

629

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO  
DIVISIÓN DE NUEVAS CREACIONES

cons 8

2020  
Bogotá, D.C., 05 de octubre de 2007

Abogado  
**Ramiro Castro D.**  
(Apoderado)  
Solicitante: Satake Corporation

|        |            |             |       |
|--------|------------|-------------|-------|
| ASUNTO | Radicación | 01 – 20 803 |       |
|        | Trámite    | 002         |       |
|        | Evento     | 001         |       |
|        | Actuación  | 430         | 12992 |
|        | Oficio     |             |       |
|        | Folios     | 028         |       |

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**

- 1.1. Descripción: Folios: 13 a 42 como se radicó inicialmente
- 1.2. Reivindicaciones: 1 a 33, folios 43 a 49 como se radicó inicialmente
- 1.3. Dibujos: Folios 51 a 65 como se radicó inicialmente  
Folios 593 a 607 modificación
- 1.4. Prioridad: Folios: 70 a 569,  
00-03-15, JP, 2000 – 73 076  
00-03-23, JP, 2000 – 83 027  
00-03-24, JP, 2000 – 85 167  
00-06-16, JP, 2000 – 182 350  
00-07-19, JP, 2000 – 218 854  
00-10-17, JP, 2000 – 317 219

**2. Objeto de la invención**

- Título de la solicitud: *Método de, y aparato para, fabricar cereal que no contiene salvado*, folio 1.
- El objeto de la presente solicitud de patente de invención consiste en suministrar un método y un aparato para producir un cereal sin salvado, que es capaz de retirar la adherencia del salvado en la superficie de cada grano del cereal sin producirle ningún daño a la vez que le mejora el sabor porque mantiene la humedad del cereal.

Reivindicaciones 1 a 22: Un método de producir un cereal sin salvado, que comprende: (a) agregarle humedad al cereal refinado; (b) mezclar y agitar

cereal en grano con cereal refinado humedecido de tal manera que se le retira la adherencia del salvado a la superficie de cada grano de cereal refinado; y, (c) separar el cereal refinado del cereal en grano

Reivindicaciones 23 a 33: Un aparato, para producir un cereal sin salvado, que comprende: un medio de adición de humedad para agregar humedad al cereal refinado; un medio de mezcla y agitación para mezclar y agitar cereal granular con el cereal refinado humedecido, para retirar adherencias de salvado de la superficie de cada grano de cereal refinado; y un medio de separación, para separar el cereal refinado del cereal en grano.

El problema planteado en esta solicitud es la necesidad de retirar completamente el salvado de un cereal sin que se vean afectadas negativamente las características organolépticas del producto.

Para solucionar este problema técnico la solicitud en estudio proporciona un método y un aparato que regula las condiciones de la humedad durante el proceso y añade porciones de cereal molido para ayudar a retirar el salvado de la superficie del grano del cereal refinado, mediante el mezclado y agitado de los dos componentes bajo ciertas circunstancias.

- Clasificación Internacional de Patentes (IPC): A23L 1/10, B02B 1/08, 3/00

### 3. De la solicitud de Patente

#### 3.1. Descripción (artículo 28 D. 486)

- El solicitante debe:
  - (1) Revisar el empleo de gerundios dentro de la solicitud porque, en español, sólo deben emplearse: o bien como modificadores de un verbo -no en sustitución de él- (cumplen la función de adverbios de modo), o bien, en pocos casos, como adjetivos. Si se mantiene la redacción actual, se verá afectada negativamente la legibilidad de lo divulgado en la solicitud y, por tanto, también la claridad.
  - (2) Corregir la expresión *una rata de 100 a 10 a 200 en peso* que aparece por primera vez en la página 2, folio 14, porque el rango carece de sentido y porque el significado de *rata* no corresponde con el contexto.
  - (3) Aclarar la expresión *una máquina de mezclado con un agitador, un epitelio del endosperma sobre la superficie del arroz puede cortarse mediante al alta presión y recibir daños en la superficie*. Que aparece en la página 2, folio 14, porque carece de sentido.
  - (4) Adecuar el texto de la descripción a las condiciones regionales de Colombia, porque en la página 2, folio 14, aparece la expresión *En la estación de invierno, se requiere mayor presión para retirar efectivamente el salvado puesto que la superficie del arroz refinado se endurece* que, aparentemente se refiere a las condiciones en otras latitudes.
  - (5) Definir qué entiende el solicitante por *material granular*, expresión que aparece por primera vez en la página 3, folio 15, porque su significado es demasiado amplio como para aplicarlo al objeto de la solicitud.
  - (6) Corregir la expresión *maíz barley* que aparece por primera vez en la página 3, folio 15, porque *barley* no es una clase de maíz reconocida [y, *barley* es una palabra en inglés que traduce *cebada*].
  - (7) Definir la expresión *caoliang* que aparece por primera vez en la página 3, folio 15, porque no es corriente en el arte.

- (8) Introducir la definición que se da, en la página 28, folio 40, de *tapioca de perla o tapioca en perla*, la primera vez que se emplee esta expresión, es decir, debe dar la definición en la página 3 [folio 15].
- (9) Evitar el uso de la barra oblicua en expresiones como *mezclado/agitado* que aparece por primera vez en la página 4, folio 16, porque su significado es ambiguo.
- (10) Sustituir la expresión *comisura* que aparece por primera vez en la página 8, folio 20, por otra que concuerde con el contexto.
- (11) Aclarar la expresión *humedad en forma de niebla M* que aparece en la página 9, folio 21, porque dicha *M* no se ilustra en ninguna de las figuras y tampoco se vuelve a utilizar dentro del texto, con relación a la humedad.
- (12) Aclarar la expresión *el arroz molido has a temperatura* que aparece en la página 9, folio 21, porque carece de sentido.
- (13) Aclarar, en la misma página 9, la expresión *la temperatura de gelatinizado tocada con material granular*, porque, también, carece de sentido.
- (14) Aclarar la expresión *para obtener arroz refinado con obtenido de aproximadamente 90%* que aparece en la página 12, folio 24, porque carece de sentido. Dentro del texto de la solicitud se encuentran otras expresiones similares que también deben ser aclaradas.
- (15) Aclarar la expresión *saltador* que aparece por primera vez en la página 12, folio 24, porque su significado no concuerda con el contexto.
- (16) Aclarar la expresión *un tamiz 25 esparcido en la máquina* que aparece en la página 13, folio 25, porque no tiene sentido.
- (17) Aclarar, en la misma página 13, la expresión *vibrador 27 tal como se muestra en la Figura 6* porque en la figura 6, folio 595, no aparece éste numeral de referencia.
- (18) Aclarar, en la página 14, folio 26, con relación a la figura 10, la expresión *tanque de agua 43, una válvula eléctrica 44 y una tubería de agua 45* porque ninguno de tales números de referencia aparecen en la figura mencionada.
- (19) Aclarar la expresión *un cribador rotativo 39 para elevar el arroz* que aparece en la página 16, folio 23, porque carece de sentido.
- (20) Revisar la expresión *el arroz refinado ... es enrollado en el cilindro 12* que aparece en la página 17, folio 29, porque, seguramente, no era eso lo que se quería decir.
- (21) Corregir la expresión *sin causar ningún grumo por asentamiento del mismo periodo* que aparece en la página 17, folio 29, porque carece de sentido.
- (22) Corregir la expresión *Agua de desperdicio ... se seca ... a ser formado polvo y recogido* que aparece en la página 18, folio 30, porque carece de sentido.
- (23) Aclarar la expresión *puede reciclarse mediante por lo menos cinco veces* que aparece en la página 19, folio 31, porque carece de sentido.
- (24) Corregir el texto o la figura 13, porque en la página 22, folio 34, se mencionan, dos veces, los rodillos 7c, pero en la figura 13 -a la que alude el texto- no se encuentra tal referencia.
- (25) Incluir la conversión de los valores que aparecen dentro del texto a las unidades del Sistema Internacional. Esto es aplicable, por

ejemplo, a las *rpm* que aparecen por primera vez en la página 26, folio 38 y a la presión que se menciona en la página 27, folio 39.

(26) Aclarar la expresión *la adherencia de salvado ... se gelatiniza ... cuando se toca ... para aumentar inmediatamente la adherencia* que se encuentra en la página 29, folio 41, porque carece de sentido.

(27) Aclarar la expresión *una apetencia entre el salvado gelatinizado y el material granular* que aparece en la página 29, folio 41, porque carece de sentido.

- La descripción no cumple con el requisito de claridad de acuerdo al art. 28 de la Decisión 486.

### 3.2. Reivindicaciones (artículo 30 D 486)

- El solicitante debe:
  - 1) Corregir la expresión *retirar la adherencia de salvado en una superficie cada grano de cereal* que aparece en la reivindicación 1, página 31, folio 43, porque carece de sentido. Incidentalmente, también se debe corregir la expresión *una superficie del grano* que aparece a lo largo de toda la solicitud, porque el salvado cubre toda la superficie del grano y se debe hablar, entonces, de *la superficie del grano* no de *una superficie del grano*, porque el grano no tiene sino una única superficie que lo envuelve por completo.
  - 2) Corregir las reivindicaciones 2 a 8, porque dentro de ellas no se añade ninguna característica propia de una etapa del método, sólo se caracterizan los materiales que intervienen en el desarrollo del método, pero eso no afecta al método en sí.
  - 3) Corregir la reivindicación 3, respecto a la expresión *barley*.
  - 4) Corregir la reivindicación 33, folio 49, porque dentro de ella no están claras las características propias del aparato que se reclama.
  - 5) Emplear las unidades del Sistema Internacional en la reivindicación 33, folio 49
- El capítulo reivindicatorio no cumple con el requisito de claridad de acuerdo al art. 30 de la Decisión 486.

Se deben presentar, entonces, nuevos capítulos descriptivo y reivindicatorio, ambos completos, junto con un nuevo juego de dibujos, si es el caso, donde se hayan corregido todas las objeciones que se han hecho arriba. Esto con el fin de evitar -cuando solo se presentan algunas páginas sueltas corregidas- que el lector tenga que desplazarse desde un sitio a otro de la solicitud y luego regresar a donde estaba antes sin perder la ilación de la lectura, porque esto produce confusión y afecta negativamente la claridad de dichos capítulos.

## 4. Determinación del Estado de la Técnica

Dado que las fechas de presentación de las primeras solicitudes de patente de las cuales se reivindica prioridad son el 00-03-15, el 00-03-23, el 00-03-24, el 00-06-16, el 00-07-19 y el 00-10-17; se buscaron documentos del estado de la técnica relacionados, con fecha de publicación anterior a esta.

Durante la búsqueda de anterioridades se encontraron los siguientes documentos que forman parte de la familia de patentes del objeto de la presente solicitud: solicitud publicación US 2001/0033885 A1 del 01-10-25; solicitud publicación US 2003/0177916 A1 del 03-09-25; Patente US 6 610 345 B2 del 03-08-26; y Patente

US 6 832 545 B2 del 04-12-21; se anexan copias de las primeras páginas de estos documentos, junto con la copia del Informe de Búsqueda Internacional Europeo y la copia de las reivindicaciones admitidas por la Oficina Europea

| n.º | Documento                                                                                                                                                                                                                 | Título                                                                                                                                                  | Fecha de publicación |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| D1  | Patente US 4 741 913, cuyo inventor es Toshihiko Satake, quien le cedió sus derechos a la Satake Engineering Co. Ltd.                                                                                                     | 'Wheat flouring process' (Un proceso de pulverización de trigo)                                                                                         | 88-05-03             |
| D2  | Patente US 5 119 721, cuyos inventores son Toshihiko Satake, Satoru satake, Katsuyuki Kumamoto y Shijeru Arij, quienes le cedieron sus derechos a la Satake Engineering Co. Ltd.                                          | 'Apparatus for producing washed rice' (Un aparato para producir arroz lavado)                                                                           | 92-06-09             |
| D3  | Patente US 5 520949, cuyos inventores son Victor M. Lewis y David A. Lewis, quienes le cedieron sus derechos a la Byron Agricultural Company Pty.                                                                         | 'Grain Product' (Producto en grano)                                                                                                                     | 96-05-28             |
| D4  | Patente US 5 773 056, cuyas inventoras son Thalia A. Hohenthal y Michelle Weinberg, quienes le cedieron sus derechos a la Guittard Chocolate Company                                                                      | 'High cocoa/chocolate' liquor syrups with improved flow properties' (Unos jarabes concentrados de cocoa o chocolate con propiedades de flujo mejoradas) | 98-06-30             |
| D5  | JP Patent Abstract 11033418, cuyo inventor es Eizou Kaizaki                                                                                                                                                               | 'Rice polishing particle' (Una partícula pulidora de arroz)                                                                                             | 99-02-09             |
| D6  | JP Patent Abstract 11042056, cuyos inventores son Satoru Satake, Kazunobu Kajiware, Shiro Tajima, Takeshi Kawaguchi, Kenichi yokoshima y Koji Kawakami, quienes le cedieron sus derechos a la Satake Engineering Co. Ltd. | 'Production or rice unneeded washing and machine therefor' (La producción de arroz que no necesita lavado y la máquina para producirlo)                 | 99-02-16             |

Se anexan las copias de las páginas pertinentes

634

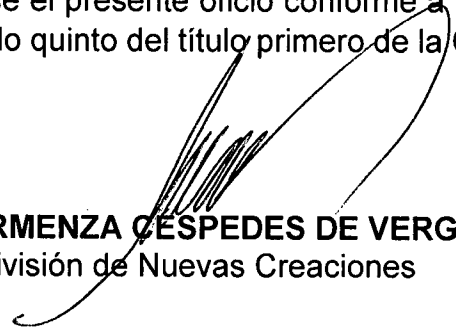
NOTA: No se realizó una evaluación de los demás requisitos de patentabilidad, porque se objetó la claridad de las reivindicaciones. Una vez hayan sido superadas las objeciones establecidas en este Concepto Técnico, se podrán hacer los exámenes correspondientes.

