Industria y Comercio

SUPERINTENDENCIA

Delegatura de propiedad Industrial

División de Nuevas Creaciones

PCT

SOLICITUD

PATENTE DE INVENCIÓN

21. **EXPEDIENTE No.** 06-11103

54. **TÍTULO** Base de Goma no pegajosa para Chicle

51. **CLASIFICACIÓN INTERNACIONAL**

71. **SOLICITANTE** Gum Base S.p.A.

DOMICILIO Lainate, Italia.

74. **APODERADO** Dilia Rodriguez D' Alemán

22. **BOGOTÁ, D. C.,** Enero 26, 2006.

(FORMA P-10)

PI

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
Radicacion : 05011103 00000000 Folios: 117
Fecha (AMD): 2006-02-06 16:52:43
Tramite : 011 PCT-PATENT 379 FASE NACI 411 PRESENTAC
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

Industria y Comercio
SUPERINTENDENCIA

FORMULARIO ÚNICO DE SOLICITUD DE PATENTE
PCT
ENTRADA EN FASE NACIONAL

1) SOLICITUD DE:

☒ Patente de invención ☐ Patente de Modelo de Utilidad

☐ Capitulo I. ☒ Capitulo II.

2) SOLICITANTE (71)	**Nombre: GUM BASE CO. S.P.A.** **Dirección: Via Nerviano, 25, I-20020 Lainate, Italia** **Nacionalidad o domicilio: Lainate, Italia** **Lugar de constitución: Italia**	**IDENTIFICACIÓN** **C.C.** ☐ **NIT:** ☒ **C.E.** ☐ **OTRO** ☐ **Cual** _____ **NÚMERO**_____
	Teléfono: Fax: **E. Mail:**	
3) REPRESENTANTE APODERADO	Nombre: DILIA MARÍA RODRÍGUEZ D´ALEMAN Dirección: Carrera 11 N°. 86-53 Piso 6 Bogotá D.C. Teléfono: 6181088 Fax: 6350824 E. Mail: info@clarkemodet.com.co	**IDENTIFICACIÓN** **C.C.** ☒ **NIT:** ☐ **C.E.** ☐ **OTRO** ☐ **NÚMERO:** 41.654.882 **TP:** 20824 CSJ
4) INVENTOR (ES) **(72)**	**Nombre: 1. SOZZI, Giuseppe; 2. DEL VISCIO, Giovanna** **Dirección: 1. Via Re Umbreto, 45, I-20020 Lainate, Italia; 2. Viale Campania 26/A, I-20133 Milano, Italia** **Nacionalidad o Domicilio: Todos los anteriores, Italianos**	

5) PCT (86)
Solicitud Internacional No. PCT/EP2004/007569 Fecha: Julio 6, 2004

Publicación Internacional No. WO 2005/004621 A1 Fecha: Enero 20, 2005

6)Título (54) BASE DE GOMA NO PEGAJOSA PARA CHICLE

7) Clasificación Internacional: A23G 3/00

8) PRIORIDAD	**33) País de Origen**	**(32) Fecha**	**(31) Número de Solicitud**
SI ☒ **NO** ☐	EUROPEA	JULIO 8, 2003	03425448.2

9) Comprobante de pago N°. 06-6,527 Fecha: Enero 25, 2006

Instrucciones para el diligenciamiento del presente formulario. Ver reverso de esta pagina

10) ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud
- ☐ Comprobante de pago por reivindicación de prioridad
- ☐ Documento que acredita la existencia y representación legal cuando el solicitante sea persona Jurídica
- ☒ Poderes, si fuera el caso
- ☒ Documento de cesión del inventor al solicitante o a su causante
- ☐ Declaraciones
- ☒ Copia de la solicitud Internacional. (Resumen, descripción, reivindicación, Dibujos).
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicación, Dibujos)
- ☒ Copia del examen preliminar efectuado por la IPEA
- ☐ De ser el caso, copia del contrato de acceso
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas
- ☐ De ser el caso, certificado de depósito del material biológico
- ☐ Arte final 12 x 12 y 6 x 6 cm
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionados parcial o totalmente con la invención de esta solicitud.
- ☒ Otros:
  1. Reporte internacional de búsqueda
  2. Demanda PCT Capítulo II
  3. Solicitud PCT

11) FIGURA CARACTERÍSTICA:

12) Solicitud concesión de la patente,

NOMBRE: DILIA RODRÍGUEZ D´ALEMAN

FIRMA:

C.C. 41.654.882 de Bogota TP 20824 CSJ

Instrucciones para el diligenciamiento del presente formulario. Ver reverso de esta pagina

3

SUPERINDUSTRIA Y COMERCIO
Radicacion : 06011183 00000000 Folios: 117
Fecha (AMD): 2006-02-06 16:52:43
Tramite : 011 PCT-PATENT 379 FASE NACI 411 PRESENTAC
Dependencia: 2000 DIVISION DE NUEVAS CREACIONES

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 06 - 6,527
FECHA : ENERO 25 DE 2006

***** C O N S I G N A C I O N *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CLARKE MODET Y CO. COLOMBCONSIGNACION		BANCO POPULAR	050-00110-6	49044330	25/01/2006	7,404,500.00

***** C O N C E P T O *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE IN	463,000.
		TOTAL : $	463,000.00

SON: CUATROCIENTOS SESENTA Y TRES MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

P.727

4

TRADUCCIÓN OFICIAL No. 06/033 de un documento escrito en inglés, el cual para su identificación se selló con el sello del traductor al tiempo con la presente. Esta traducción ha sido preparada por Juan Pablo Piedrahita Aguilera, Traductor e Intérprete Oficial debidamente reconocido de conformidad con el Certificado de Idoneidad Profesional No. 0045 expedido por la Universidad Nacional de Colombia, por el Ministerio de Relaciones Exteriores y autorizado por el Ministerio del Interior y de Justicia, por resolución número 718 de 2003.

(Se traduce un Poder, otorgado por la compañía GUM BASE CO. SPA, firmado por Nikolai Brohawetzki, con fecha Marzo 8, 2005 y certificado notarial, escritos en inglés, adjuntos a una autenticación de firma y Apostillas Nos. 2867 AP , escritas en italiano.)

Clarke, Modet & Co.

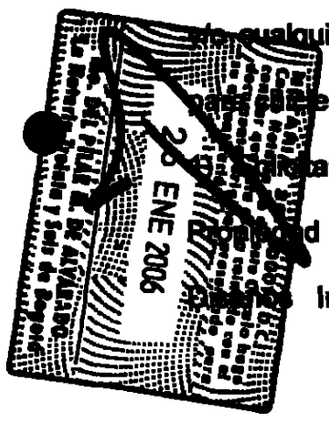
COLOMBIA

(Dirección en español)

PODER

Yo (nosotros) Nikolai Brohawetzki, representantes legales de GUM BASE CO. SPA, sociedad constituida y existente bajo las leyes de Italia y en actual cumplimiento de su objeto social, con domicilio en Lainate (Milán), por el presente por el presente confiero (conferimos) poder especial a favor de a DILIA MARÍA RODRÍGUEZ D'ALEMÁN, identificada con cédula de ciudadanía No. 41.654.882 de Bogotá y Tarjeta Profesional 20824 y CLAUDIA LUCIA CARO RAMIREZ, identificada con Tarjeta Profesional 36448 y cédula de ciudadanía No 40.017.374 de Tunja, con domicilio en Bogotá, Colombia, para que actuando en su orden en nombre de la otorgante la representen ante cualquier entidad, autoridad y/o persona, especialmente ante las del orden Administrativo, Contencioso Administrativo, Judicial, Tribunales de Arbitramento o de cualquier otro en lo referente a la siguiente: "Base de goma no pegajosa para chicle".

[illegible] tramitar, obtener y/o registrar cualesquiera de las modalidades de Propiedad Industrial, tales como: Patentes de Invención, Modelos de Utilidad; Diseños Industriales, variedades vegetales, Marcas, Lemas, Nombres y



TRADUCCION OFICIAL No. 06/033
JUAN PABLO PIEDRAHITA
TRADUCTOR E INTERPRETE OFICIAL
RES. 718 DE MAYO 2003
DEL MIN. INTERIOR Y DE JUSTICIA

Enseñas Comerciales y Denominaciones de Origen; así como sus renovaciones, prórrogas, traspasos, cambios de nombre y/o domicilio, contratos y licencias.

