be held at room temperature or at refrigerator temperature for a considerable period of time without spoilage because of the bacteriostatic effect of the sugar/water ratio.

The foods of this invention are generally characterized by a high sugar content, usually at least equal in weight to the amount of water present in order to provide microbiological stability. The sugars used have a low molecular weight, being primarily dextrose and fructose, which comprise together at least about 50% and preferably at least about 75% of the total sugar content. Sucrose has a sweetness between that of fructose and dextrose. The fructose, which is sweeter than the dextrose, is preferred since it has a lesser tendency to crystallize and cause apparent hardness. For most foods, particularly where the food comprises an emulsion, it is preferred that the fats used, if any, include partially unsaturated fats which tend to provide superior flow properties and nutritional advantages although less stable than saturated fats. The fat content is usually less than the water content in order to form a stable oil-in-water emulsion; the water content is preferably at least about 25% greater than the fat content.

The high levels of sugar requisite to effect bacteriostasis may render the ultimate food product excessively sweet, however, and thus less palatable to some consumers. In accordance with this invention, it has been found that the addition of a bitterness principle modifies the undesirable sweetness of the sugar. More specifically, addition of a quinine salt, such as quinine sulfate, quinine bisulfate or quinine hydrochloride, results in reduced perception of sweetness. In many cases, the perceived sweetness is reduced by more than half the value associated with the unmodified food product. Quinine salts are employed in this regard in amounts up to about 125 p.p.m. per food stuff. A preferred range of such additive amounts is from 2 to 75 p.p.m.

An important group of foods which has been particularly well-adapted in accordance with the present invention consists of the oil-in-water emulsions, including butter creams, whipped toppings, low-fat whipped creams, milk mates, non-dairy shakes, icings and coffee creamers.

Another class of goods, which forms a unique combination with the foregoing, is bakery products such as cakes, breads, cookies, pie shells, muffins, turnovers, pancakes, waffles and doughnuts. The pastries can be filled or topped with the creams and icings of this invention.

Many diverse foods can likewise be adapted pursuant to this invention, such as dressings, puddings, sauces, gravies, snack spreads, pancake syrups, ice creams, candies, and beverage (soup, tea, juice) concentrates, and meat, fish, fruit and vegetable products.

The foods of this invention are generally characterized by a water activity of about 0.75-0.90, up to about 0.93, a sugar to water ratio of about 1:1 and a sugar content which is at least 50% dextrose, fructose, or a combination thereof. In addition, many of the foods of this invention are adapted to remain spoonable or pourable at freezer temperature. Although most intermediate-moisture products will conventionally have a water activity below 0.85, some sacrifice in texture and taste may be required to meet this standard. Since the foods of this invention are maintained at freezer temperature until ready to be used, a water activity of 0.85-0.90, up to about 0.93, is adequate. Freezer temperatures of course are adequate to maintain the microbiological stability of foods and even moderate control of water activity is adequate to extend the useful life of these products after removal from the freezer. Freezer temperature, unless otherwise indicated, refers to temperatures of from about -5° F. to +10° F., which represents a common range for both home and store freezers.

The standard of being spoonable refers to the texture or flexibility of the product, as well as to the quality of being able to eat the food when it is at freezer temperature. The quality of being spoonable as used in this description is one which gives a satisfactory reading on a standard penetrometer and/or flow test, i.e., gave a penetrometer reading above about 3 mm.

The products of this invention having a penetrometer reading of about 3 mm or below are substantially non-crystalline, however, and become spoonable within a very short period of time upon removal from freezer temperatures and introduction to room temperature (about 72° F.), generally within about 5 to about 15 minutes. Such non-crystalline-type products can be used immediately in mixing, blending and various other food preparation procedures, although generally not

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considered quite flexible or soft enough for immediate consumption.

Pourable products of this invention are more fluid and are tested by flow characteristics, generally about 30 ml per minute and higher during the first five minutes after removal from the freezers.

The products, of this invention present highly significant results when compared to the standard, rock-hard frozen products currently on the market. Details of the testing procedures are specified below.