**5. Conclusión:**

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados negativamente por la falta de claridad de la descripción y las reivindicaciones.

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica al solicitante que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de 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 N° 10 de 2001.

  
**ALIX CARMENZA CÉSPEDES DE VERGEL**  
Jefe de División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista, de fecha **11 OCT. 2007**

|                                  |                                                |
|----------------------------------|------------------------------------------------|
| <b>CONCEPTO TÉCNICO</b> n.º 1819 | <b>EXAMINADOR TÉCNICO</b><br>Código n.º 202009 |
|----------------------------------|------------------------------------------------|



US 20010033885A1

(19) **United States**

(12) **Patent Application Publication**  
**Satake et al.**

(10) **Pub. No.: US 2001/0033885 A1**  
(43) **Pub. Date: Oct. 25, 2001**

(54) **METHOD OF AND APPARATUS FOR  
MANUFACTURING NO-BRAN CEREAL**

Mar. 24, 2000 (JP) ..... 85167/2000  
Jun. 16, 2000 (JP) ..... 182350/2000  
Jul. 19, 2000 (JP) ..... 218854/2000  
Oct. 17, 2000 (JP) ..... 317219/2000

(76) **Inventors:** Satoru Satake, Tokyo (JP); Nobuhiro  
Matsumoto, Tokyo (JP); Takeshi  
Munesada, Tokyo (JP); Yukihiko  
Kawano, Tokyo (JP); Akihiko Kato,  
Tokyo (JP); Kazuto Nonaka, Tokyo  
(JP); Katsunori Chikamune, Tokyo  
(JP); Yosuke Inomoto, Hiroshima (JP);  
Kaoru Shitadera, Hiroshima (JP)

**Publication Classification**

(51) **Int. Cl.<sup>7</sup>** ..... **A23L 1/182**  
(52) **U.S. Cl.** ..... **426/462; 426/484; 426/481;  
426/460**

**Correspondence Address:**  
**STAAS & HALSEY LLP**  
**700 11TH STREET, NW**  
**SUITE 500**  
**WASHINGTON, DC 20001 (US)**

(57) **ABSTRACT**

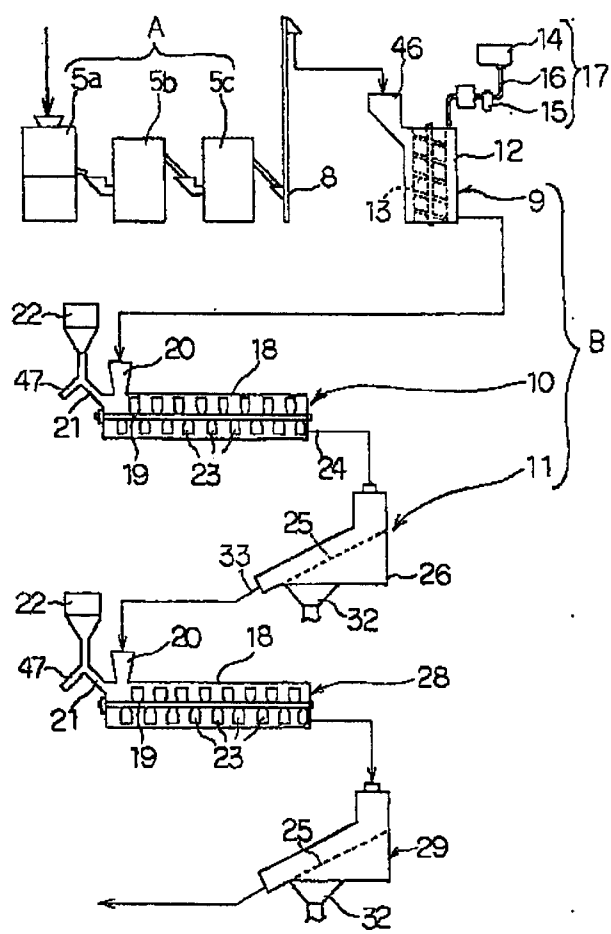
A method of and an apparatus for manufacturing no-bran cereal such as no-bran rice which require no washing before cooking. With the method and the apparatus, bran stuck on a surface of a grain of the polished cereal is easily removed without imparting any damage on the surface, and further moisture in the grain is maintained to increase taste of the cereal. Moisture is added to the polished cereal and granular material is mixed and stirred with the moistened polished cereal to polish a surface of each grain of the polished cereal and remove bran stuck on the surface of the polished cereal. Then, the polished cereal is separated from the granular material to obtain the no-bran rice.

(21) **Appl. No.:** 09/812,778

(22) **Filed:** Mar. 15, 2001

(30) **Foreign Application Priority Data**

Mar. 15, 2000 (JP) ..... 73076/2000  
Mar. 23, 2000 (JP) ..... 83027/2000



638

621



US 20030177916A1

(19) **United States**  
(12) **Patent Application Publication** (10) **Pub. No.: US 2003/0177916 A1**  
**Satake et al.** (43) **Pub. Date: Sep. 25, 2003**

(54) **METHOD OF AND APPARATUS FOR MANUFACTURING NO-BRAN CEREAL**  
(75) **Inventors:** Satoru Satake, Tokyo (JP); Nobuhiro Matsumoto, Tokyo (JP); Takeshi Munesada, Tokyo (JP); Yukihiro Kawano, Tokyo (JP); Akihiko Kato, Tokyo (JP); Kazuto Nonaka, Tokyo (JP); Katsunori Chikamune, Tokyo (JP); Yosuke Inomoto, Hiroshima (JP); Kaoru Shitadera, Hiroshima (JP)

**Correspondence Address:**  
**STAAS & HALSEY LLP**  
**SUITE 700**  
**1201 NEW YORK AVENUE, N.W.**  
**WASHINGTON, DC 20005 (US)**

(73) **Assignee:** SATAKE CORPORATION, Tokyo (JP)  
(21) **Appl. No.:** 10/393,426  
(22) **Filed:** Mar. 21, 2003

**Related U.S. Application Data**

(62) **Division of application No. 09/812,778, filed on Mar. 15, 2001.**

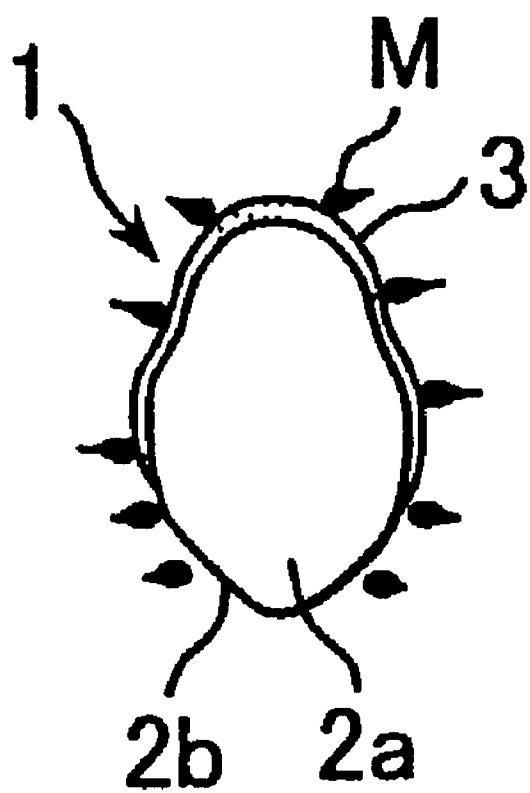
| (30) Foreign Application Priority Data |      |             |
|----------------------------------------|------|-------------|
| Mar. 15, 2000                          | (JP) | 73076/2000  |
| Mar. 23, 2000                          | (JP) | 83027/2000  |
| Mar. 24, 2000                          | (JP) | 85167/2000  |
| Jun. 16, 2000                          | (JP) | 182350/2000 |
| Jul. 19, 2000                          | (JP) | 218854/2000 |
| Oct. 17, 2000                          | (JP) | 317219/2000 |

**Publication Classification**

(51) **Int. Cl.<sup>7</sup>** B02B 3/00; B02B 5/02  
(52) **U.S. Cl.** 99/600; 99/601; 99/623

(57) **ABSTRACT**

A method of and an apparatus for manufacturing no-bran cereal such as no-bran rice which require no washing before cooking. With the method and the apparatus, bran stuck on a surface of a grain of the polished cereal is easily removed without imparting any damage on the surface, and further moisture in the grain is maintained to increase taste of the cereal. Moisture is added to the polished cereal and granular material is mixed and stirred with the moistened polished cereal to polish a surface of each grain of the polished cereal and remove bran stuck on the surface of the polished cereal. Then, the polished cereal is separated from the granular material to obtain the no-bran rice.





US006610345B2

(12) **United States Patent**  
**Satake et al.**

(10) **Patent No.: US 6,610,345 B2**  
(45) **Date of Patent: Aug. 26, 2003**

(54) **METHOD OF MANUFACTURING NO-BRAN CEREAL**

(58) **Field of Search** ..... 426/483, 627, 426/618

(75) **Inventors:** Satoru Satake, deceased, late of Tokyo (JP), by Toshiko Satake, legal representative; Nobuhiro Matsumoto, Tokyo (JP); Takeshi Munesada, Tokyo (JP); Yukihiro Kawano, Tokyo (JP); Akihiko Kato, Tokyo (JP); Kazuto Nonaka, Tokyo (JP); Katsunori Chikamune, Tokyo (JP); Yosuke Inomoto, Hiroshima (JP); Kaoru Shitadera, Hiroshima (JP)

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,741,913 A • 5/1988 Satake  
5,119,721 A • 6/1992 Satake et al.  
5,520,949 A • 5/1996 Lewis et al.  
5,773,066 A • 6/1998 Satake et al.

**FOREIGN PATENT DOCUMENTS**

JP 61005751 • 1/1986  
JP 07274857 • 10/1995  
JP 09290166 • 11/1997  
JP 11033418 • 2/1999  
JP 11042056 • 2/1999  
JP 11-137191 5/1999

\* cited by examiner

*Primary Examiner*—Anthony J. Weier

(74) *Attorney, Agent, or Firm*—Staas & Halsey LLP

(73) **Assignee:** Satake Corporation, Tokyo (JP)

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 128 days.

(21) **Appl. No.:** 09/812,778

(22) **Filed:** Mar. 15, 2001

(65) **Prior Publication Data**

US 2001/0033885 A1 Oct. 25, 2001

(30) **Foreign Application Priority Data**

Mar. 15, 2000 (JP) ..... 2000-073076  
Mar. 23, 2000 (JP) ..... 2000-083027  
Mar. 24, 2000 (JP) ..... 2000-085167  
Jun. 16, 2000 (JP) ..... 2000-182350  
Jul. 19, 2000 (JP) ..... 2000-218854  
Oct. 17, 2000 (JP) ..... 2000-317219

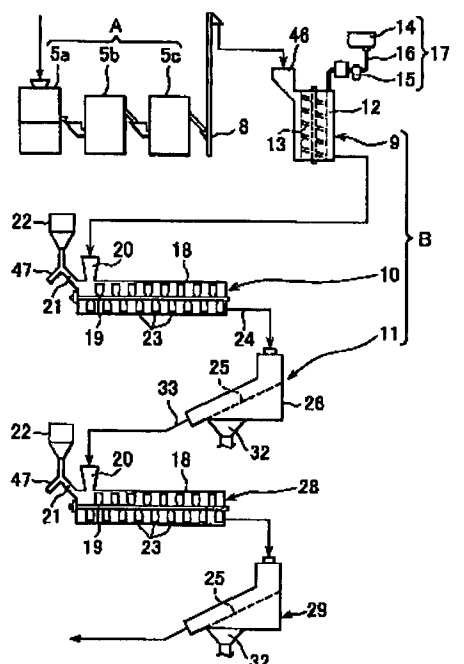
(51) **Int. Cl.<sup>7</sup>** ..... A23L 1/015; A23L 1/10; A23L 1/158

(52) **U.S. Cl.** ..... 426/483; 426/627; 426/618

(57) **ABSTRACT**

A method of and an apparatus for manufacturing no-bran cereal such as no-bran rice which require no washing before cooking. With the method and the apparatus, bran stuck on a surface of a grain of the polished cereal is easily removed without imparting any damage on the surface, and further moisture in the grain is maintained to increase taste of the cereal. Moisture is added to the polished cereal and granular material is mixed and stirred with the moistened polished cereal to polish a surface of each grain of the polished cereal and remove bran stuck on the surface of the polished cereal. Then, the polished cereal is separated from the granular material to obtain the no-bran rice.