2) Solicitar, tramitar, obtener, y/o registrar derechos de autor, en cualquiera de sus presentaciones así como la protección de secretos industriales y know-how.

3) Solicitar, tramitar, obtener y/o registrar registros sanitarios, permisos y/o licencias de funcionamiento; así como sus renovaciones o prórrogas, cesiones, traspasos, cambios de nombre y/o domicilio, contratos y licencias.

4) Ejercer acciones de oposición, observación, reclamos, reivindicaciones, reconsideración, reposición, apelación, cancelación administrativa o judicial, nulidad, protección al consumidor, concesión de licencias, protección de secretos industriales y demás acciones y recursos relacionados con derechos derivados de los asuntos arriba indicados y en contra de la competencia desleal, acciones derivadas de la obtención o explotación de licencias, acciones de indemnización de perjuicios. También podrán intervenir en juicios civiles, comerciales, penales, contencioso-administrativos, tutelas y de policía; acciones o juicios promovidos por el mandante o contra él.

5) Registrar nombres de dominio ante la entidad competente.

6) En el ejercicio de este mandato los mandatarios arriba mencionados quedan facultados para: conciliar, cancelar, transigir, aceptar cláusulas compromisorias, desistir, recibir y tomar posesión de la cosa objeto de litigio y renunciar o declinar derechos concedidos o en curso de concesión, admitir los hechos del proceso.

06/033

TRADUCCION OFICIAL No._____
JUAN PABLO PIED...
TRADUCTOR E INTERPRETE OFICIAL
RES. 718 DE MAYO ...
DEL MIN. INTERIOR Y DE JUSTICIA

6

7) Ratificar o no la agencia oficiosa.

8) Así mismo facultamos a los mencionados apoderados para recibir notificaciones y designar apoderados judiciales o extrajudiciales, sustituir el presente poder y revocar las sustituciones que hicieren.

Dado y firmado en (en blanco), hoy día 8 de Marzo, 2005.

Por: (Firmado) Ilegible

Al respaldo: Autenticación de firma y Apostilla No. 286P AP, escritas en italiano.

CERTIFICADO NOTARIAL (Cuando el solicitante es una SOCIEDAD)

(Poderes otorgados en El Salvador, México, Estados Unidos de América y Venezuela)

Expedido hoy día 8 de Marzo, 2005, el suscrito Notario CERTIFICA que:

1). Nikolai Brohawetzki, (nombre de quien firma el poder), mayor de edad y domiciliado en Lainate (MI), Italia suscribió el anterior documento.

2) El otorgante le es conocido personalmente y tiene capacidad para firmar el documento.

3) El otorgante ha suscrito el anterior documento en su calidad de Funcionario Ejecutivo de la persona jurídica GUM BASE CO. SPA.

4) La mencionada persona jurídica con domicilio comercial en Via Nerviano 25, 20020 Lainate (MI), Italia, está debidamente constituida, tiene actualmente existencia legal y el fin para el cual se otorga este poder se encuentra dentro de su objeto social.

06 / 033

TRADUCCION OFICIAL No._____
JUAN PABLO PIEDRA AGUILERA
TRADUCTOR E INTERPRETE OFICIAL
RES. 718 DE MAYO 2003
DEL MIN. INTERIOR Y DE JUSTICIA

5) El otorgante tiene en efecto la capacidad referida y su representación es legal y está autorizado para otorgar este poder.

6) Fundamento las certificaciones 3), 4) y 5) en los documentos auténticos que para tal fin me fueron exhibidos.

(Firmado) Ilegible, Notario Público

(Sello Notarial a tinta)

Nota: El Consulado de Colombia debe autenticar la firma del Notario Público.

Para todos los demás países el Señor Cónsul de Colombia o ante quien se otorgue, debe expedir una certificación dejando constancia de: 1) la existencia legal de la sociedad, 2) que cumple actualmente con su objeto social, y 3) que la persona o personas que otorgan este poder están facultadas para hacerlo. El Cónsul también certificará que los tuvo a la vista los documentos que prueban y acreditan tales circunstancias.

LEGALIZACIÓN POR EL CÓNSUL DE COLOMBIA A O POR APOSTILLA

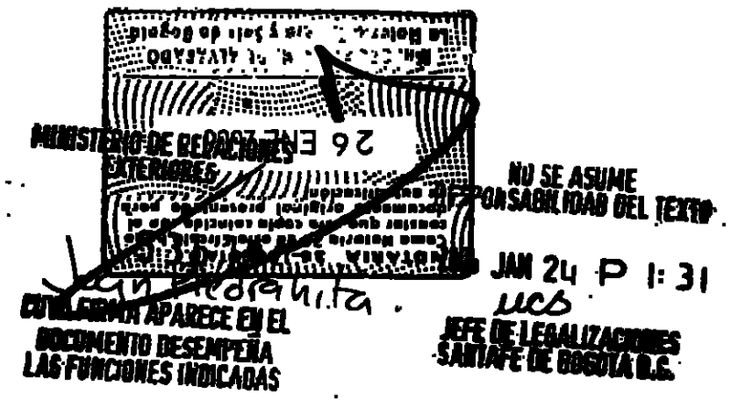
Al respaldo: Apostilla No. **2867 AP**, escrita en italiano.

ES TRADUCCIÓN FIEL Y COMPLETA de la cual se deja copia en los archivos de esta oficina para su confrontación y a la cual me remito.

Bogotá, [illegible] 09, 2006.

26 ENE 2006

TRADUCCION OFICIAL No. 06/033
JUAN PABLO PIEDRAHITA AGUILERA
TRADUCTOR E INTERPRETE OFICIAL
RES. 718 DE MAYO 2003
DEL MIN. INTERIOR Y DE JUSTICIA


MINISTERIO DE RELACIONES EXTERIORES
NO SE ASUME RESPONSABILIDAD DEL TEXTO
JAN 24 P 1:31
ESTA FIRMA APARECE EN EL DOCUMENTO DESEMPEÑA LAS FUNCIONES INDICADAS
JEFE DE LEGALIZACIONES SANTAFE DE BOGOTA D.C.

P. 727

1

8

COLOMBIA

Carrera 11 nº 93-43, Of. 404 Bogotá Colombia Tel: (57 1) 6350813· Fax: (57 1) 6350824· Email:clarksmodetaclarksmodet.com.co

PODER

Yo (nosotros), abajo firmante(s)

en mi (nuestro) carácter de representante(s) legales de

una sociedad organizada y existente de acuerdo con las leyes de

y en actual cumplimiento de su objeto social, con domicilio en

por el presente instrumento confiero (conferimos) poder especial a favor de DILIA MARIA RODRIGUEZ D'ALEMAN, con Cédula de Ciudadanía No. 41.654.882 de Bogotá, y tp. 20824 y CLAUDIA LUCIA CARO RAMIREZ, con Cédula de Ciudadanía No. 40.017.374 de Tunja, y tp. 36448, con domicilio en Bogotá, Colombia, para que actuando en su orden(s) en nombre del (de la) otorgante le (la) representen ante cualquier entidad, autoridad y/o persona, especialmente ante las del orden Administrativo, Contencioso Administrativo, Judicial, Tribunales de Arbitramento y/o cualquier otro en lo referente a los siguientes asuntos:

1) Solicitar, tramitar, obtener y/o registrar cualquiera de las modalidades de Propiedad Industrial, tales como: patentes de invención, modelos de utilidad; diseños industriales, variedades vegetales; marcas, lemas, nombres y enseñas comerciales y denominaciones de origen; así como sus renovaciones, prórrogas, transferencias, cambios de nombre y/o domicilio, contratos y licencias.
2) Solicitar, tramitar, obtener y/o registrar derechos de autor, en cualquiera de sus presentaciones así como la protección de secretos industriales y know-how.
3) Solicitar, tramitar, obtener y/o registrar registros sanitarios, permisos y/o licencias de funcionamiento; así como sus renovaciones o prórrogas, transferencias, cambios de nombre y/o domicilio, contratos y licencias.
4) Ejercer acciones de oposición, observación, reclamos, reconsideración, reposición, apelación, cancelación administrativa o judicial, nulidad, protección al consumidor, concesión de licencias, protección de secretos industriales y demás acciones y recursos relacionados con derechos de los asuntos arriba indicados y en contra de la competencia obtención o explotación de licencias, judiciales. También podrá(n) intervenir en contencioso-administrativos, tutelas promovidos por el (la) mandante o en
5) Registrar nombres de dominio ante la entidad competente.
6) En desarrollo de este mandato los mandatarios arriba mencionados conciliar, cancelar, transigir, comprometer en recibir y tomar posesión de la cosa objeto de litigio y concedidos o en curso de concesión,
7) Ratificar todo lo que se haga en virtud de los mencionados apoderados para apoderados judiciales o extrajudiciales, las sustituciones que hicieren.