The water activities of the foods of this invention are usually about 0.75 to 0.90. Generally, the water activity is at the higher end of this range, i.e., about 0.85-0.90, up to about 0.93. Although microbiological stability is inversely proportional to water activity, several desirable properties of food are adversely affected at very low water activity, e.g., mouth-feel and taste. Since the foods of this invention are normally held at freezer temperatures for long-term stability, it is practical to formulate foods which have water activities nearer the borderline of microbiological stability, which is about 0.90-0.93.

Several mathematical methods are available for calculating water activity, even of formulations containing different solutes and with non-solutes. Rough calculations based on the additive effect of the number of moles of each component multiplied by the activity of the component are useful for estimating water activity. Such calculations reduce the number of experimental measurements that might otherwise be needed and thus assist in reaching a suitable formulation more quickly. A combination of mathematical techniques with trial and error experiments followed by analytical measurements for determining water activity will lead to acceptable results.

There are commercially available devices for measuring the water activity of formulations. For example, a formulation may be placed in a container until equilibrium is reached and then the humidity in the container measured. The water activity is then determined through reference to standard tables. For example, electric hygrometers are devices commonly used to measure water activity. These devices contain sensors impregnated with salts such as lithium chloride or potassium chloride. Water is adsorbed on the sensor and causes a change in electrical resistance which is measured by a wheatstone bridge. Reference curves based on solutions of known humidity are used to relate the electrical readings to water activity.

Throughout this application all amounts are by weight unless stated otherwise. In the examples the amounts have been adjusted to a basis of 100. Percentages are based upon total formulation weight, unless a different basis is given.

Many of the foods of this invention are generally characterized as microbiologically stable food products comprising about from 15 to 45% water, sugar in a ratio to water of about 1:1 to 2:1, preferably about from 1.5-1:1, and minor but effective amounts of salt, emulsifier, stabilizer and flavoring, provided that the foregoing comprises at least one of fructose and unsaturated fat, that the amount of fat, if any, is less than the amount of water or equivalent phase, such as non-aqueous water-soluble liquid phase, the solutes content is adequate to provide the product with a water activity of about from 0.8-0.9, up to about 0.93, the amount of dextrose plus fructose is at least about 50% based upon the total sugar content, and wherein the foregoing in-

gredients are adapted to provide a product which is substantially non-crystalline at freezer temperatures. Further, the foods of this invention may comprise up to about 125 p.p.m. of a quinine salt.

Certain other foods of the instant invention are characterized by the above general formulation exclusive of the restriction specifying that the ingredients comprise minor but effective amounts of salt, emulsifier and stabilizer, and the ratio to water of sugar. Other foods may comprise saturated fat, the total amount of fat comprising about from 2.5 to 30%.

A preferred class of foods is microbiologically stable oil-in-water emulsion cream-type products, such as butter creams, whipped creams, shakes, non-dairy creamers, etc., which comprise about from 25 to 45% water, sugar in a ratio to water of about from 1.5-1:1, about from 10 to 30% fat, and minor but effective amounts of protein, salt, emulsifier, stabilizer and flavoring, a water activity of about from 0.8 to 0.9, wherein the amount of fructose is about from 15 to 65% based on the sugar content and the amount of dextrose is at least about 50% based upon the remaining total sugar content, the fat content preferably contains at least about 10% unsaturated fat and the foregoing ingredients are adapted to provide a product which will flow at about 10° F. Such preparations may also comprise preferably about from 3 to 20 p.p.m. of a quinine salt. When the sugar component of the non-dairy creamer formulation is modified to contain only dextrose, a microbiologically stable food product is produced which remains semi-soft and substantially non-crystalline rather than spoonable at freezer temperature.

These oil-in-water emulsion products have excellent texture and eating properties and are readily whipped to a high volume with a light but firm structure. In addition to microbiological stability, these products have physical stability in that they retain a smooth foamed cellular structure without separation of a liquid portion. The products are further characterized by having an overrun of greater than about 150% and a density as low as about 0.3 or 0.4 for a butter cream and a whipped cream.