**22 Claims, 15 Drawing Sheets**





US006832545B2

(12) **United States Patent**  
Satake et al.

(10) Patent No.: **US 6,832,545 B2**  
(45) Date of Patent: **Dec. 21, 2004**

(54) **APPARATUS FOR MANUFACTURING  
NO-BRAN CEREAL**

(75) Inventors: Satoru Satake, deceased, late of Tokyo (JP); by Toshiko Satake, legal representative, Tokyo (JP); Nobuhiro Matsumoto, Tokyo (JP); Takeshi Munesada, Tokyo (JP); Yukihiro Kawano, Tokyo (JP); Akihiko Kato, Tokyo (JP); Kazuto Nonaka, Tokyo (JP); Katsunori Chikamune, Tokyo (JP); Yosuke Inomoto, Higashihiroshima (JP); Kaoru Shitadera, Higashihiroshima (JP)

(73) Assignee: Satake Corporation, Tokyo (JP)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 10/393,426

(22) Filed: Mar. 21, 2003

(65) **Prior Publication Data**

US 2003/0177916 A1 Sep. 25, 2003

#### Related U.S. Application Data

(62) Division of application No. 09/812,778, filed on Mar. 15, 2001, now Pat. No. 6,610,345.

#### (30) Foreign Application Priority Data

|               |      |             |
|---------------|------|-------------|
| Mar. 15, 2000 | (JP) | 2000/73076  |
| Mar. 23, 2000 | (JP) | 2000/83027  |
| Mar. 24, 2000 | (JP) | 2000/85167  |
| Jun. 16, 2000 | (JP) | 2000/182350 |
| Jul. 19, 2000 | (JP) | 2000/218854 |
| Oct. 17, 2000 | (JP) | 2000/317219 |

(51) Int. Cl.<sup>7</sup> A23P 1/00; B02B 3/00; B02B 3/12; B02B 5/02

(52) U.S. Cl. 99/518; 99/519; 99/601; 99/528

(58) Field of Search 99/601, 487, 518, 99/602, 605, 613, 519, 520, 525, 528

#### (56) References Cited

##### U.S. PATENT DOCUMENTS

|             |   |        |               |
|-------------|---|--------|---------------|
| 1,377,125 A | * | 5/1921 | Gurjar        |
| 3,523,025 A | * | 3/1970 | McGinley      |
| 4,741,913 A |   | 5/1988 | Satake        |
| 5,119,721 A |   | 6/1992 | Satake et al. |
| 5,520,949 A |   | 5/1996 | Lewis et al.  |
| 5,773,066 A | * | 6/1998 | Satake et al. |

##### FOREIGN PATENT DOCUMENTS

|    |           |         |
|----|-----------|---------|
| JP | 61005751  | 1/1986  |
| JP | 07274857  | 10/1995 |
| JP | 09290166  | 11/1997 |
| JP | 11033418  | 2/1999  |
| JP | 11042056  | 2/1999  |
| JP | 11-137191 | 5/1999  |

\* cited by examiner

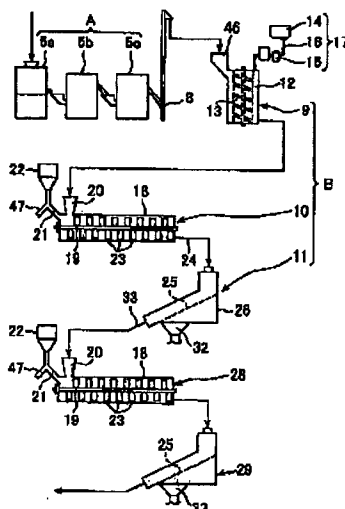
Primary Examiner—Anthony Weier

(74) Attorney, Agent, or Firm—Staas & Halsey LLP

#### (57) ABSTRACT

An apparatus for manufacturing no-bran cereal such as no-bran rice which require no washing before cooking. With the apparatus, bran stuck on a surface of a grain of the polished cereal is easily removed without imparting any damage on the surface, and further moisture in the grain is maintained to increase taste of the cereal. Moisture is added to the polished cereal and granular material is mixed and stirred with the moistened polished cereal to polish a surface of each grain of the polished cereal and remove bran stuck on the surface of the polished cereal. Then, the polished cereal is separated from the granular material to obtain the no-bran rice.

18 Claims, 15 Drawing Sheets



United States Patent [19]  
Satake

[11] Patent Number: 4,741,913  
[45] Date of Patent: May 3, 1988

[54] WHEAT FLOURING PROCESS

[75] Inventor: Toshihiko Satake, Higashihiroshima, Japan

[73] Assignee: Satake Engineering Co., Ltd., Tokyo, Japan

[21] Appl. No.: 873,680

[22] Filed: Jun. 12, 1986

[30] Foreign Application Priority Data

Sep. 30, 1985 [JP] Japan ..... 60-218969  
Oct. 14, 1985 [JP] Japan ..... 60-229627

[51] Int. Cl.<sup>4</sup> ..... A23P 1/00

[52] U.S. Cl. .... 426/483; 426/507;  
426/622

[58] Field of Search ..... 426/482, 483, 507, 622;  
99/518, 519, 520, 525, 528, 602, 605, 613

[56] References Cited

U.S. PATENT DOCUMENTS

2,745,748 5/1956 McCashen ..... 426/622  
3,717,480 2/1973 Guichard et al. .... 426/482  
4,133,257 1/1979 Satake ..... 99/518

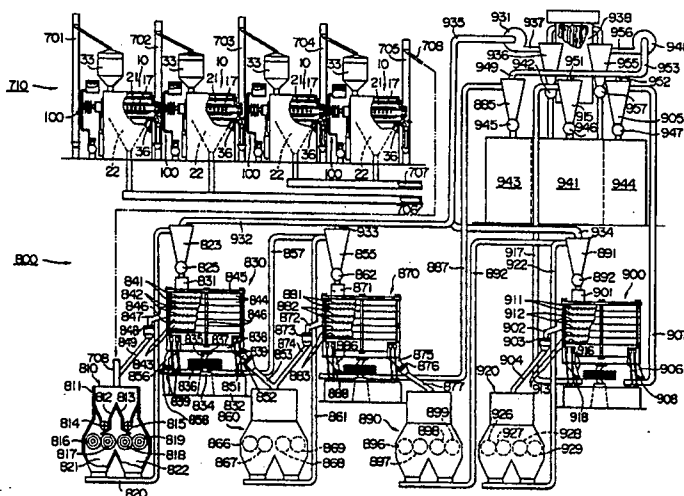
Primary Examiner—George Yeung  
Attorney, Agent, or Firm—Henry Sternberg; Bert J. Lewen

[57] ABSTRACT

A pretreatment system for wheat to be floured comprises a plurality of friction type wheat polishing machines

disposed in series relation to form a continuous wheat polishing process line. Each polishing machine includes a perforated tubular polishing member mounted on a frame and a frictionally polishing roll rotatably mounted on the frame. The polishing roll is disposed with the polishing member and cooperates therewith to define therebetween a polishing chamber. Upon the rotation of the polishing roll, it causes wheat grains supplied into the polishing chamber to be agitated and brought into frictional contact with each other to strip a pericarp from each wheat grain, to thereby polish the same. A moisture supplying device supplies moisture to the polishing chamber of at least one of the polishing machines, to add the moisture to the wheat grains flowing within the polishing chamber, to thereby increase a frictional contact force between the wheat grains. The friction between the wheat grains by the polishing roll causes each wheat grain to be moisturized and softened, to thereby facilitate the stripping of the pericarp from each wheat grain and the exposure of an endosperm part thereof. A wheat flouring system comprises the above pretreatment system and a milling and screening system. The milling and screening system comprises at least one milling machine for milling the wheat grains each having the endosperm part exposed to form a powder material, and at least one screening machine for screening the powder material to provide wheat flour having a desired particle size.

20 Claims, 13 Drawing Sheets





US005119721A

United States Patent [19]  
Satake et al.

[11] Patent Number: 5,119,721  
[45] Date of Patent: Jun. 9, 1992

- [54] APPARATUS FOR PRODUCING WASHED RICE
- [75] Inventors: Toshihiko Satake, Higashihiroshima; Satoru Satake, Tokyo; Katsuyuki Kumamoto, Mihara; Shigeru Arij, Higashihiroshima, all of Japan
- [73] Assignee: Satake Engineering Co., Ltd., Tokyo, Japan
- [21] Appl. No.: 748,243
- [22] Filed: Aug. 21, 1991
- [30] Foreign Application Priority Data
- |                    |       |          |
|--------------------|-------|----------|
| Aug. 27, 1990 [JP] | Japan | 2-226217 |
| Nov. 28, 1990 [JP] | Japan | 2-333153 |
| Dec. 18, 1990 [JP] | Japan | 2-412000 |
- [51] Int. Cl.<sup>5</sup> B02B 3/00; B08B 3/06; A23N 17/00
- [52] U.S. Cl. 99/519; 99/536; 99/600; 99/609; 134/65; 134/132; 366/234; 366/318
- [58] Field of Search 99/487, 516, 519, 520, 99/534, 536, 600, 609; 134/65, 132; 366/224, 234, 235, 318, 319; 100/117, 145
- [56] References Cited

U.S. PATENT DOCUMENTS

|           |         |                |          |
|-----------|---------|----------------|----------|
| 787,108   | 4/1905  | Oliver         | 99/536 X |
| 871,517   | 11/1907 | McDaniel       | 99/536   |
| 2,295,918 | 9/1942  | Thomas         | 134/65   |
| 2,314,871 | 3/1943  | De Back        | 134/65   |
| 3,135,668 | 6/1964  | Wesson         | 134/132  |
| 4,055,673 | 10/1977 | Mueller et al. | 99/519   |
| 4,741,264 | 5/1988  | McPeak         | 366/318  |
| 4,875,344 | 10/1989 | Zittel         | 366/319  |

|           |        |                     |         |
|-----------|--------|---------------------|---------|
| 4,993,316 | 2/1991 | Greer               | 99/516  |
| 5,020,555 | 6/1991 | Nishibayashi et al. | 134/132 |
| 5,033,371 | 7/1991 | Satake et al.       | 99/519  |

FOREIGN PATENT DOCUMENTS

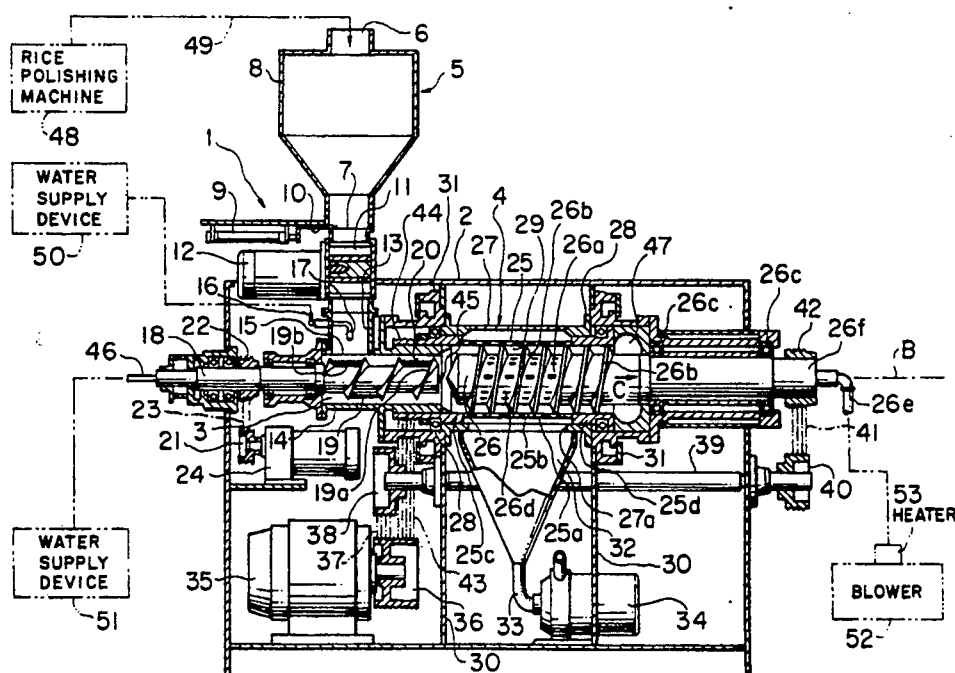
|         |        |                      |         |
|---------|--------|----------------------|---------|
| 489668  | 1/1930 | Fed. Rep. of Germany | 134/132 |
| 2161446 | 3/1973 | Fed. Rep. of Germany | 134/65  |
| 1091820 | 4/1989 | Japan                | 99/536  |

Primary Examiner—Timothy F. Simone  
Attorney, Agent, or Firm—Darby & Darby

[57] ABSTRACT

A washed rice producing apparatus includes a frame; a first tubular member, arranged within the frame, for defining a rice-washing chamber therein for washing polished rice introduced therein from one end thereof, the rice-washing chamber having a discharge end portion; an agitating member, arranged in the first tubular member, for agitating the polished rice in the rice-washing chamber; a spiral member supported on the frame to be rotatable about an axis thereof for transporting washed, polished rice discharged from the discharge end portion of the rice-washing chamber while dewatering the washed polished rice; and a second tubular member provided in the frame to be rotatable about the axis and to externally surround the spiral member for defining a dewatering chamber in cooperation with the spiral member, the second tubular member including a circumferential wall having many penetrating holes formed therethrough for draining off water separated from the washed polished rice transported by the spiral member. The washed rice producing apparatus is capable of reducing the installation space thereof.