Dado y firmado en

a los días de

POWER OF ATTORNEY

I (we), the undersigned

NIKOLAI BRONIAWSKI

legal representative(s) of

GUM BASE CO. SPA

an organization existing under the laws of

Italy

and in present execution of its business activity, domiciled at

Lainate (Milano)

do hereby grant POWER OF ATTORNEY to DILIA MARIA RODRIGUEZ D'ALEMAN, identification card No. 41.654.882 of Bogotá, and tp. 20824 and CLAUDIA LUCIA CARO RAMIREZ, tp. 36448, identification card No. 40.017.374 of Tunja, residing in Bogotá, Colombia, to act in the order of their appointment in behalf of grantor before any entity, authority and/or natural or juridical person, specially before those Administrative, Administrative-Contentious, Judicial, arbitration courts, and/or any other, in all matters concerning the following: "Non sticky gum base for chewing gum"

1) To apply, process, obtain and/or register any of the modalities of Industrial Property, such as: Patents of Invention, Utility Models; Designs, plant varieties; Marks, Slogans, Trade Names and emblems and appellations of Origin; as well as their renewals, assignments, changes of name and/or domicile, agreements and licenses.
2) To apply, process, obtain and/or register copyrights of any kind as well as protection of industrial secrets or know-how.
3) To apply, process, obtain and/or register sanitary registrations, operating authorizations and/or licenses; as well as their renewals or assignments, changes of name and/or domicile, agreements and licenses.
4) To bring actions of opposition, observations, claims, reconsideration, appeal or legal remedies, cancellations, nullity, protection to the consumer, granting of licenses, protection of trade secrets and other actions related with rights derived from the above- mentioned matters and against the unfair competition, actions resulting from the obtaining or exploitation of licenses, recovering damages actions. They can also intervene or participate in Civil, Commercial, Criminal or Contentious-Administrative Trials; the actions for writ mandamus, police actions; in actions, lawsuits or litigations instituted by the grantor or against him.
5) To register domain names before the competent entity.
6) To the effect of this mandate the above-named proxy are empowered to: conciliate, cancel, settle, submit to arbitration, withdraw and to receive and take possession of the litigation related objet and waive or renounce the rights granted or in process of granting, admit the facts of the case.
7) To ratify or not the officious agency.
8) I (we) hereby appoint the afore mentioned attorneys with powers to receive notifications and to designate judicial and extrajudicial attorneys, substitute this Power of Attorney and to revoke such sustitutions.

Granted and signed at

on this 8th day of March of 2005

TRADUCCION OFICIAL No. 330/05

Firma / signatura

JUAN PABLO PIEDRAHITA AGUILAR
TRADUCTOR E INTERPRETE OFICIAL
RES. 718 DE MAYO 2003
DEL MIN. INTERIOR Y DE JUSTICIA

2868.

AUTENTICAZIONE DI FIRMA

Certifico io sottoscritto dott. GIUSEPPE CALAFIORI, Notaio in Milano, iscritto al Collegio notarile di Milano, vera ed autografa la premessa firma apposta in mia presenza, sul testo in inglese che precede, lingua da me Notaio conosciuta, dal signor BROHAWETZKI NIKOLAI nato a Hannover il 22 aprile 1946, domiciliato per la carica in Lainate, via Nerviano n. 25, dirigente, persona della cui identità sono io notaio certo che ha firmato Amministratore Delegato e Legale Rappresentante della società "GUM BASE COMPANY s.p.a." con sede in Lainate.

Milano, nel mio studio in piazza San Babila n. 1, addì 8 (otto) marzo 2005 (duemilacinque).

[illegible]LE

([illegible] du 5 ottobre 1961)

[illegible]

[illegible] atto pubblico

[illegible] timbro di

Attestato 11 MAR 2005

[illegible]

2868

26 ENE 2006

[illegible] Repubblica

CERTIFICADO NOTARIAL

(Cuando el solicitante es SOCIEDAD)

(Poderes otorgados en: El Salvador, Estados Unidos, México y Venezuela)

A los días del mes de de , el Notario que suscribe DA FE de que:

1. _____
(nombre de la persona que firma el poder)

mayor de edad y domiciliado _____ _____ firmó de su puño y letra el documento que antecede.

2. Conoce al (a la) otorgante y que este (a) está legalmente capacitado para el otorgamiento.

3. El otorgante ha firmado el referido documento en su carácter de _____ de la persona jurídica _____

4. La citada persona jurídica con sede en _____ _____ está legalmente constituida, que tiene actualmente existencia legal y que el acto para el cual se ha otorgado este poder está comprendido entre los que constituyen su objeto social.

5. El otorgante tiene efectivamente la representación que ostenta, que esta es legítima y que está facultado para otorgar este poder.

6. las anteriores certificaciones de los puntos 3, 4 y 5, me constan porque he tenido a la vista los documentos auténticos.

_____
Notario Público

NOTA: A continuación de lo anterior, el Cónsul de Colombia debe autenticar la firma del Notario Público.

CERTIFICADO NOTARIAL (Cuando el solicitante es INDIVIDUO)

A los días del mes de de el Notario que suscribe DA FE de que:

_____
(nombre de la persona que firma el poder)

_____ _____ firmó en su presencia _____ conoce al otorgante y que este está _____ otorgamiento.

_____
_____ Público
_____ anterior, el Cónsul de Colombia debe _____ Público.

_____ Señor Cónsul de Colombia o ante _____ una certificación dejando constancia _____ la sociedad, 2) de que esta ejerce _____ y 3) de que la persona o personas que otorgan el poder están facultadas para hacerlo, dejando constancia así mismo de que tuvo a la vista las pruebas que acrediten tales circunstancias.

LEGALIZACIÓN POR EL CONSUL DE COLOMBIA O POR APOSTILLA

NOTARIAL CERTIFICATE

(When the applicant is a CORPORATION)

(Powers of attorney granted in: El Salvador, Mexico, U.S.A. and Venezuela)

This 8th day of march 2005 , the undersigned Notary CERTIFIES that:

1. NIKOLAI BRONAWETZKI
(name of the person who signs the power of attorney)

of legal age and domiciled in Lainate (MI), Italy set his hand on the foregoing document.

2. The grantor is to him personally known and that he/she has legal capacity to execute the document.

3. The grantor has executed the foregoing document in his capacity of CHIEF EXECUTIVE OFFICER of the juridical person GUM BASE CO. SPA

4. The mentioned juridical person with place of business in Via Nerviano 25,20020 Lainate (MI), Italy is duly organized, has actual legal existence and that the purposes for which the power of attorney is granted are within the scope of its corporate purposes.

5. The grantor has in fact the referred quality and that his/her representation is legal and that he/she is empowered to grant this power of attorney.

6. I have checked the above certifications 3, 4 and 5, on the authentic documents which for this purpose were exhibited to me.

_____
Notary Public

NOTA: Then the Colombian Consul must legalize the signature of the Notary Public.

NOTARIAL CERTIFICATE (When the applicant is an INDIVIDUALS)

On this day of the undersigned Notary CERTIFIES that:

1. _____
(name of the person who signs the Power of Attorney)

of legal age and domiciled at Lainate (MI), Italy Via Nerviano 25 signed in his presence the foregoing document, the grantor is to him personally known and that he/she has legal capacity to execute the document.

_____
Notary Public

NOTA: Then the Colombian Consul must legalize the signature of the Notary Public.

For all other countries the Colombian Consul or before who it is granted must issue a certification stating 1) the legal existence of the corporation, 2) that the corporate purposes are actually being accomplished , 3) that the person or persons who grant this Power of Attorney are empowered to do it. The Consul will certify also that the documents evidencing these circumstances were exhibited to him.