Another class of useful products is the flour-based foods. The batters for these products comprise conventional amounts and types of flour depending on the final product, about from 15 to 40% water, sugar in a ratio to water of about from 1.5-1:1, about from 2 to 10% or up to 25% fat, and minor but effective amounts of leavening agent which may be encapsulated, egg products, salt, emulsifier, stabilizer and flavoring, provided that the solutes content is adequate to provide the product with a water activity of about from 0.8 to 0.9, the fructose content of the sugar preferably is about 10 to 40%, the amount of dextrose plus fructose is at least about 50% or from 75 to 100% based upon the total sugar content, and the fat is preferably unsaturated. The batter should have at least one of fructose and unsaturated fat to assist in providing a spoonable and preferably a pourable product at about 10° F. The final product made from the batter has a higher penetrometer value than conventional products at 10° F. and is edible at that temperature. Such preparations may also comprise preferably about from 5 to 100 p.p.m. of a quinine salt.

A unique combination is prepared from a bakery product and a cream-type product, each made in accordance with this invention. Further, fruit (which may be infused with solutes) may be added to the bakery products and the cream-type products. The water activity of

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the bakery product and cream-type product when used in combination should be approximately the same, plus or minus 0.05 units, or up to 0.10 units deviation from each other. When the water activity values are comparable there is less of a tendency for water transfer as, for example, between a cake and its topping or filling.

Microbiologically stable soup concentrates and sauces have been made comprising about from 30 to 45% water, sugar in a ratio to water of about from 1.5-1:1, about from 5 to 30% fat, and minor but effective amounts of salt, stabilizer and flavoring, wherein the amount of dextrose plus fructose is at least about 50% based upon the total sugar content, the foregoing ingredients comprise at least one of fructose and unsaturated fat and the product is spoonable at about 10° F. Fish, meat and vegetables (which may be infused with solutes) are added to these to provide, for example, a chowder concentrate or newburg sauce. Such preparations may also comprise about from 5 to 100 p.p.m., preferably about from 30 to 70 p.p.m., of a quinine salt.

Microbiologically stable beverage concentrates, for example, tea, orange juice, etc., are made in accordance with this invention. They generally comprise about from 35 to 45% water, sugar in a ratio to water of about 1.8-1.2:1, and minor but effective amounts of flavoring, provided that the amount of fructose plus dextrose is about from 75 to 100% based on the total sugar content and the amount of fructose is about from 10 to 30% based upon the total sugar content, wherein the foregoing ingredients are adapted to provide a product which will flow at about 10° F. Such preparations may also comprise preferably about from 5 to 50 p.p.m. of a quinine salt.

Microbiologically stable pudding products have been made comprising about from 25 to 45% water, sugar in a ratio to water of about from 2-1:1, about from 3 to 25% fat, preferably unsaturated, and minor but effective amounts of gelling agent, emulsifier, stabilizer and flavoring, provided that the amount of dextrose plus fructose is at least about 75% of the total sugar content, wherein the foregoing ingredients are adapted to provide a product which is spoonable at about 10° F. Such preparations may also comprise about from 5 to 75 p.p.m., preferably 10 to 20 p.p.m., of a quinine salt. Fruit, which may be infused with solutes, may be added to the pudding products of this invention. Suitable pudding products include bread, rice, and plum pudding.

Microbiologically stable meat products, such as hot-dogs, hamburgers, sausages and various meat loaves, are also made in accordance with this invention. Standard recipes for such products, known to those skilled in the art, are modified through this invention to contain (1) enhanced amounts of sugar, preferably fructose, in place of conventional sugar now used in amounts up to several times greater than those presently employed or (2) an infused solution of sugar in a ratio to water of at least 1:1, and, in either case, (3) fat in an amount less than the amount of water or equivalent phase, wherein the fat is substantially unsaturated, i.e., 50% or more, or preferably 75% or more of the fat is unsaturated. Furthermore, a quinine salt may be added in an amount not exceeding 125 p.p.m., and preferably falling within the range of 7 to 75 p.p.m. These modifications are incorporated in the compositions of such meat products to provide increased microbiological stability and thus extend the shelf-life of such goods.

The apparatus for measuring the flow characteristics of the products of this invention was fabricated from

stainless steel, and was essentially a stand 14"×12", with a movable platform of the same size to provide for vertical and angular adjustments.

The platform was provided with a bulls-eye level and a protractor level; with the leading edge having a wire brace to retain the sample container.