8 Claims, 10 Drawing Sheets



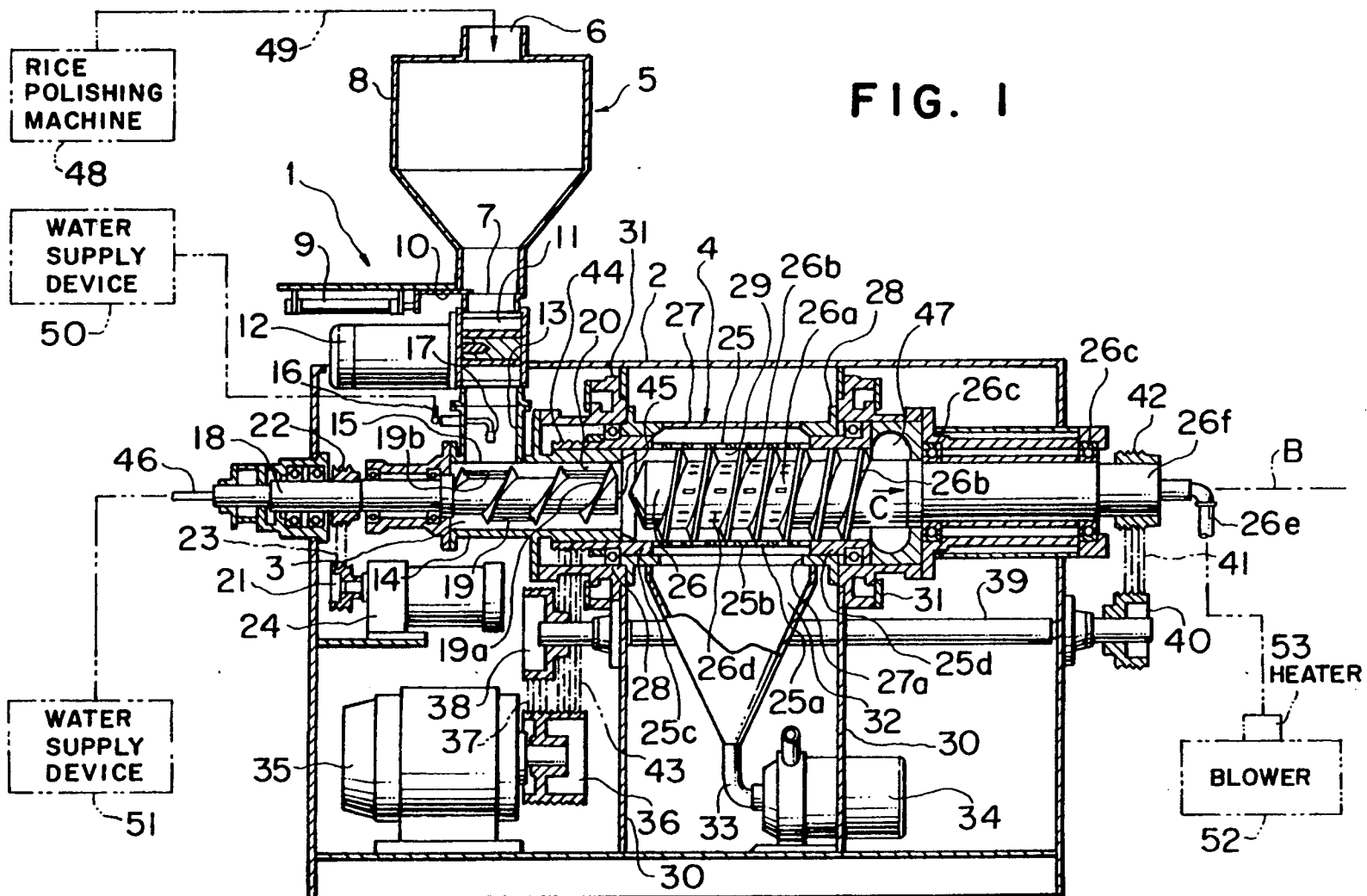


FIG. 2

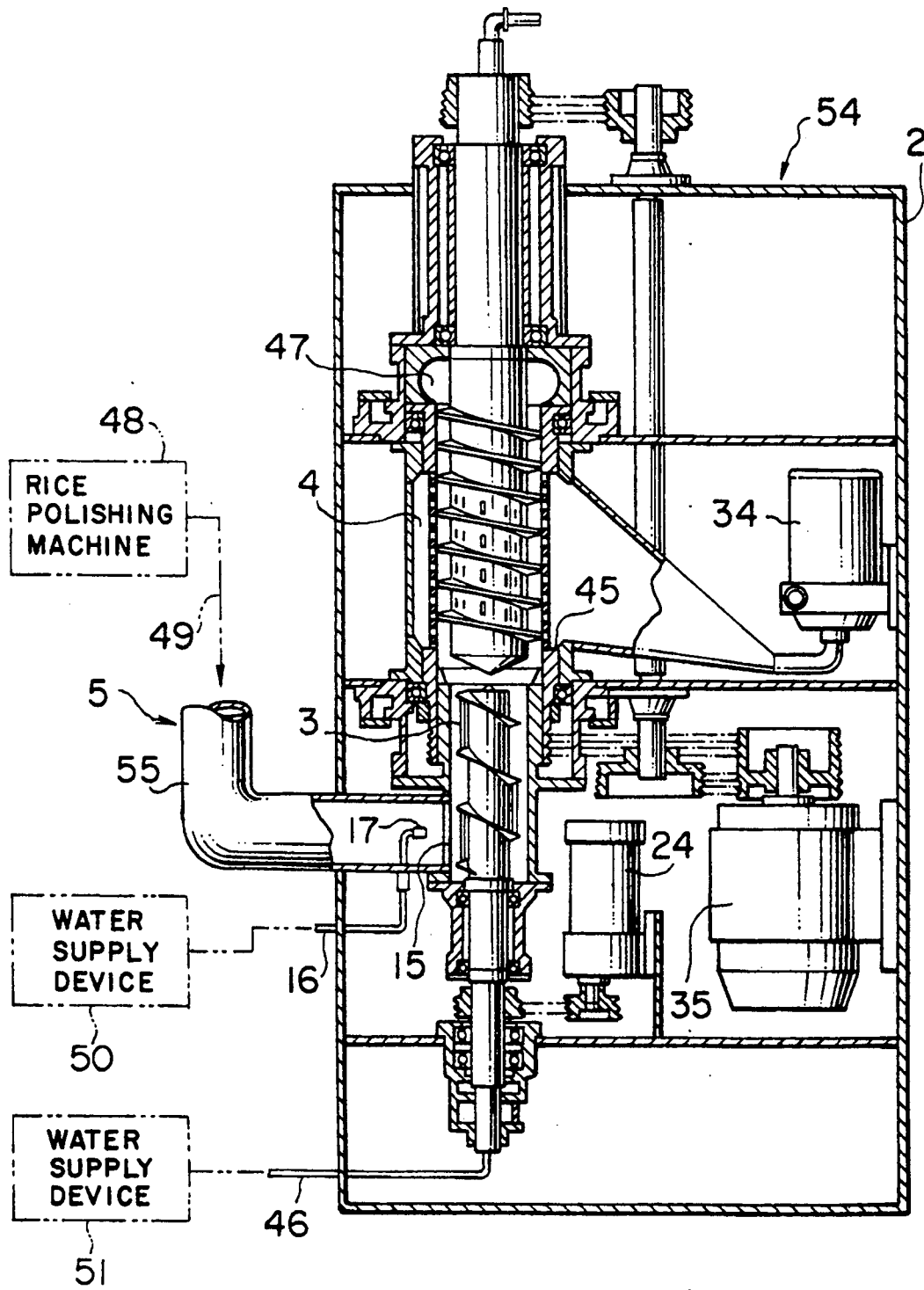
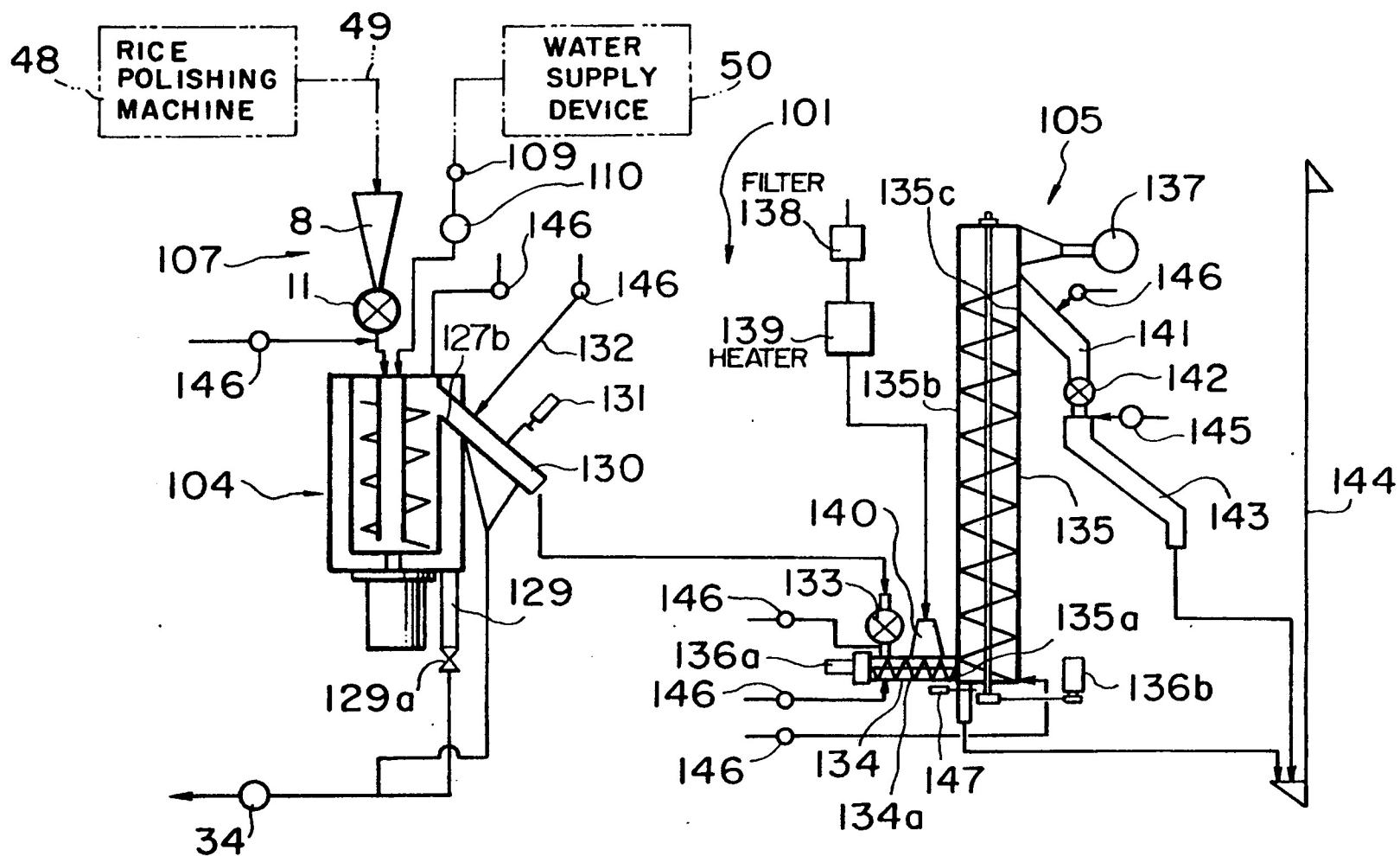


FIG. 3





US005520949A

**United States Patent** [19]  
**Lewis et al.**

[11] **Patent Number:** **5,520,949**  
[45] **Date of Patent:** **May 28, 1996**

[54] **GRAIN PRODUCT**

[75] Inventors: **Victor M. Lewis; David A. Lewis**, both  
of Rushcutters Bay, Australia  
[73] Assignee: **Byron Agricultural Company Pty.**  
**Ltd.**, New South Wales, Australia

[21] Appl. No.: **401,364**

[22] Filed: **Mar. 9, 1995**

[30] **Foreign Application Priority Data**

Mar. 15, 1994 [AU] Australia ..... PM4474

[51] Int. Cl.<sup>6</sup> ..... **A23L 1/182**

[52] U.S. Cl. .... **426/618; 426/443**

[58] Field of Search ..... 426/618, 640,  
426/463, 464, 466, 467, 461, 462, 443

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

2,638,838 5/1953 Talmey et al. .  
2,884,327 4/1959 Robbins .  
2,930,697 3/1960 Miller .  
2,975,058 3/1961 Colarusso ..... 426/462  
3,132,948 5/1964 Smith et al. .  
3,162,535 12/1964 Ferrel .  
3,190,754 6/1965 Mathews .  
3,228,771 1/1966 Copley et al. .  
3,264,113 8/1966 Barta et al. .