LEGALIZATION BY THE COLOMBIAN CONSUL OR BY APOSTILLE.

TRADUCCION OFICIAL No. 06/033
JUAN PABLO PIEDRA...
TRADUCTOR E INTERPRETE OFICIAL
RES. 718 DE ... 2003
DEL MIN. INTERIOR Y DE JUSTICIA

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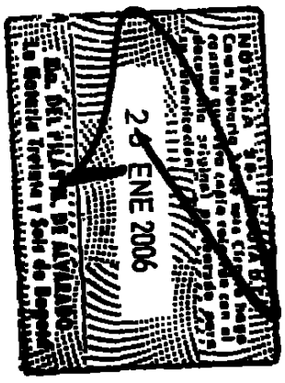
Adición



10

TRADUCCIÓN OFICIAL DEL ITALIANO AL ESPAÑOL DE CERTIFICADO NOTARIAL DE AUTENTICACIÓN DE FIRMA Y APOSTILLE CORRESPONDIENTES AL TEXTO REDACTADO EN INGLÉS DE PODER DE LA GUM BASE COMPANY s.p.a. Marzo de 2005.

AUTENTICACIÓN DE FIRMA

Yo, el suscrito Doctor GIUSEPPE CALAFIORI, Notario en Milán, inscrito en el Colegio Notarial de Milán, Certifico que la firma que antecede fue registrada en mi presencia sobre el anterior texto en inglés, lengua que yo Notario conozco; la firma en mención fue registrada por el Señor BROHAWETZKI NIKOLAI, nacido en Hannover el 22 de abril de 1946 y domiciliado por su encargo en Lainate, via Nerviano No.25; dirigente, persona de cuya identidad personal yo notario doy fe, y quién firmó como Administrador Delegado y Representante Legal de la sociedad "GUM BASE COMPANY S.p.A.", con sede en Lainate.

Expedido en Milán, en mi oficina en la Plaza San Babila No.1 a los 8 (ocho) días del mes de marzo de 2005 (dos mil cinco)
Sello circular de CALAFIORI GIUSEPPE. NOTARIO EN MILÁN. Firma ilegible.

"APOSTILLE"

(Convención de la Haya del 5 de octubre de 1961)

1. PAIS: ITALIA

El presente acto público

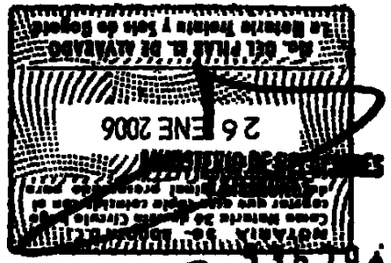
2. ha sido firmado por: CALAFIORI GIUSEPPE
3. Agente en calidad de: NOTARIO EN MILÁN
4. Tiene el sello /timbre de: SELLO NOTARIAL

CERTIFICADO

5. En Milán 6. El 11 de marzo de 2005
7. Por: La oficina del Ministerio Público
8. Inscripto con el número: 2869 AP
9. Sello o timbre: Sello de Estado.
10. Sello circular de la Procuraduría de la República – Tribunal Ordinario de Milán.
11. Firma: EL PROCURADOR SUSTITUTO DE LA REPUBLICA
Doctora Ada Rizzi. Firma ilegible.
FIN DEL DOCUMENTO

26 ENE 2006

Claudio Cardona



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TRADUCCIÓN OFICIAL DEL ITALIANO AL ESPAÑOL DE APOSTILLE CORRESPONDIENTE AL TEXTO REDACTADO EN INGLÉS DE CERTIFICACIÓN NOTARIAL DE EXISTENCIA Y REPRESENTACIÓN LEGAL DE LA GUM BASE COMPANY s.p.a. Marzo de 2005.

11

"APOSTILLE"

(Convención de la Haya del 5 de octubre de 1961)

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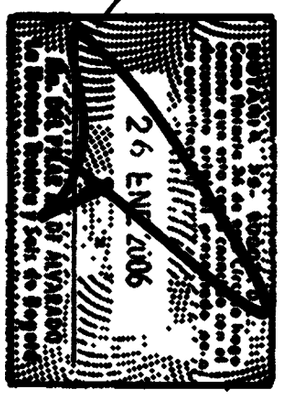
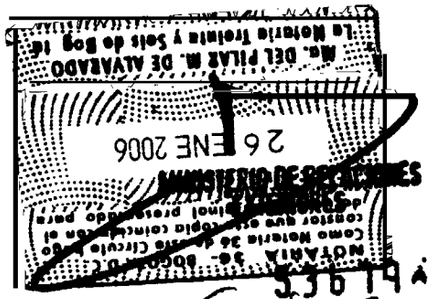
FIN DEL DOCUMENTO

Laudra Cardoso





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(Se traduce un documento de cesión a favor de la compañía GUM BASE CO. SPA escrita en inglés, adjuntas a una autenticación de firma y Apostilla No. 2868 AP , escrita en Italiano.)

CLARKE, MODET & Co. Colombia Ltda.

(Dirección en español)

CORREO-ELECTRÓNICO: clarkemodet@ clarkemodet.com.co

SANTAFÉ DE BOGOTÁ, AA. 92397

COLOMBIA

CESIÓN

Los suscritos, (en adelante los CEDENTES), SOZZI Giuseppe, DEL VISCIO Giovanna, inventores / diseñadores de "Base de goma no pegajosa para chicle" con domicilio en Via Re Humberto 45 I-20020 Lainate (MI), Italia,

Viale Campania 26/A I-20133 Milán, Italia

Por el presente certifican que ceden todos y cada uno de sus derechos y privilegios, sobre la siguiente invención, diseño industrial, modelo de utilidad a GUM BASE CO. S.P.A.

Con domicilio en Via Nerviano 25 I-20020 Lainate (mi) Italia,

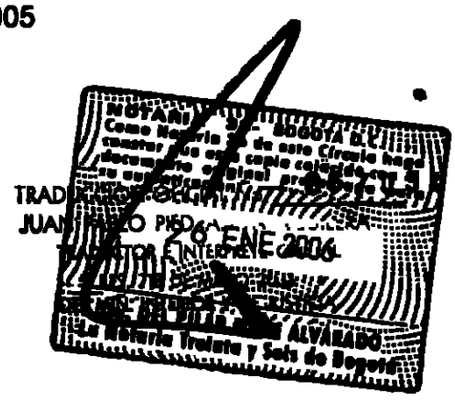
Los Cedentes y el Cesionario firman este documento como prueba de aceptación de la cesión.

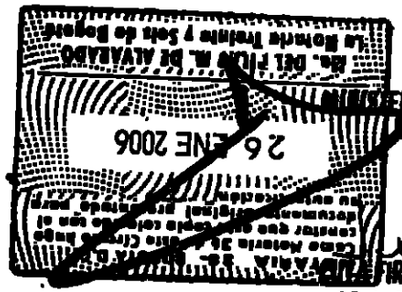
Dada y firmada en (en blanco) el día 8 de Marzo, 2005

(Firmado) Giuseppe Sozzi

Los Cedentes

(Firmado) Giovanna DEL VISCIO





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13

(Firmado) NIKOLAI BROHAWETZKI

El Cesionario

(Sello a Tinta, Estampilla)

(NOTA: Este documento debe ser otorgado ante Notario Público y legalizado por el Cónsul Colombia o por Apostilla).

Al respaldo: Autenticación de firma y Apostilla No. **2868 AP**, escritas en italiano.

ES TRADUCCIÓN FIEL Y COMPLETA de la cual se deja copia en los archivos de esta oficina para su confrontación y a la cual me remito.

Bogotá, Enero 19, 2006.

TRADUCCION OFICIAL No. 06 / 034

JUAN PABLO [illegible]ILERA

TRADUCTOR E [illegible] OFICIAL

RES. 718 DE MAYO [illegible]

DEL MIN. INTERIOR Y DE JUSTICIA

NOTARIA 36a. BOGOTA D.C.
Como Notaria 36 de este Circulo hago constar que esta copia coincide con el documento original presentado para su autenticación.
26 ENE 2006
Dra. DEL PILAR GIL DE ALVARADO
La Notaria Treinta y Seis de Bogotá

Clarke, Modet & Co.
Colombia
E-MAIL: clarkemodet@clarkemodet.com.co
SANTAFÉ DE BOGOTA, A.A. 92397
COLOMBIA

CESION

El (la) abajo firmante (En adelante EL CEDENTE)

en su carácter de Inventor /diseñador

con domicilio en:

por el presente documento declara que cede todos y cada uno de los derechos que le corresponden o puedan corresponderle sobre la siguiente invención , modelo de utilidad, diseño industrial

a:

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En prueba de la mutua aceptación de esta cesión ambas partes CEDENTE y CESIONARIO firman el presente documento.