The following method was used in obtaining the flow data. Graduated cylinders of 600 ml. capacity were filled with the samples and frozen for at least 24 hours at +5° F. The frozen samples were removed from the freezer, immediately placed on the platform in a horizontal (0°) position, and the effluent collected in other graduated cylinders, with the volume noted at timed intervals. Temperatures were monitored with a Honeywell recorder. Sample temperatures within the freezer varied from +4° F. to +7° F. over a four-week interval, but varied no more than 1° F. over an 8 hour period, while the temperature in the freezer varied from +5° F. to +15° F., each time the door opened. Room temperature varied about 2° F. for an average of 72° F., while the temperature of the samples in the original container rose anywhere from 1° F. to 14° F. during the 15 minutes after removal from the freezer.

The penetrometer test and equipment used are standard. The penetrometer is made by Labline Instrument Co. Inc., Chicago, Illinois. The device measures the penetration into the sample of the point of a hard rubber cone which weighs 12 grams and has a height of 1½" and a diameter of 1¼" at its base. The inverted cone is supported by a freely-sliding bar which weighs 48 grams. For all measurements the sample was brought to a temperature of -7° F. in a freezer and then removed from the freezer and immediately tested.

The products of this invention exhibited freeze-thaw stability in storage. The products were kept in a supermarket-type freezer unit which cycled six times a day between application of cooling to freeze the product and application of heat to defrost the unit. Under these conditions the products remained acceptable and functional.

The liquid emulsions were examined by dipping a spatula in the emulsion, letting it drain and noting whether the residual film was smooth and uniform or whether particles were present, a condition denoting destabilization. These emulsions were also evaluated for their intended functional application.

The products passed the following test procedures:

(a) The non-dairy creamer concentrates were tested in coffee for whitening ability, signs of free oil on the surface or curdled appearance, and presence of oil globules or curdling indicating emulsion breakdown.

(b) The semi-solid products which are consumed as such, e.g., pudding and cocktail sauce, were tested for syneresis and appearance (texture).

The method of making a microbiologically stable food product of this invention generally comprises mixing together about from 15 to 45% water, sugar in a ratio to water of about from 2-1:1, about from 2.5 to 30% fat, and minor but effective amounts of salt, emulsifier, stabilizer and flavoring, provided that the amount of fat is less than the amount of water, the solutes content is adequate to provide the product with a water activity of about from 0.8 to 0.9, and the sugar comprises at least about 50% dextrose plus fructose; pasteurizing the mixture and cooling the resultant product. Up to about 125 p.p.m. of a quinine salt may also be employed in the mixing step.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

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RADICACIÓN: 0-84952

EDICTO No. 13294

**LA SECRETARÍA GENERAL AD-HOC
HACE SABER:**

Que esta Superintendencia profirió **Resolución No. 20253 de 29-JUN-2007**. Que el contenido de la parte resolutive es como sigue: El Superintendente de Industria y Comercio.

RESUELVE

ARTICULO PRIMERO: Negar el privilegio de patente de invención para la solicitud correspondiente a "LLENANTES QUE CONTIENEN HUMEDAD NO BASADA EN EMULSION, PARA PRODUCTOS DE MASA".

ARTICULO SEGUNDO: Notificar personalmente el contenido de la presente resolución al doctor Emilio Ferrero, o a quien haga sus veces, en su calidad de apoderado de The Pillsbury Company., entregándole copia de la misma, advirtiéndole que contra ella procede el recurso de reposición interpuesto ante el Superintendente de Industria y Comercio, al momento de la notificación o dentro de los 5 días hábiles siguientes a ella.

NOTIFÍQUESE Y CUMPLASE

Dada en Bogotá, D.C., a los **29 JUN. 2007**

EL SUPERINTENDENTE DE INDUSTRIA Y COMERCIO,


JAIME RUBIO ESCOBAR

Para notificar a los interesados, se fija el presente EDICTO en lugar visible al público en la SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO, por el término de (10) diez días hábiles contados a partir de las 8:00 a.m. de hoy.

Secretaría General Ad-Hoc **25-JUL-2007** Este edicto se desfija hoy **08-AGO-2007** a las 4:30 p.m.
Secretaría General Ad-Hoc
EDICTO No. 13294