3,342,607 9/1967 Hickey ..... 426/464  
3,457,084 7/1969 Weiss .  
3,526,511 9/1970 Rockland .  
3,778,521 12/1973 Fisher et al. .  
4,133,898 1/1979 Carlson et al. .... 426/467  
4,233,327 11/1980 Ando et al. .... 426/462  
4,699,797 10/1987 Fast ..... 426/508  
5,002,787 3/1991 Fraile et al. .... 426/467  
5,183,682 2/1993 Lai ..... 426/466

**FOREIGN PATENT DOCUMENTS**

0120063 7/1984 Japan .  
0227292 12/1984 Japan .  
814756 6/1959 United Kingdom .

*Primary Examiner*—Donald E. Czaja  
*Assistant Examiner*—Linda H. Tonucci  
*Attorney, Agent, or Firm*—Scully, Scott, Murphy & Presser

[57] **ABSTRACT**

The present invention relates to a whole grain preferably wheat product and a process of preparing same, said product being prepared by the steps of increasing the moisture content of the grain to about 20–45%; heating the hydrated grain at temperatures ranging between 100°–130° C. for 7–50 minutes; dehydrating the grain to a moisture content of about 18–30%; compressing the grains following a short tempering period; and rapidly drying the grains following compression.

**18 Claims, No Drawings**

1  
GRAIN PRODUCT

BACKGROUND OF THE INVENTION

The major source of starchy carbohydrate foods on a global basis is derived from grains (Gramineae). While there are other important starchy carbohydrate sources, such as potatoes, cassava, sweet potatoes etc., grains are pre-eminent in providing starchy carbohydrate energy for the world's population. One reason for this is that grains are harvested in a naturally dry state and hence are relatively non-perishable. By contrast potatoes, cassava and sweet potatoes, for example, are harvested at an elevated moisture content and because of this they have a shorter storage life in their harvested state.

Of the major food grains, wheat is produced in the largest tonnage. Rice and corn are produced in very large quantities, with barley, rye, sorghum, oats, millets etc being produced in substantial but lesser amounts. Of those grains which are used directly for food for human consumption (as distinct from grains which are used for animal feeds) rice is the only major grain which is cooked (mostly as white rice and to some extent as brown rice) by the ultimate consumer predominantly in a whole-grain form. No doubt the reason for this is that rice may be cooked, for example, by boiling in water in a period of time which is conveniently short, for example 15-20 minutes. Other major grains such as wheat, corn, rye, sorghum, barley, are very slow (and hence inconvenient) to cook. As a consequence the major usage of these grains as food is in the form of flours, flakes or meals which are more conveniently consumed in various forms such as bakery products, porridge, pastas, etc.

There exists however, especially in the Middle East, a traditional food based on whole-grain wheat whereby the grain is consumed as a whole or cracked grain in the form of Bulgur (or Burghul). Bulgur is really a parboiled wheat product (analogous to parboiled rice). However, since whole-grain bulgur is fairly slow cooking, (45-60 minutes of cooking) the individual grains are usually cracked into small pieces so that the consumer can cook the bulgur in a more conveniently shorter time. Even so cracked bulgur requires cooking for 10-15 minutes then gently steaming for a similar period.

PRIOR RESEARCH

The technical and patent literature describes a number of methods for producing bulgur, by both traditional and by more modern industrial methods.

U.S. Pat. Nos. 2,884,327 and 3,778,521 (Fisher et al) describe a process for the continuous production of bulgur.

U.S. Pat. No. 3,526,511 (Rockland et al) describes a quick-cooking whole-grain wheat food produced by impregnating the grains with a solution of salt, alkaline salts and a chelating salt, the grains then being dried.

U.S. Pat. No. 2,930,697 (Miller) produces a quick cooking wheat grain product by soaking the grains to soften them, partially flattening the grain, further hydrating and cooking the grain to cause substantial swelling and to achieve substantial and uniform gelatinisation then drying the swollen grain in rapidly moving air so that the grain sets and dries in its enlarged condition.

U.S. Pat. No. 3,457,084 (Weiss) produces a water-saturated wheat grain which is gelatinised by radio frequency energy.

2

U.S. Pat. No. 3,190,754 (Matthews) steeps the wheat in caustic soda and an ammonium salt, then elutes the alkaline materials, neutralises it and dries it.

U.S. Pat. No. 3,264,113 (Barta et al) uses hot alkali to strip the bran layer from whole grains of wheat, typically pre-heated by steam or water, followed by vigorous agitation in cold water to remove the alkalised bran layer, neutralisation and drying. The final product is light coloured and cooks in 15 to 30 minutes.

U.S. Pat. No. 3,162,535 (Ferrel) uses previously fully parboiled and debranned wheat which is then heated in rapidly moving air preferably at 260°-316° C. to achieve a puffing effect. The puffed wheat product is prepared for eating by adding boiling water and allowing the food to stand for about 5 minutes.

U.S. Pat. No. 3,228,771 (Copley et al) describes a more elaborate method of bran removal from raw wheat grain (i.e., not parboiled) with an associated bleaching step, followed by hot air puffing. The puffed products cooked in 10-20 minutes as compared to the 45-60 minutes required to cook wheat which has not been puffed.

OBJECTS OF THE INVENTION

The present invention has as its primary object the production of whole-grain (preferably wheat) quick-cooking grain which may be cooked in a few minutes, providing thereby a convenient carbohydrate food which may be used as an alternative to potatoes, pasta, rice or other forms of cooked carbohydrate as well as in other ways.

A further object is the production of a grain product in which all the bran germ and other components having high nutritional value may be left substantially present in the final product.

A yet further object is to produce a grain product which does not have a strong parboiled or toasted flavour when finally cooked for eating.

A further object is to produce a grain product which does not necessarily require cooking and may be consumed after brief soaking in water or even in its dry form as a crunchy cereal-type food.

It is also an object of the invention that there should be minimum or no use of chemical additives such as alkalis, salts, chelating agents and the like in processing the grains, since there is a negative reaction by many consumers towards the use of chemicals in the processing of basic foods.

A still further object is to produce a whole-grain quick-cooking product by a process during which the amount of absorption of moisture by the grain is minimised thereby achieving maximum economy. Other objects and advantages will be apparent from the ensuing detailed description of a grain product (preferably wheat) and its preparation.

SUMMARY OF THE INVENTION

The invention discloses a process for preparing an edible food product from wheat and other whole grains wherein the processed product is recognisable as in natural grain, except where the grain has been subdivided after completion of the process, said whole grain product being quick-cooking, or quickly rehydratable and then suitable for consumption either before or after cooking and rehydration, the process comprising the steps of:

- (a) increasing the water content of the grain to a predetermined level, preferably by soaking in water until the moisture content is about 20%–45
- (b) heating the hydrated grain at temperatures ranging between 100°–130° C. for 7–50 minutes, preferably by heating in live steam
- (c) subjecting the heated grains to partial dehydration to decrease the moisture content to about 18 to 30%
- (d) optionally removing a proportion of the outer bran layer
- (e) subjecting the processed grain to compression preferably by passing the grains after brief tempering between rollers
- (f) rapidly drying the grains either immediately after compression or after the compressed grains have been further dried to a moisture content of about 12%. The invention also relates to a grain product produced by this process. In accordance with this process a quick-cooking or ready to eat grain product is produced which may be cooked by total absorption of the cooking fluid in about 2 to about 7 minutes depending on the chosen processing details, the grains of the cooked food product being separate, non-cohesive, tender, of attractive colour and flavour and having a very desirable nutritional profile and an appearance resembling a natural integral whole grain in cooked form.

It is also within the scope of this process for the final whole grain product to be reduced in size for example by crushing to produce a whole-grain cous-cous like product which is capable of rehydration and preparation for eating simply by the addition of water, preferably boiling water without any further heating or cooking.

While the process is applicable to various types of grains, it is especially suitable for use with wheat of various types such as red and white high protein wheats, medium and soft wheats, durum wheats as well as other Triticum species, barley, triticale, rye, sorghums and millets, maize oats and the like.

With appropriate variation of the process, an expanded crunchy grain may be produced which finds application as a crunchy ready to eat cereal-type food, in mixtures, bars and the like, in which products the quick-cooking or quick rehydration characteristic is not required in use even though it is an intrinsic characteristic of the food produced by the process.

#### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

An embodiment of the invention will be described in relation to wheat.

Wheat which has been fully cleaned and graded is first hydrated by steeping at an elevated temperature which may be typically at 50° to 65° C. preferably at 60° C. The advantage of so elevating the temperature is that the time required for moisture absorption is usefully shortened, the risk of microbial activity during steeping is essentially eliminated and no starch gelatinisation will occur. Water absorption is continued until the moisture content increases to about 20% to about 45%, preferably 30% to 35%. Depending on the type of finished product required a final moisture content of about 30% or about 35% may be chosen as will be referred to later. The duration of the steeping process is typically 60 to 90 minutes, the exact time being dependent on the type of grain being processed the steep temperature and the final moisture content required.

When the grain has absorbed moisture to the desired moisture content it is dewatered or drained of free surface water. Because there has been no removal of any of the bran

at this stage there is an advantage that less of the wheat solids are lost into the steep water. While bran may be removed prior to moisture increase, it is preferred that if any bran is to be removed it should be carried out at a later stage of the process as will be described. However, if the bran is of dark colour or of strong flavour, it may be preferred to remove at least part of the bran prior to steeping.

After dewatering or draining as required the grain may require a tempering period to achieve more uniform moisture distribution throughout the grain for example for about 30 minutes. Thereafter the grain is cooked.

To achieve an ultimately quick-cooking wheat food, it is desired that the cooking process be such that only partial gelatinisation of the starch in the grain should be effected. A preferred method of cooking is to use a continuous steam cooker, operating under pressure in which the grain is kept continually slowly moving. If the temperature in the vessel is 121° C. (equivalent to 15 p.s.i. gauge) a cook time of about 7 minutes to 14 minutes, preferably about 10 minutes, is required.

Other methods of cooking in steam may be employed, for example, use of a batch steam pressure cooker.

At a moisture content of 30% after steeping, 10 minutes of cooking at 121° C. will achieve a suitable degree of partial gelatinisation, whereby the centre of each grain can be seen to be less gelatinised, bordering on ungelatinised. It will be understood to persons skilled in the art that the temperature and duration of the cook can be inversely varied without particularly varying the degree of gelatinisation.

It is also possible to carry out the partial gelatinisation process in the steep water by increasing its temperature. However it has been found that better control and continuity is achieved by the procedure described above.

The cooked grains exit from the cooker in an extremely separate condition, that is, there is no tendency for the grains to clump together. This is because the bran layer is intact and little or no free starch is available to effect cohesion.

The cooked grains are then partly dehydrated until the moisture content is reduced to 18–30%, preferably 22–24%. This is best carried out by using through-bed continuous dehydration equipment, fluid bed drying or the like. Air temperature for dehydration should be such that the product temperature does not exceed about 100° C. A product temperature during dehydration of about 75° C. is quite satisfactory. As soon as the target moisture content is reached the grain may be moved to an abrasive bran removal machine (such as the type of machine widely used for polishing rice) and a degree of bran removal may be effected. Removal of bran at this stage is optional and is not required for the performance of the invention. If partial bran removal is carried out the amount of bran removed would normally be no more than about 5% of the weight of the grain. This will depend on the type of grain being processed and the preference of the processor or the ultimate consumers.