Dado y firmado en

A los Días de De

El Cedente /The Assignor

El Cesionario/The Assignee

Este documento debe ser otorgado ante Notario público y legalizado por el Cónsul de Colombia) o por Apostilla

ASSIGNMENT

The undersigned (Hereinafter THE ASSIGNOR)
SOZZI Giuseppe
DEL VISCIO Giovanna
Inventor /designer of Non sticky gum base for chewing gum
domiciled at
Via Re Umberto 45 I-20020 Lainate (MI), Italy
Viale Campania26/A I-20133 Milano, Italy
do hereby declares that it assigns all and ech of his rights and privileges on the following invention, industrial design, utility model

to

GUM BASE CO. S.P.A.

with domicile in
Via Nerviano 25 I-20020 Lainate (Mi), Italy

As a proof of the mutual acceptance of this assignment, both parties ASSIGNOR and ASSIGNEE sign the present document.

Granted and signed at

on this 8th day of march of 2005

Giuseppe Sozzi
El Cedente /The Assignor

Giovanna DEL VISCIO
El Cesionario/The Assignee

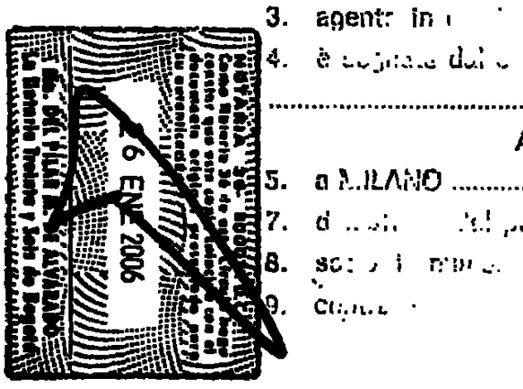
(This document must be signed ... legalized before the colombian ... consul) or by Apostille

28 ENE 2006

TRADUCCION OFICIAL No. 7201
JUAN PABLO PIEDRAHITA AGUILERA
TRADUCTOR E INTERPRETE OFICIAL
RES. 718 DE MAYO 2003
DEL MIN. INTERIOR Y DE JUSTICIA

2868 6

Visto per la verità delle firme dei signori:
- SOZZI GIUSEPPE nato a Lainate il 20 aprile 1941, residente a Lainate (MI), via Re Umberto n. 45, dirigente;
- DEL VISCIO GIOVANNA nata a Milano il 22 settembre 1968, residente a Milano, viale Campania n. 26, impiegata, e
- BROHAMETZKI NIKOLAI nato a Hannover il 22 aprile 1946, domiciliato per la carica in Lainate, via Nerviano n. 25, dirigente, quale Amministratore Delegato e Legale Rappresentante della società "GUM BASE COMPANY s.p.a." con sede in Lainate.
persone della cui identità sono io notaio certo.
Milano, nel mio studio in piazza San Babila n. 1, addì 8 (otto) marzo 2005 (duemilacinque).



APOSTILLE

(Convention de la Haye du 5 ottobre 1961)

1. Paese: ITALIA

Il presente atto pubblico

2. è stato sottoscritto da
3. agente in qualità di
4. è munito del sigillo/timbro di

Attestato

5. a MILANO il 11 Marzo 2005
7. dal Tribunale
8. sotto il numero 2868
9. Firma

Il Sost. Procuratore della Repubblica
(Dott.ssa Ada Rizzi)

15

TRADUCCIÓN OFICIAL DEL ITALIANO AL ESPAÑOL DE CERTIFICADO NOTARIAL DE AUTENTICACIÓN DE FIRMA Y APOSTILLE CORRESPONDIENTES AL TEXTO REDACTADO EN INGLÉS DE CESIÓN DE SOZZI GIUSEPPE Y DEL VISCIO GIOVANNA A LA GUM BASE COMPANY s.p.a. Marzo de 2005.

VISTO PARA AUTENTICACIÓN DE LA FIRMA DE LOS SEÑORES:

-SOZZI GIUSEPPE, nacido en Lainate el 20 de abril de 1941, residente eh Lainate (Milán), en la Via Re Humberto No.45, dirigente;

- DEL VISCIO GIOVANNA, nacida en Milán el 22 de septiembre de 1968, residente en Milán, en el viale Campania No.26, empleada, y

- BROHAWETZKI NIKOLAI, nacido en Hannover el 22 de abril de 1946, domiciliado por su encargo en Lainate, via Nerviano No.25; dirigente, quien actúa como Administrador Delegado y Representante Legal de la sociedad "GUM BASE COMPANY S.p.A.", con sede en Lainate.

Yo Notario doy fe de la identidad de las anteriores personas

Expedido en Milán, en mi oficina en la Plaza San Babila No.1, a los 8 (ocho) días del mes de marzo de 2005 (dos mil cinco)

Sello circular de CALAFIORI GIUSEPPE. NOTARIO EN MILÁN. Firma ilegible.

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Doctora Ada Rizzi. Firma ilegible. FIN DEL DOCUMENTO

Sandra Cardona

SANDRA PATRICIA CARDONA MEJIA
TRADUCTOR E INTERPRETE OFICIAL
RESOLUCION [illegible] JUSTICIA 1997

3 ENE 2006

Ma. del PILAR M. DE ALVARADO
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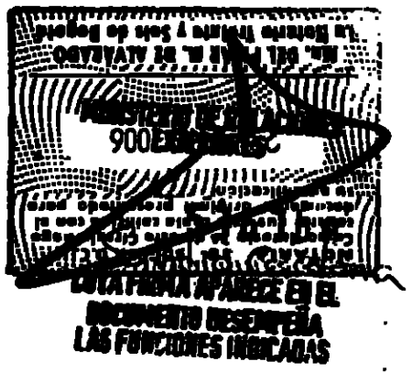

NO SE ASUME
RESPONSABILIDAD DEL TEXTO

2006 JAN 24 P 1:31

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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 January 2005 (20.01.2005)

PCT

(10) International Publication Number
WO 2005/004621 A1

(51) International Patent Classification[7]: A23G 3/00

(21) International Application Number:
PCT/EP2004/007569

(22) International Filing Date: 6 July 2004 (06.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03425448.2 8 July 2003 (08.07.2003) EP

(71) Applicant (*for all designated States except US*): GUM BASE CO. S.P.A. [IT/IT]; Via Nerviano, 25, I-20020 Lainate (IT).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): SOZZI, Giuseppe [IT/IT]; Via Re Umberto, 45, I-20020 Lainate (IT). DEL VISCIO, Giovanna [IT/IT]; Viale Campania 26/A, I-20133 Milano (IT).

(74) Agents: PISTOLESI, Roberto et al.; Dragotti & Associati Srl, Galleria San Babila 4/C, I-20122 Milano (IT).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:
— *of inventorship (Rule 4.17(iv)) for US only*

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: NON STICKY GUM BASE FOR CHEWING GUM

(57) Abstract: The present invention relates to a gum base formulation suitable for the production of a chewing gum with good sensory properties and good flavour release in combination with anti-adhesive properties in respect of teeth, dentures and the like typical of formulations containing polyvinyl acetate. This gum base formulation does not stick to teeth and it is characterized by having the following composition by weight: (a) elastomers, 8-16% (b) emulsifiers and/or technological auxiliaries 18-30% (c) adjuvants 15-40% (d) vegetable resins and/or vegetable resin esters 20–45% (e) antioxidants 0-2% and by not containing polyvinyl acetate.

WO 2005/004621 A1

NON STICKY GUM BASE FOR CHEWING GUM

The present invention relates to a gum base formulation without polyvinyl acetate suitable for the production of a chewing gum with good sensory properties and good flavour release combined with properties of non-adhesion to hard surfaces including teeth, dentures and the like typical of formulations containing polyvinyl acetate.

STATE OF THE ART

It is known that conventional chewing gum formulations have a well-known tendency to stick not only together but also to any solid surface with which they come into contact.