After partial dehydration (and partial bran removal, if this is carried out) the grain is tempered without significant moisture loss for about 15 to 30 minutes. This tempering period allows moisture in the centre of the grains to diffuse outwards to equilibrate with the surface of the grains which is drier as a consequence of the partial dehydration. It is necessary to achieve reasonable moisture uniformity in preparation for the next step of the process.

The tempered grains are then compressed for example by passing them between the rolls of a roller mill set such that the gap between the rolls is about 0.15 mm to 0.55 mm.

5

preferably about 0.4 to 0.45 mm. Compression causes a degree of flattening of the grain, but because the product is somewhat rubbery at this stage the grains bounce back to a thickness which is much greater than the gap through which they pass in the roller mill. The brief tempering period prior to rolling is intended to minimise the tendency of the grains from cracking radially at the periphery. After compression the grains still have the appearance of natural grains, though slightly flattened, the normal shape and the crease being quite identifiable.

After compression the grains are dried in a dehydrating unit in such a way that a degree of expansion occurs. For products which are to be cooked in 5-7 minutes, drying is effected immediately after compression, that is, while the moisture content is at or slightly below that at which compression is carried out. To achieve a desirable result, the grains are exposed to rapidly moving air at about 170° C. to about 230° C., preferable at about 200°-210° C., the grains being actively fluidised in the rapidly moving air. It requires about 30-40 seconds for the grains to be dried to about 12% moisture, though this time will vary somewhat depending on temperature and on the balance of airspeed and feed rate of the grains into the dehydrating unit.

In order to produce a more rapidly cookable grain suitable for instant snack meals the same general procedure is followed, except that the grain is cooked for a longer period, for example 20 to 25 minutes at 121° C. and the compression is increased such that the gap between the rolls is about half of that indicated above (namely 0.4-0.45 mm). This product has a bulk density when dried of about 300 g/liter while the first described product has a bulk density of about 360-400 g/liter. However these bulk density figures will vary depending on the type of grain processed.

Thus by varying the processing parameters as described the ultimate cook time of the grain may be varied from "instant"—requiring about 2 minutes of cooking, to "rapid"—requiring about 5 to 7 minutes of cooking. It will be understood that products can be produced having various different ultimate cooking times by varying certain of the processing parameters as described.

Either of the above products or their variants may be changed from whole-grain form to a reduced size by for example passing the dry whole grain products through crushing equipment to produce a fragmented whole-grain product. The size of the fragments may be varied according to market requirements. Such a fragmented whole grain product can be analogous to a whole-grain cous-cous or pilpil. In the present case, the fragmented whole-grain product may be prepared for eating simply by addition of water, preferably boiling water after which a wait of only 2 to 3 minutes is required to achieve hydration.

To produce an expanded crunchy grain product which does not require cooking the basic process as described above is varied by extending the steep time and hence the moisture content increase to the upper end of the indicated range, for example by steeping for about 90 minutes to achieve a moisture content of about 35%, extending the cook time of the steeped grain to about 35 to 45 minutes at 121° C. (or for a shorter time at a higher temperature), compressing the grain to an extent equal to or greater than that indicated for instant and by drying the compressed grain back to about 12% moisture at a moderate temperature below about 100° C. preferably about 70° C-80° C. followed by toasting of the dried grain in rapidly moving fluidising air at about 190° C. to 230° C. for about 15 to 30 seconds. As a consequence of these process modifications,

6

the toasted grains are more expanded, very crispy and of low bulk density, for example 140 to 200 g/liter.

Optionally, selected enzymes may be used in the process, for example before or after the compression step. Use of enzymes to enhance expansion of rice and waxy grains has been described in Australian Patents 583817 and 610053 but their use on nonwaxy grains such as wheat, barley, rye oats and the like is not disclosed in the prior art.

It will be thus be seen that by varying the heating and temperature ranges depending on the type of product required a whole range of products may be obtained ranging from those requiring extremely short cooking times to those requiring no cooking and in general it has been found that satisfactory products can be produced within these parameters if the heating of the grains is effected at temperatures ranging between 100°- 130° C. for 7-50 minutes.

What is claimed is:

- 1. A process of preparing an edible food product from wheat or other whole grains comprising the steps of:  
increasing the moisture content of the grain to hydrate the grain to a moisture content of about 20-45%;  
heating the hydrated grain at temperatures ranging between 100°-130° C. for 7-50 minutes;  
dehydrating the grain to a moisture content of about 18-30%;  
compressing the grains following a short tempering period; and  
rapidly drying the grains following compression.

- 2. A process as claimed in claim 1 wherein the moisture content of the grains is increased by soaking in water.
- 3. A process as claimed in claim 1 wherein heating of the hydrated grain is effected with live steam.

- 4. A process as claimed in claim 1 wherein a portion of the outer bran layer of the grains is removed following the dehydration.
- 5. A process as claimed in claim 1 wherein the grains are subject to compression by passing the grains between the rollers.

- 6. A process as claimed in claim 1 wherein following compression the grains are dried to a moisture content of about 12% in a rapidly moving air stream at a temperature sufficient to achieve expansion of the grains.
- 7. A process as claimed in claim 1 wherein the grains following said drying step are sub-divided.

- 8. A process as claimed in claim 1 wherein said grains are selected from the group consisting of red and white high protein wheats, medium and soft wheats, durum wheats, barley triticale, rye, sorghums, millets, maize and oats.
- 9. A process as claimed in claim 1 wherein the compressed grain is dried to a moisture content of about 12% at a temperature below about 100° C. and thereafter toasted at about 190° C. to about 230° C. to achieve an expanded crispy texture.

- 10. An edible food product prepared from wheat or other grains wherein said product has been prepared by  
increasing the moisture content of the grain to hydrate the grain to a moisture content of about 20-45%;  
heating the hydrated grain at temperatures ranging between 100°-130° C. for 7-50 minutes;  
dehydrating the grain to a moisture content of about 18-30%;  
compressing the grains following a short tempering period; and  
rapidly drying the grains following compression.

- 11. An edible food product as claimed in claim 10 wherein the moisture content of the grains is increased by soaking in water.

7

- 12. An edible food product as claimed in claim 10 wherein heating of the hydrated grain is effected with live steam.
- 13. An edible food product as claimed in claim 10 wherein a portion of the outer bran layer is of the grains removed following the dehydration.
- 14. An edible food product as claimed in claim 10 wherein the grains are subject to compression by passing the grains between the rollers.
- 15. An edible food product as claimed in claim 10 wherein following compression the grains are dried to a moisture content of about 12% in a rapidly moving air stream at a temperature sufficient to achieve expansion of the grains.
- 16. An edible food product as claimed in claim 10 wherein the grains following said drying step are sub-divided.

8

- 17. An edible food product as claimed in claim 10 wherein said grains are selected from the group consisting of red and white high protein wheats, medium and soft wheats, durum wheats, barley triticales, rye, sorghums, millets, maize and oats.
- 18. An edible food product as claimed in claim 10 wherein the compressed grain is dried to a moisture content of about 12% at a temperature below about 100° C. and thereafter toasted at about 190° C. to about 230° C. to achieve an expanded crispy texture.

\* \* \* \* \*



US005773056A

**United States Patent** [19]  
**Hohenthal et al.**

[11] **Patent Number:** **5,773,056**  
[45] **Date of Patent:** **Jun. 30, 1998**

[54] **HIGH COCOA/CHOCOLATE LIQUOR  
SYRUPS WITH IMPROVED FLOW  
PROPERTIES**

3,982,042 9/1976 Arden ..... 426/631  
4,343,818 8/1982 Eggen .  
4,948,600 8/1990 Zumbé et al. .... 426/45

[75] **Inventors:** **Thalia A. Hohenthal**, Santa Clara;  
**Michelle Weinberg**, San Bruno, both of  
Calif.

**FOREIGN PATENT DOCUMENTS**

622 028 3/1981 Germany .  
50-33137 10/1975 Japan .  
61-219339 9/1986 Sweden .

[73] **Assignee:** **Guittard Chocolate Company**,  
Burlingame, Calif.

**OTHER PUBLICATIONS**

Shimazaki et al. Patent Abstracts of Japan, Abstracting  
07-79749, Mar. 1995.

[21] **Appl. No.:** **713,275**

*Primary Examiner*—Leslie Wong

[22] **Filed:** **Sep. 12, 1996**

*Attorney, Agent, or Firm*—Townsend and Townsend and  
Crew LLP

[51] **Int. Cl.<sup>6</sup>** ..... **A23G 1/00**

[52] **U.S. Cl.** ..... **426/45; 426/44; 426/48;**  
**426/49; 426/50; 426/52; 426/584; 426/593;**  
**426/631**

[58] **Field of Search** ..... **426/44, 45, 48,**  
**426/50, 51, 52, 549, 564, 572, 584, 593,**  
**658, 659, 660, 631, 49**

[57] **ABSTRACT**

Compositions containing cocoa, sweetener, a combination  
of food-grade enzymes, and optionally chocolate liquor are  
described. The compositions provide a cocoa/chocolate  
liquor flavored syrup having a high concentration of the  
flavoring, in part due to the substantially higher usage of  
cocoa and liquor than previous syrups. Additionally, the  
compositions have excellent flow properties for use in  
beverages and confections, while further having a low water  
activity which leads to a longer and more commercially  
useful shelf life. Some compositions will also contain an  
acidulant, a mold inhibitor, and vanilla flavor.

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

1,854,354 4/1932 Wallerstein ..... 426/45  
2,014,342 9/1935 Gutekunst ..... 426/45  
2,965,490 12/1960 Rusoff ..... 426/45  
3,397,061 8/1968 Katz ..... 426/45  
3,821,420 6/1974 Arden ..... 426/45

**14 Claims, No Drawings**

5,773,056

1

## HIGH COCOA/CHOCOLATE LIQUOR SYRUPS WITH IMPROVED FLOW PROPERTIES

This invention lies in the field of chocolate and cocoa syrups which are useful in the flavoring of beverages and confections.

### BACKGROUND OF THE INVENTION

The flavoring of beverages and confections with water-based dispersions of chocolate ingredients has been very limited in flavor type and intensity. This is partly due to the high viscosities that result from high levels of cocoa and/or chocolate liquor required to yield a rich chocolate flavor.

Currently, water-based dispersions of chocolate ingredients are prepared from cocoa powder, typically using only low fat cocoa. See, U.S. Pat. No. 4,343,818, incorporated herein by reference. Conventional cocoa powder is prepared from roasted cocoa beans by removing the husks or shells and grinding the roasted beans to a semi-liquid sludge known as chocolate liquor. The fat (cocoa butter) is then partially separated from the chocolate liquor, generally by pressing, resulting in partially defatted solids which are finely ground to give the product known as cocoa, or cocoa powder. The cocoa powder may then be subjected for a further treatment known as "dutching", in which it is contacted with an alkali, usually potassium carbonate, in the presence of water.

The main purpose of dutching is to render the cocoa more easily dispersible in water. The chemical reactions which occur during dutching are complex but it is believed that a limited hydrolysis takes place, producing compounds which render the cocoa less hydrophobic.

The traditional dutching process gives a product which disperses in warm water or milk more or less readily but which is still far from being completely soluble. Thus, on dispersion in water, an emulsion is produced rather than a solution and the emulsion is opaque with a deep brown color and characteristic heavy taste. These characteristics make conventional cocoa unsuitable for coloring and flavoring foods requiring a light appearance and texture, such as certain types of decorative creams and icings, or for soft drinks in which complete water-solubility is practically essential.

Chocolate liquor, despite its important contribution to a rich chocolate flavor, is rarely used in chocolate syrups because it provides compositions which are too viscous. Chocolate liquor has a fat content of about 50 to 55% and has only been used in very small amounts for some limited compositions. See, U.S. Pat. No. 3,821,420. In general, the chocolate flavoring syrups known in the art contain low proportions of cocoa (about 5%) and resist the incorporation of any chocolate liquor. Frequently this type of syrup yields a desired viscosity but not the desired flavor. If higher levels of cocoa or chocolate liquor (the combination hereinafter referred to as "the flavoring") are used, it is known that the viscosity will be increased to the point that room temperature use for commercial food service is not possible.