These formulations comprise synthetic elastomers such as a polyisobutylene, isobutylene-isoprene copolymer, butadiene-styrene copolymer, natural gums such as chicle or jelutong, resins such as vegetable and/or synthesised terpenes and/or glycerol esters of rosin, polyvinyl acetate, microcrystalline waxes, and adjuvant agents, emulsifiers and technological auxiliaries.

Once these chewing gums have been chewed and moistened, the entire edible part is dissolved and ingested while the remaining gum part is highly sticky not just to teeth and skin but also to floors, bins and any other dry and hard surfaces.

This adhesion is to due to specific interface forces and depends on the free energy of the surface: adhesion to surfaces is influenced by the wettability of the surface, its surface tension and obviously the nature and conditions of the solid surface, i.e. whether it is rough or smooth.

In the past, additives have been identified to minimise the tackiness of chewing gums.

For instance, Patent Specification US-3 255 018 proposes the use of tannic acid to reduce the adhesiveness of gum bases. As tannic acid is soluble, however, it is rapidly extracted and ingested, returning the original adhesive properties to the gum base; in order, therefore, to prolong and regulate the extraction of the tannic acid, the use of a tannic-acid-based gelatine is disclosed.

Patent Specification US-2 273 425 suggests the use of ethylcellulose, while Patent Specification US-3 285 750 suggests the use of a polyolefin resin containing fluorine. Materials such as sulphides, mineral salts of the type of calcium carbonate, waxes, fats, oils, soaps and starches have also been used with varying degrees of success to reduce adhesion: Patent Specifications US-2 429 664 and US-3 440 060.

However, the use of anti-adhesive agents not only does not guarantee success but often creates many problems; they may have an adverse effect on taste, be costly, cause damage to production lines and, in particular, in some cases, be so soluble as to be rapidly extracted, giving the gum back its properties of tackiness.

A proposed alternative to the inclusion of additives with anti-adhesive properties is to dispose with ingredients normally used in the gum base and in particular to rule out combinations of ingredients such as natural or synthetic gums with resins or waxes and to use increased quantities of polyvinyl acetate, a material which is well known to be non-tacking.

A proposed formulation with reduced tackiness in respect of solid surfaces is disclosed, in particular, in Patent Specification US-3 984 574. This patent discloses a formulation containing 5-35% of an elastomer which may be polyisobutylene, polyisoprene and isobutylene-isoprene copolymer or butadiene-styrene copolymer; 5-50% of hydrogenated or partially hydrogenated vegetable oils or animal fats; 5-40% of adjuvant agents; over 55% of polyvinyl acetate; over 20% of fatty acids and over 10% of mono or diglycerides of fatty acids.

This patent attributes the lack of adhesion of the chewing gum in particular to the total exclusion of some conventional ingredients of the gum base such as the glycerol esters of rosin, natural waxes and gums and indicates certain elastomers, partially or totally hydrogenated vegetable oils or animal fats and adjuvant agents as well as polyvinyl acetate, fatty acids and mono and diglycerides of fatty acids as the ingredients of a non-tacking formulation.

Although this patent is evidently valid, it is clear that a drastic reduction of the type of ingredients that can be used in gum base formulations is undoubtedly limiting for formulators. In practice, if the number of ingredients that can be used

is limited, it is less possible effectively to satisfy the various market requirements in terms of chewing properties, use of particular flavours, and the production of different types and formats of finished products.

It is known, in the gum base sector, however, that the use of large quantities of polyvinyl acetate, with a resulting reduction of some ingredients such as rosin esters and microcrystalline waxes, gives the gum non-adhesive properties without precluding the use of other ingredients.

Polyvinyl acetate is a synthetic, hygroscopic homopolymer which, in combination with other ingredients, provides a non-tacking gum base probably because, given its hygroscopic nature, it helps to keep the gum moist, thereby reducing its adhesiveness.

US Patent Specification 4 357 355 relates in particular to a non-tacking bubble gum containing between 20 and 55% of polyvinyl acetate of high molecular weight, 8-20% of an elastomer, 8-30% of a plasticiser, between 5 and 25% of adjuvants, 0-20% of fatty acids and other ingredients. The preparation method disclosed in this patent comprises two-stage processing: the preparation of a semi-finished product formed by an emulsifier derived from glyceryl of the type of glyceryl monostearate, glyceryl triacetate and by polyvinyl acetate in a ratio varying between 5 and 75%, and the subsequent incorporation of all the other ingredients of the gum base into this semi-finished product. The preparation of this semi-finished product allows better dispersion of the polyvinyl acetate into the gum base, providing it with non-adhesive properties.

US Patent Specification 4 518 615 also discloses a chewing gum which does not adhere to teeth, dentures or other dental surfaces with the following composition: 15 to 45% of polyvinyl acetate with a molecular weight of between 15 000 and 30 000, 10 to 30% of an elastomer, 2 to 10% of an emulsifier, 0.5 to 15% of polyethylene with a molecular weight of 2000, between 0.5 and 10% of waxes having a melting point of some 76°C, 10 to 40% of plasticiser and 0 to 5% of adjuvant agents as well as an elastomer solvent chosen from the methyl, glycerol and pentaerythritol esters of rosin and terpenes in quantities of between 2 and 18%.

In the above-mentioned patent, the essential ingredient is the polyvinyl acetate of molecular weight of between 15 000 and 30 000 in quantities varying between 15 and 45% by weight of the base and preferably between 20 and 30%. It is explicitly disclosed that quantities of polyvinyl acetate of less than 15% make the gum base non-homogeneous and cause a non-uniform flavour release, while quantities higher than 45% make the product too plastic. The molecular weight also seems to have a crucial influence, as a polyvinyl acetate with a molecular weight of 15 000 or less in particular gives rise to a product which readily breaks down when chewed.

US Patent Specification 5 437 878 also discloses a chewing gum which has reduced adhesive properties, using a combination of waxes and elastomers. The formulations described in particular contain from 16 to 30% of polyvinyl acetate with a molecular weight of between 7000 and 13 000, from 8 to 18% of polyisobutylene of low molecular weight, from 1 to 4% of polyisobutylene of high molecular weight, from 16 to 35% of adjuvant agents, from 1 to 6% of polyethylene with a mean molecular weight of 2000, from 18 to 30% of fats selected from a group of hydrogenated and/or partially hydrogenated vegetable oils, from 1 to 6% of emulsifiers and from 2 to 10% of microcrystalline waxes, while the use of resins of rosin, methyl, glycerol and pentaerythritol esters of rosin and terpene resins is specifically ruled out since they are responsible, according to the inventor, for detracting from the desired properties of the gum.

US Patent Specification 6231896 discloses a chewing gum rubber composition (gum base) that utilizes carnosic acid as an antioxidant stabilizer whereas US Patent application 2003/0124220 discloses a chewing gum rubber composition that utilizes carnosic acid as an antioxidant stabilizer together with lecithin as an emulsifier for the carnosic acid.

BRIEF DESCRIPTION OF THE INVENTION

It has been unexpectedly discovered by the invention that it is possible to formulate soft gum bases with a good flavour release, which do not stick to teeth and/or hard surfaces, which are very similar to high-quality gum bases typically containing significant quantities of polyvinyl acetate and a small content of other resins, without the use of polyvinyl acetate or anti-adhesive agents such as tannic

acid, ethylcellulose, or other anti-adhesive materials, without necessarily excluding any class of compounds typically used in the production of the gum base, and even with a content of polyterpene resins and rosin esters greater than the content normally used for non-tacking gums.

The particular feature of these gums lies in the fact that high sensory standards are maintained throughout the chewing profile and excellent anti-adhesive properties are achieved, making it ideal for products in tablet form which are well known to be difficult to produce with tacking gum bases, even though formulated without polyvinyl acetate.

DETAILED DESCRIPTION OF THE INVENTION

The gum base formulated by the present invention represents a well-researched and careful combination of the classes of ingredients conventionally used in the production of the gum base.

The only ingredient that has been intentionally excluded from the formulation is polyvinyl acetate, already widely used for the formulation of non-tacking gums, in order to make the gum base more natural.