In an effort to incorporate higher levels of cocoa, Arden (U.S. Pat. No. 3,821,420) described the use of amylolytic enzymes to reduce the viscosity associated with increased cocoa content. One disadvantage of amylolytic enzyme treatment for syrups with high levels of the flavoring is that the viscosity will, in the time needed for national distribution of a commercial product, revert and increase to the point where the syrup cannot be used in dispensing equipment at

2

room temperature. This prohibits the use of such a syrup in many segments of the food service industry. Another disadvantage of high levels of flavoring in a syrup is that the water activity is difficult to control with the traditional addition of sucrose as the sweetener because the flavoring tends to require so much water for hydration. This leads to limitations in packaging and distribution to also prevent commercial use of such formulations.

What is needed in the art are new cocoa/chocolate syrup compositions which provide high contents of chocolate flavor and which have flow properties suitable for various commercial applications over a long period of time. Surprisingly, the present invention provides such compositions and methods for their preparation.

### SUMMARY OF THE INVENTION

The present invention provides a composition comprising chocolate flavoring, sweetener, and a combination of food-grade enzymes. In some embodiments the composition will further comprise an acidulant, a mold inhibitor, vanilla flavor, or combinations thereof. The chocolate flavoring can be either cocoa (in an amount of from about 15-20 weight percent) or a combination of cocoa and chocolate liquor (in which the cocoa is present in an amount of from about 12-19 weight percent and the chocolate liquor is present in an amount of from about 1-5 weight percent). This composition provides a cocoa/chocolate liquor flavored syrup having a high concentration of the flavoring, in part due to the substantially higher usage of cocoa and liquor than previous syrups. Additionally, this composition has excellent flow properties for use in beverages and confections, while further having a low water activity which leads to a longer and more commercially useful shelf life. These compositions are readily dispensed and mixed at ambient temperatures with ingredients for beverages and confections. More particularly, the present compositions comprise an aqueous solution or suspension containing from about 15-20 weight percent cocoa, from about 0-5 weight percent chocolate liquor, from about 35 to 50 weight percent sweetener, a combination of enzymes including, an  $\alpha$ -amylase, a pentosanase and a pectinase, and optionally an acidulant, a mold inhibitor, vanilla flavor, or combinations thereof.

The present invention further provides methods for the preparation of the cocoa/chocolate liquor syrups described above.

Other advantages, features and embodiments of the invention will be apparent from the description which follows.

### DETAILED DESCRIPTION OF THE INVENTION

#### Cocoa/chocolate liquor compositions

In one aspect, the present invention provides a cocoa/chocolate liquor composition comprising an aqueous solution containing cocoa, sweetener, a combination of enzymes including an  $\alpha$ -amylase, a pentosanase and a pectinase, and optionally chocolate liquor. In some embodiments, the compositions will further comprise an acidulant, a mold inhibitor, vanilla flavor, or combinations thereof.

As noted above, cocoa is typically referred to as having various degrees of fat (cocoa butter) and is available as low fat cocoa (having about 8-10% cocoa butter content), medium fat cocoa (having about 10-12% cocoa butter content) up to high fat breakfast cocoa (having 26-28% cocoa butter content). For use in the present invention, the type of cocoa is preferably either high fat (having in the range of 22-24% residual cocoa butter) or medium fat

(having in the range of 10–12% residual cocoa butter). The choice of flavor of the cocoa may vary greatly. Additionally, combinations of cocoa types may be used to further enhance the quality of the flavor.

The precise amount of cocoa used can vary greatly depending upon the fat content of the cocoa and the presence or absence of chocolate liquor. As the present invention relates to achieving high flavor levels with suitable flowable properties, the compositions can accommodate up to about 20% cocoa. Any adjustment downward depends on flavor desires and quantity of chocolate liquor used.

As noted above, the use of chocolate liquor as part of the flavoring system in a chocolate syrup is possible, and preferred, in this invention. The type may be of dutched or natural process. The amount is based on the total fat content of the syrup formulation. The fat content of the syrup may be higher or lower depending upon the total non-fat cocoa solids content. The higher the non-fat cocoa solids content of the formulation, the lower the total fat content. Additionally, for formulations with lower cocoa levels, the chocolate liquor content level may be increased. The most useful range of chocolate liquor in this invention is 1–5%.

Commercially available chocolate liquor has a fat content of about 50 to 55%. The amount of cocoa and chocolate liquor which are present will depend on the combined cocoa butter content of the various species. Thus, cocoa will be present in an amount of about 15 to 20 percent by weight with about 1 to about 5 percent by weight of chocolate liquor. For those compositions in which medium fat cocoa (10–12% cocoa butter) is used, the amount of chocolate liquor will be sufficient to bring the total cocoa butter/fat content to about 2.0 to 5.0%, more preferably about 2.5 to 4.5%.

Each of the cocoas and chocolate liquor used above are available from commercial sources such as Guittard Chocolate Company (Burlingame, Calif., USA), E.D.S. Man Cocoa Products (Glassboro, N.J., USA) and Grace Cocoa (Milwaukee, Wis., USA). A preferred supplier is Guittard Chocolate Company.

The sweetener chosen in this invention may be of any monosaccharide or disaccharide, for example, fructose, sucrose or dextrose. Additionally, combinations of different monosaccharides and disaccharides can be used. The choice can be based on flavor or the effect as a preservative in lowering the water activity. Preferably, the sweetener is fructose or sucrose. The amount and type of sweetener will vary with the quantity of the flavoring used. The usage of between 35–50% is preferred. For those compositions in which dextrose is used, it is preferred that the dextrose be used in combination with a second sweetener and that the amount of dextrose be limited to 50% of the combined sweeteners.

The use of an acidulant is helpful to bring the formulation into a pH range that is favorable for the enzyme activity. This will depend on the type of enzyme. In general, hydrolytic enzymes such as amylases, pentosanases and pectinases favor an acidic environment of pH 4–5.5. The type of acidulant is preferably a weak acid such as acetic acid, citric acid, malic acid, lactic acid, or combinations thereof. The amount will depend upon the type used. Less than 1% of lactic acid is preferred in this invention.

The use of potassium sorbate as a mold inhibitor is part of the commercial advantage to the packaging and processing. The amount is typically 0.2% or less. One of skill in the art will understand that a number of other food grade mold inhibitors can also be used.

The enzyme system is chosen to break down a broad range of carbohydrates, recognizing that cocoa solids nat-

rally contain this broad range as part of their physiology in the living cocoa plant. Accordingly, the present invention provides compositions in which a mixture of an  $\alpha$ -amylase, a pentosanase and a pectinase are used in combination. The  $\alpha$ -amylase will preferably be a combination of a bacterial  $\alpha$ -amylase and a fungal  $\alpha$ -amylase. Examples of such  $\alpha$ -amylases include CLARASE® and TENASE® (sold by Solvay Enzymes, Elkhart, Ind., USA), as well as CANALPHA® and BIOBAKE® (sold by Quest International, Sarasota, Fla., USA). The use of both a fungal source  $\alpha$ -amylase and a bacterial source  $\alpha$ -amylase extends the types of carbohydrate hydrolysis which occur. A second enzyme, or group of enzymes, used in the present compositions are the pentosanases. As used herein, the term "pentosanase" is meant to include single enzymes as well as enzyme complexes which contain xylanase activity, cellulase activity, hemi-cellulase activity,  $\beta$ -glucanase activity or combinations thereof. One example of a pentosanase complex containing such activity is the enzyme complex from *Trichoderma reesei* (marketed by Quest International under the name BIOPEPTOSANASE®). Incorporation of a pentosanase is useful for the hydrolysis of pentosans which account for part of the syrup thickening with time due to the ability of pentosans to preferentially absorb water from other dissolved materials in the syrup. A pectinase is also used in the present compositions to degrade the pectins so that they are not active to absorb water to form a gel type structure. An example of a suitable pectinase is an enzyme system derived from a strain of *Aspergillus niger* (marketed by Quest International under the name BIOPECTINASE OK SYSTEM®). Reducing the pentosan and pectin activity also reduces the tendency of the syrup to either retrograde or thicken after time. In addition to the enzymes and suppliers noted above, similar "food-grade" enzymes are available from commercial sources such as Genencor (Rochester, N.Y., USA) and Novo Nordisk Biochem North America (Danbury, Conn., USA).

The amounts of each of the above enzymes depends upon their activity as provided by the manufacturer. For example, an  $\alpha$ -amylase with an activity of 800,000FAAu/g (Fungal Alpha Amylase units/gram) is typically used at about 0.04% by weight. A pectinase having an activity of 300PGu/mL (Pectinase units/mL) is also preferably used at about 0.04% by weight. A pentosanase having an activity of 14,500 Xylu/g (Xylanase units/gram) can be used at about 0.04% by weight. And, finally, a bacterial  $\alpha$ -amylase having an activity of 60,000BAAu/g (Bacterial amylase units/gram) can be used at about 0.02 weight percent. Thus, the use of about 0.02–0.04% of each of the enzymes named above is preferred in the present compositions.

The use of spices and extracts to enhance the natural chocolate flavors is accounted for in this invention. Vanilla extract in any of its forms is useful and at any level necessary for flavoring, generally under 2%. Additionally, the pH which is a partial predictor of flavor is not restricted in this formulation and can vary greatly.

Preparation of Cocoa/chocolate liquor compositions

Preparation of the above compositions typically requires proper hydration of the flavoring material, without excessive cooking that can begin to dehydrate the granules and prematurely lead to crystallization of the solids in the system. The thickening of the syrup over time is both a function of crystallization by some components and hydration of other components. Preferably, the cocoa is alternately blended with portions of water with agitation to disperse the powder. The acidulant and mold inhibitor can be added, and heat is applied sufficient to hydrate but low enough to avoid dehy-

5

dration on the surface and sides of the cooking vessel. Such dehydration would result in the initiation of crystal growth of the solids present. This precrystallization would further enhance undesirable crystal growth of the carbohydrates and proteins in the system, with time. Use of extra water at the rate of 3.5 weight percent of the water content is useful in achieving proper hydration during this stage. Reaching a temperature of 175° F. is sufficient to complete the hydration. Hydration also prepares the carbohydrates to be hydrolyzed by the enzymes. A holding time of 5 minutes is typically adequate once at temperature. When present, the chocolate liquor can be added at its melting range starting at about 80° F.

Cooling and temporarily thinning the mixture can be accomplished by addition of the sweetener. For this formulation a temperature of 135° F. is preferred. At this temperature the enzymes can be introduced. The temperature optimum for three of the enzymes is about 135°-145° F. Accordingly, a hold time of 15-30 minutes at this temperature is desirable. The fourth enzyme has a temperature optimum of 160°-170° F. A second hold time of 15-30 minutes at this more elevated temperature is subsequently used.

Once the enzymes have acted on the appropriate substrates, the enzyme activity should be quenched by heating the mixture to about 185° F. At this temperature, the enzymes are typically denatured and no further uncontrolled activity is found. Preferably the compositions are held at temperatures of from 185° F. to 190° F. for periods of about 5 minutes.

Following enzyme denaturation, the spice ingredients can be added and the resulting compositions can be packaged.

Preferably, the syrup is cooled before packaging to prevent crystal growth. A cooling medium is used to drop the temperature of the syrup within 5 minutes from 185° F. to between about 70°-100° F. A slower cooling rate is undesirable as it leads to slow, large growth of carbohydrate, protein or fat crystals. Commercially sterile packaging can then be filled using the resulting composition at temperatures of about 70-100° F.

In preferred embodiments, the compositions can be prepared by combining the acidulant and mold inhibitor in a minimum amount of water and alternately adding portions of the cocoa and water with agitation until a smooth mixture is obtained. A small additional portion of water (about 2-7% of that which is already present) is added and will be lost during cooking. The resulting mixture is heated to at least about 75° F. and any chocolate liquor is added. The mixture is then heated to 165°-170° F. and held at that temperature for about 5 minutes. After this time, sweetener is added and the temperature is reduced to 135°-140° F. The enzyme mixture is then added and the temperature is held constant for 15 min, elevated to 165°-170° F. and held for five minutes, then raised to 185°-190° F. and held for an additional five minutes. Vanilla extract is added and the resulting composition is mixed for 3 minutes then cooled to 70°-100° F. and packaged in sterile containers. In some embodiments, the product is packaged into polypropylene bottles at room temperature and an induction heat seal cap liner is applied to the mouth of the bottle and the cap tightened.

The following examples are provided by way of illustration and not by way of limitation.

EXAMPLES

Materials used in the present invention can be obtained as follows: Enzymes can be obtained from Genencor (Rochester, N.Y., USA), Novo Nordisk Biochem North

6

America (Danbury, Connecticut, USA) or Quest International Bioproducts (Sarasota, Fla., USA). In particular, Biobake alpha amylase 40,000P with an activity of 800,000 FAAu/g used at 0.04 weight percent for an activity of 320 FAAu/g (Fungal Alpha Amylase Units/gram); Biopectinase 300L pectinase with an activity of 300 PGU/ml used at 0.04 weight percent for an activity of 0.12 PGU/ml (Pectanase units/ml); Biopentosanase 5X pentosanase with an activity of 14,500 XYLu/g used at 0.04 weight percent for an activity of 5.8 XYLu/g (Xylanase units/gram); and Canalpha amylase 1000 P with an activity of 60,000 BAAu/g used at 0.02 weight percent for an activity of 12 BAAu/g (Bacterial Amylase units/gram) were all obtained from Quest International.

General Preparation

Potassium sorbate and Lactic acid are combined with a minimum of water in a suitable kettle. Water (10% of the total amount) and cocoa (10% of the total amount) are alternately added in increments with agitation and no heating until all the cocoa and water are added and the mixture is smooth. An additional weight of water equal to 3.5% of the weight of the total water is added. This portion of the water will be evaporated during the cooking process. The resulting mixture is heated to 80° F. Chocolate liquor is added and the mixture is heated to 165°-170° F. After holding the mixture at this temperature for 5 minutes, the heating is stopped and sweetener is added. A reduced temperature of 135°-140° F. is maintained and the enzymes are added. The temperature is held for 15 minutes, then increased to 165°-170° F. and held for 5 minutes. The temperature is then increased to 185°-190° F. and held for 5 minutes. The vanilla extract is added and the resulting composition is mixed for 3 minutes. The product temperature is reduced to 70°-100° F. with active cooling, and the resulting mixture is packaged in commercially sterile containers.

EXAMPLE 1

This example illustrates six compositions which were prepared according to the general method outlined above.

| Component                               | Weight Percent |
|-----------------------------------------|----------------|
| Composition I                           |                |
| Fructose, Crystalline                   | 44.50          |
| Water                                   | 34.50          |
| Dutch Process Cocoa (10-12% fat)        | 17.00          |
| Chocolate Liquor                        | 3.00           |
| Lactic Acid, 88% solution               | 0.40           |
| Vanilla Extract                         | 0.36           |
| Potassium sorbate                       | 0.10           |
| Biobake 40,000 (Quest International)    | 0.04           |
| Biopectinase 300L (Quest International) | 0.04           |
| Biopentosanase 5X (Quest International) | 0.04           |
| Canalpha 1000P (Quest International)    | 0.02           |
|                                         | 100.00         |
| Composition II                          |                |
| Fructose, Crystalline                   | 44.51          |
| Water                                   | 34.50          |
| Dutch Process Cocoa (10-12% fat)        | 15.00          |
| Chocolate Liquor                        | 5.00           |
| Lactic Acid, 88% solution               | 0.40           |
| Potassium sorbate                       | 0.10           |
| Vanilla Extract                         | 0.35           |
| Biobake 40,000 (Quest International)    | 0.04           |

7

-continued

| Component                               | Weight Percent |
|-----------------------------------------|----------------|
| Biopectinase 300L (Quest International) | 0.04           |
| Biopentosanase 5X (Quest International) | 0.04           |
| Canalpha 1000P (Quest International)    | 0.02           |
|                                         | 100.00         |
| Composition III                         |                |
| Fructose, Crystalline                   | 44.50          |
| Water                                   | 34.50          |
| Dutch Process Cocoa (10-12% fat)        | 20.00          |
| Lactic Acid, 88% solution               | 0.40           |
| Vanilla Extract                         | 0.36           |
| Potassium sorbate                       | 0.10           |
| Biobake 40,000 (Quest International)    | 0.04           |
| Biopectinase 300L (Quest International) | 0.04           |
| Biopentosanase 5X (Quest International) | 0.04           |
| Canalpha 1000P (Quest International)    | 0.02           |
|                                         | 100.00         |
| Composition IV                          |                |
| Fructose, Crystalline                   | 44.86          |
| Water                                   | 34.50          |
| Natural Process Cocoa (10-12% fat)      | 20.00          |
| Vanilla Extract                         | 0.40           |
| Potassium sorbate                       | 0.10           |
| Biobake 40,000 (Quest International)    | 0.04           |
| Biopectinase 300L (Quest International) | 0.04           |
| Biopentosanase 5X (Quest International) | 0.04           |
| Canalpha 1000P (Quest International)    | 0.02           |
|                                         | 100.00         |
| Composition V                           |                |
| Fructose, Crystalline                   | 44.46          |
| Sucrose, Crystalline                    | 5.00           |
| Water                                   | 34.50          |
| Dutch Process Cocoa (10-12% fat)        | 12.00          |
| Chocolate Liquor                        | 3.00           |
| Lactic Acid, 88% solution               | 0.40           |
| Vanilla Extract                         | 0.40           |
| Potassium sorbate                       | 0.10           |
| Biobake 40,000 (Quest International)    | 0.04           |
| Biopectinase 300L (Quest International) | 0.04           |
| Biopentosanase 5X (Quest International) | 0.04           |
| Canalpha 1000P (Quest International)    | 0.02           |
|                                         | 100.00         |
| Composition VI                          |                |
| Sucrose, Crystalline                    | 49.46          |
| Water                                   | 34.50          |
| Dutch Process Cocoa (10-12% fat)        | 12.00          |
| Chocolate Liquor                        | 3.00           |
| Lactic Acid, 88% solution               | 0.40           |
| Vanilla Extract                         | 0.40           |
| Potassium sorbate                       | 0.10           |
| Biobake 40,000 (Quest International)    | 0.04           |
| Biopectinase 300L (Quest International) | 0.04           |
| Biopentosanase 5X (Quest International) | 0.04           |
| Canalpha 1000P (Quest International)    | 0.02           |
|                                         | 100.00         |

The foregoing is offered primarily for purposes of illustration. It will be readily apparent to those skilled in the art that modifications and variations may be made in the materials, proportions, conditions and procedures used without departing from the spirit and scope of the invention.

What is claimed is:

- 1. A composition comprising an admixture of:
  - (a) from about 15 to about 20 weight percent chocolate flavoring;
  - (b) from about 35 to about 50 weight percent sweetener;

8

- (c) an enzyme mixture comprising an  $\alpha$ -amylase, a pentosanase, and a pectinase; and
- (d) water; said composition having a cocoa butterfat content of from about 2 to about 5% by weight.
- 2. A composition in accordance with claim 1, further comprising an acidulant, a mold inhibitor, vanilla flavor, or combinations thereof.
- 3. A composition in accordance with claim 1, wherein said chocolate flavoring is medium fat cocoa.
- 4. A composition in accordance with claim 1, wherein said chocolate flavoring is a combination of cocoa and chocolate liquor, said cocoa being present in an amount of from 12 to about 19 weight percent and said chocolate liquor being present in an amount of from about 1 to about 5 weight percent.
- 5. A composition in accordance with claim 2, wherein said acidulant is a member selected from the group consisting of acetic acid, malic acid, citric acid, lactic acid and combinations thereof.
- 6. A composition in accordance with claim 2, wherein said mold inhibitor is potassium sorbate.
- 7. A composition in accordance with claim 1, wherein said flavoring is a medium fat cocoa and is present in an amount of from about 17 to about 20 weight percent.
- 8. A composition in accordance with claim 1, wherein said flavoring is a medium fat cocoa/chocolate liquor combination, said cocoa being present in an amount of from about 12 to about 17 weight percent and said chocolate liquor being present in an amount of from about 3 to about 5 weight percent.
- 9. A composition in accordance with claim 1, wherein said sweetener is a member selected from the group consisting of sucrose, dextrose and fructose.
- 10. A composition in accordance with claim 1, wherein said sweetener is fructose and is present in an amount of about 42 to about 47 weight percent.
- 11. A composition in accordance with claim 1, wherein said flavoring is a cocoa/chocolate liquor combination and said cocoa is present in an amount of about 17 weight percent and said chocolate liquor is present in an amount of about 3 weight percent.
- 12. A composition in accordance with claim 2, comprising about 44.5 weight percent fructose, about 17 weight percent medium fat cocoa, about 3 weight percent chocolate liquor, about 0.4 weight percent of a 88% aqueous solution of lactic acid, about 0.1 weight percent potassium sorbate, about 0.3 to 0.4 weight percent vanilla and from 0.02 to about 0.04 weight percent of each of said enzymes.
- 13. A composition in accordance with claim 2, comprising about 44.6 weight percent fructose, about 15 weight percent medium fat cocoa, about 5 weight percent chocolate liquor, about 0.4 weight percent of a 88% aqueous solution of lactic acid, about 0.1 weight percent potassium sorbate, about 0.3 to 0.4 weight percent vanilla and from 0.02 to about 0.04 weight percent of each of said enzymes.
- 14. A composition in accordance with claim 2, comprising about 44.9 weight percent fructose, about 5 weight percent sucrose, about 12 weight percent medium fat cocoa, about 3 weight percent chocolate liquor, about 0.4 weight percent of a 88% aqueous solution of lactic acid, about 0.1 weight percent potassium sorbate, about 0.3 to 0.4 weight percent vanilla and from 0.02 to about 0.04 weight percent of each of said enzymes.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION

PATENT NO. : 5,773,056

DATED : June 30, 1998

INVENTOR(S) : Thalia A. Hohenthal

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected to read as shown below:

Column 3, line 35, replace "E.D.S. Man" with --ED&F Man--

Column 4, line 42, replace "30OPGu/mL" with --300PGu/mL--

Signed and Sealed this  
First Day of December, 1998

Attest:



BRUCE LEHMAN

Attesting Officer

Commissioner of Patents and Trademarks



PATENT ABSTRACTS OF JAPAN

(11) Publication number: **11033418 A**

(43) Date of publication of application: **09.02.99**

(51) Int. Cl. **B02B 7/00**  
**B02B 3/00**  
**B02B 3/06**

(21) Application number: **09226943**  
(22) Date of filing: **22.07.97**

(71) Applicant: **AKORO:KK KAIZAKI**  
**GIJYUTSUSHI JIMUSHO:KK**  
(72) Inventor: **KAIZAKI EIZOU**

(54) **RICE POLISHING PARTICLE**

(57) Abstract:

PROBLEM TO BE SOLVED: To make it possible to obtain polished rice adhered with bran-components to a lesser extent and to dispense with water polishing by using the particles, which are formed by kneading powder of a conductor, such as triiron tetraoxide and nickel, having ferromagnetism with rubber, such as acrylonitrile butadiene rubber, and molding the mixture to a specific size and shape, as rice polishing particles.

SOLUTION: The rice polishing particles used for grain polishing by being incorporated together with milled rice at the time of forming the polished rice by a rice milling machine are formed by kneading conductor powder, such as triiron tetraoxide having the ferromagnetism with the rubber, such as acrylonitrile butadiene rubber, and molding the mixture to the shape of an ellipsoidal body of revolution of 2 to 3 mm in minor diameter and 4 to 6 mm in major diameter or the resembling shapes, i.e., a rectangular parallelepiped, cylinder, etc., and vulcanizing or curing the moldings. Unpolished rice is first polished by the rice milling machine of a first stage to obtain the milled rice adhered with the bran-component in a rice milling stage. This milled rice is then so treated as to be polished by

the rice milling machine of a second stage by adding the rice polishing particles thereto in the next stage, by which the branless polished rice is obt'd.

COPYRIGHT: (C)1999,JPO





PATENT ABSTRACTS OF JAPAN

(11) Publication number: **11042056 A**

(43) Date of publication of application: **16.02.99**

(51) Int. Cl

**A23L 1/10**  
**B02B 1/04**  
**B02B 3/00**

(21) Application number: **09215639**

(22) Date of filing: **25.07.97**

(71) Applicant: **SATAKE ENG CO LTD**

(72) Inventor:  
**SATAKE SATORU**  
**KAJIWARA KAZUNOBU**  
**TAJIMA SHIRO**  
**KAWAGUCHI TAKESHI**  
**YOKOSHIMA KENICHI**  
**KAWAKAMI KOJI**

**(54) PRODUCTION OF RICE UNNEEDED WASHING AND MACHINE THEREFOR**

**(57) Abstract:**

**PROBLEM TO BE SOLVED:** To produce polished rice that does not need to be washed with water, as rice bran can be removed from the polished rice and, in addition, the aleuron layer is also removed, by adding a specific amount of water to polished rice grains and polishing them by agitation at a certain additional level.

**SOLUTION:** In the production of polished rice grains in no need of washing before boiling by stirring polished rice grains together with water, separating into the

polished rice grains and water and adjusting the rice grains in its moisture content, water is added to the polished rice grains in an amount of 10-30 wt.% based on the grains and the polished rice grains are further polished by stirring by 0.5-2.0 wt.%. In a preferred embodiment, the operations from the addition of water to the polished rice grains to the separation of water from the rice grains are performed within 1 minutes. The moisture content of the treated rice grains is preferably adjusted by flowing warm air. The treated rice grains may be dried with warm air followed by the moisture control with air at room temperature.

COPYRIGHT: (C)1999,JPO