The present gum base in particular comprises the following ingredients expressed as percentages by weight with respect to the total weight of the gum base*:

(a)	elastomers	5-25%
(b)	emulsifiers and/or technological auxiliaries	5-30%
(c)	adjuvants	6-50%
(d)	vegetable resins and/or vegetable resin esters	20-45%
(e)	antioxidants	0-2%

* i.e. where the percentage sum of the components (a), (b), (c), (d) and (e) is 100.

The percentage of component (a) is preferably between 8 and 16%, the percentage of component (b) between 18 and 30%, the percentage of component (c) between 15 and 40%, the percentage of component (d) between 26 and 41% and the percentage of component (e) between 0 and 2%.

The elastomers which can be used in the composition of the present gum base include all the elastomers normally used in the gum base, whether synthetic

such as butadiene-styrene copolymer, polyisobutylene, and isobutylene-isoprene copolymer, or natural such as chicle, jelutong, balata, guttapercha, lechi caspi, sorva or a combination thereof: among these, polyisobutylene, isobutylene-isoprene copolymer and butadiene-styrene copolymer are preferred.

The emulsifiers and/or technological auxiliaries include glyceryl monostearate, acetylated monoglycerides, hydrogenated coconut, soybean, palm and cottonseed vegetable oils, lecithin and triacetin, which may be used alone or in combination with one another.

The adjuvants include calcium carbonate, magnesium carbonate, talc, tricalcium phosphate and the like, and a combination thereof is also possible.

The resins and/or resin esters of vegetable origin which can be added to this formulation are terpene resins such as polymers of α-pinene, β-pinene or d-limonene, rosin derivatives such as hydrogenated or partially hydrogenated resins, glycerol esters of natural rosin, pentaerythritol esters with natural rosin, glycerol esters with partially hydrogenated natural rosin, pentaerythritol esters with partially hydrogenated natural rosin, methyl esters of hydrogenated rosin, esters of hydrogenated rosin and glycerol, esters of partially dimerised rosin and glycerol, esters of polymerised rosin and glycerol esters of tall oil resin acids, which may be used alone or in combination; polyterpene resins and glycerol esters with hydrogenated or partially hydrogenated natural rosin, or mixtures thereof, are in particular preferred. Even more preferably, component (d) is a combination of terpene resins and rosin esters.

The antioxidants may include those materials conventionally used in the composition of the gum base such as butylated hydroxyanisole, butylated hydroxytoluene, tocopherol, propyl gallate and the like.

Carnosic acid is preferably not used as the antioxidant; more preferably, lecithin is not used as the emulsifier if carnosic acid is used as the antioxidant.

In order to explain the novelty of the invention in further detail, examples of non-adhesive gum base formulations of the present invention are given in Formula 1 and Formula 2, while Formula 3 and Formula 4 are examples of conventional non-tacking formulae containing polyvinyl acetate:

	Formula 1	Formula 2	Formula 3	Formula 4
Elastomers	9-16%	8-14%	10-18%	12-16%
Emulsifiers and/or techno-logical auxiliaries	25-30%	18-25%	23-28%	26-32%
Adjuvants	15-22%	32-40%	16-22%	15-23%
Terpene resins	24-28%	18-24%	-	3-8%
Rosin esters	9-13%	8-12%	12-18%	12-16%
Antioxidants	0-2%	0-2%	0-2%	0-2%
Polyvinyl acetate	-	-	19-24%	18-22%

As can be seen from the preceding table, the gum bases of formulae 1 and 2 differs from those of formulae 3 and 4 in the following respects:

- lack of polyvinyl acetate making the gum base more natural;
- a greater content of terpene resins and rosin esters in the gum bases of formulae 1 and 2 than in those of formulae 3 and 4.

The lack of adhesiveness of the present invention does not depend on the inclusion in the mixture of some specific components or special additives which could be extracted during chewing or which could change the taste and sensory properties of the product, and the anti-adhesive effect is not obtained by excluding classes of compounds normally used in the production of the gum base, but is ensured by the appropriate combination in the formula described of hydrogenated vegetable oils and polyterpene resins which are normally excluded from or used in small quantities in conventional non-tacking formulae.

The gum base as described may be obtained by using one of the techniques known in the art; in particular, the production method may include the preparation of semi-processed products containing elastomers, adjuvants, emulsifiers and the subsequent incorporation of the other ingredients in steam-heated double-wall mixers, single processing in the same mixers or may be obtained by a continuous process.

The versatility of the gum base of the present invention makes it suitable for non-tacking formulations of chewing gum, with or without sugar, which may be produced in different formats: drops, sheets, sticks and dragées and for formulations of chewing gum in compressed tablet form.

This formulation is also suitable for nutritional and pharmaceutical products both as a result of its anti-adhesive properties and its natural nature.

In order to assess the efficiency of the new formulation in comparison with conventional formulae, three unsweetened chewing gum formulations were prepared as described below.

The first formulation comprised a gum base for unsweetened chewing gum of good quality and slightly tacky with respect to the teeth, with polyvinyl acetate as in Formula 5 below, the second formulation comprised a typical non-tacking formulation containing polyvinyl acetate as described above under Formula 4 and the third with the gum base of Formula 1 of the present invention containing resins other than polyvinyl acetate.

Formula 5:

Elastomers	10-17%
Emulsifiers and/or technological auxiliaries	30-40%
Adjuvants	9-16%
Rosin esters	20-26%
Antioxidants	0-2%
Polyvinyl acetate	10-18%.

These three gum bases were used in the laboratory to produce chewing gums with the following composition:

Gum base	30%
Polyalcohols	67.8%
Flavouring	2%
Intensive sweeteners	0.2%.

The three samples were chewed by a panel of expert chewers who assessed the tackiness, flavour release and entire sensory profile of the three samples.

The panel noted an obvious difference, as regards the tackiness of the samples with respect to the teeth and paper, between the first product and the other two products, whereas no difference was noted between the non-tacking sample containing polyvinyl acetate and the sample containing resins other than polyvinyl acetate of the present invention.

As further confirmation of the properties of the gum base of the invention, it was decided to assess its behaviour in products in compressed tablet form.

As is known, these products require non-tacking formulations as the method of production of chewing gum in tablet form, during its stages of milling, screening, mixing and in particular compression is very critical. The risk run during the stages of milling, screening and mixing is that of obtaining powders with a coarse and non-homogeneous granular size, with milling also becoming impossible in the worst cases, and in the compression stage the temperature increase of the punches of the compressor machine emphasises the tacking tendency of the powder and often makes compression impossible.

A conventional compressed chewing gum formula is as follows:

Gum base	18-30%
Sugar or sweeteners	20-70%
Intensive sweeteners	0.2%
Flavouring	1-2%
Anti-caking agents	0-4%.

A good non-tacking chewing gum formulation has in particular been obtained by compression of a chewing gum powder with the following composition included in the range of the examples disclosed in European Patent Application 02425209.0 filed on 5 April 2002 in the name of the applicants:

Gum base of Formula 1	30%
Polyalcohols	64.6%
Intensive sweeteners	0.2%
Anti-caking agents	3.8%
Liquid flavouring	1.4%.

The formulation of gum base 1 described above has no properties of tackiness during the whole process of production of the tablets: the powder obtained after the stages of milling, screening and mixing is fine and comparable and there were no technological problems at the compression stage. The process yields were comparable to equivalent non-tacking formulations containing polyvinyl acetate.

isoprene copolymer, styrene-butadiene copolymer, chicle, jelutong, balata, guttapercha, lechi caspi, sorva or a combination thereof.

7. A gum base formulation as claimed in one of the preceding claims, characterised in that the emulsifiers and/or technological auxiliaries are selected from glyceryl monostearate, acetylated monoglycerides, hydrogenated vegetable oils, lecithin, triacetin, or a combination thereof.

8. A gum base formulation as claimed in claim 7, characterised in that the hydrogenated vegetable oils are selected from coconut, soybean, palm and/or cottonseed oil.

9. A gum base formulation as claimed in one of the preceding claims, characterised in that the adjuvant agents are selected from calcium carbonate, talc or magnesium carbonate, tricalcium phosphate, or a combination thereof.

10. A gum base formulation as claimed in one of the preceding claims, characterised in that the terpene resins are selected from polymers of α-pinene, β-pinene and/or d-limonene.

11. A gum base formulation as claimed in one of the preceding claims, characterised in that the rosin derivatives are selected from hydrogenated or partially hydrogenated resins, glycerol esters of natural resin, pentaerythritol esters with natural resin, glycerol esters with partially hydrogenated natural rosin, pentaerythritol esters with partially hydrogenated natural rosin, methyl esters of hydrogenated rosin, esters of hydrogenated rosin and glycerol, esters of partially dimerised rosin and glycerol, esters of polymerised rosin and glycerol esters of tall oil resin acids, or combinations thereof.

12. A gum base formulation as claimed in one of the preceding claims, characterised in that the antioxidants are selected from butylated hydroxyanisole, butylated hydroxytoluene, tocopherol, propyl gallate and mixtures thereof.

13. A chewing gum containing a gum base formulation as claimed in one of the preceding claims.

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CLAIMS

1. A gum base formulation having the following composition by weight:

(a)	elastomers	8-16%
(b)	emulsifiers and/or technological auxiliaries	18-30%
(c)	adjuvants	15-40%
(d)	vegetable resins and/or vegetable resin esters	26-45%
(e)	antioxidants	0-2%

and by not containing polyvinyl acetate.

2. A gum base formulation as claimed in claim 1, characterised in that component (d) is a mixture of terpene resins and rosin esters.

3. A gum base formulation as claimed in claims 1 or 2, characterised in that the percentage of component (d) is between 26 and 41%.

4. A gum base formulation as claimed in claim 1, having the following percentage composition by weight:

Elastomers	9-16%
Emulsifiers and/or technological auxiliaries	25-30%
Adjuvants	15-22%
Terpene resins	24-28%
Rosin esters	9-13%
Antioxidants	0-2%.

5. A gum base formulation as claimed in claim 1, having the following percentage composition by weight:

Elastomers	8-14%
Emulsifiers and/or technological auxiliaries	18-25%
Adjuvants	32-40%
Terpene resins	18-24%
Rosin esters	8-12%
Antioxidants	0-2%.

6. A gum base formulation as claimed in one of the preceding claims, characterised in that the elastomers are chosen from polyisobutylene, isobutylene-

isoprene copolymer, styrene-butadiene copolymer, chicle, jelutong, balata, guttapercha, lechi caspi, sorva or a combination thereof.

7. A gum base formulation as claimed in one of the preceding claims, characterised in that the emulsifiers and/or technological auxiliaries are selected from glyceryl monostearate, acetylated monoglycerides, hydrogenated vegetable oils, lecithin, triacetin, or a combination thereof.

8. A gum base formulation as claimed in claim 7, characterised in that the hydrogenated vegetable oils are selected from coconut, soybean, palm and/or cottonseed oil.

9. A gum base formulation as claimed in one of the preceding claims, characterised in that the adjuvant agents are selected from calcium carbonate, talc or magnesium carbonate, tricalcium phosphate, or a combination thereof.

10. A gum base formulation as claimed in one of the preceding claims, characterised in that the terpene resins are selected from polymers of α-pinene, β-pinene and/or d-limonene.

11. A gum base formulation as claimed in one of the preceding claims, characterised in that the rosin derivatives are selected from hydrogenated or partially hydrogenated resins, glycerol esters of natural resin, pentaerythritol esters with natural resin, glycerol esters with partially hydrogenated natural rosin, pentaerythritol esters with partially hydrogenated natural rosin, methyl esters of hydrogenated rosin, esters of hydrogenated rosin and glycerol, esters of partially dimerised rosin and glycerol, esters of polymerised rosin and glycerol esters of tall oil resin acids, or combinations thereof.

12. A gum base formulation as claimed in one of the preceding claims, characterised in that the antioxidants are selected from butylated hydroxyanisole, butylated hydroxytoluene, tocopherol, propyl gallate and mixtures thereof.

13. A chewing gum containing a gum base formulation as claimed in one of the preceding claims.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/007569

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A23G3/00

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A23G

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, FSTA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/124220 A1 (HILL VALERIE ANNE ET AL) 3 July 2003 (2003-07-03) cited in the application	1-3,6-13
A	claims 1,6,10,14,17,18	4,5
X	US 6 231 896 B1 (HILL VALERIE ANNE ET AL) 15 May 2001 (2001-05-15)	1-3,6-13
A	claims 1,3,11,16	4,5
X	US 4 588 592 A (ELIAS RONALD J) 13 May 1986 (1986-05-13) column 3, line 66 - column 4, line 4	1,6,9,13
X	US 4 459 311 A (D AMELIA RONALD P ET AL) 10 July 1984 (1984-07-10) column 5; table 1	1,9,13
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 November 2004	06/12/2004

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/007569

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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BASE DE GOMA NO PEGAJOSA PARA CHICLE

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Campo de la Invención

La presente invención se refiere a formulaciones de base de goma sin acetato de polivinilo adecuadas para la producción de un chicle con buenas propiedades de percepción y un buen sabor combinados con propiedades de no adhesión a las superficies duras incluyendo los dientes, dentaduras y similares, típicas de las formulaciones que contienen acetato de polivinilo.

Antecedentes de la Invención

Es conocido que las formulaciones convencionales para chicles tienen una tendencia bien conocida no solamente de pegarse con otros chicles, sino también pegarse a cualquier superficie sólida con la cual se ponen en contacto.

Estas formulaciones comprenden elastómeros sintéticos, tales como copolímero de polisobutileno, isobutileno-isopreno, copolímero de butadieno-estireno, gomas naturales tales como chicle o *jelutong*, resinas, tales como terpenos vegetales y/o sintetizados, y/o ésteres de rosina de glicerol, acetato de polivinilo, ceras microcristalinas y agentes adyuvantes, emulsificadores y auxiliares tecnológicos.

Una vez que dichos chicles han sido masticados y humedecidos, la parte digerible completa es disuelta e ingerida mientras que la parte de la goma restante es

altamente pegajosa, no solamente para los dientes y la piel, sino también para los pisos, depósitos de superficie y cualquier otra superficie dura y seca.

Esta adhesión es debida a las fuerzas específicas de la interfase y depende de la energía libre de la superficie: la adhesión a la superficie es influenciada por la capacidad de humedecimiento de la superficie, su tensión de superficie sólida y obviamente, la naturaleza y condiciones de la superficie sólida, es decir, si es áspera o lisa.

En el pasado, se han identificado aditivos que minimizan la pegajosidad de los chicles.

Por ejemplo, la Especificación de Patente Norteamericana No. US-3 255 018 propone el uso de ácido tánico para reducir la adhesividad de las bases de goma. Sin embargo, debido a que el ácido tánico es soluble, rápidamente es extractado e ingerido, regresando las propiedades adhesivas originales a la base de goma; por lo tanto, con el objeto de prolongar y regular la extracción de ácido tánico, secuencia de nucleótido ha descrito el uso de gelatina basada en ácido tánico.

La Especificación de Patente US-2 273 425 sugiere el uso de etilcelulosa, mientras que la Especificación de Patente US-3 285 750 sugiere el uso de resina de poliolefina que contienen flúor. También se han utilizado, con grados variables de éxito, materiales tales como sulfuros, sales

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minerales del tipo de carbonato de calcio, ceras, grasas, aceites, jabones y almidones con el objeto de reducir la adhesión: Especificaciones de Patente US-2 429 664 y US-3 440 060.

Sin embargo, el uso de agentes anti-adhesivos no solamente no garantiza el éxito, sino que con frecuencia crea muchos problemas; ellos pueden tener un efecto adverso en el sabor, ser costosos, causar daños a las líneas de producción y, en particular, en algunos casos, ser solubles como para que sean extraídos rápidamente, regresándole al chicle sus propiedades de pegajosidad.

Una alternativa propuesta a la inclusión de aditivos con propiedades anti-adhesivas, es colocar con los ingredientes generalmente utilizados la base de goma y en particular, las combinaciones reglamentarias de ingredientes tales como gomas naturales o sintéticas con resinas o ceras, o utilizar cantidades aumentadas de acetato de polivinilo, un material que es bien conocido que no es pegajoso.

Una formulación propuesta con una pegajosidad reducida con respecto a las superficies sólidas, se describe en particular, en la Especificación de Patente US-3 984 574. Esta patente describe una formulación que contiene del 5% al 35% de un elastómero el cual puede ser poliisobutileno, poliisopreno y un copolímero de isobutileno-isopreno o copolímero de butadieno-estireno; del 5% al 50% de aceites

vegetales o aceites animales hidrogenados total o parcialmente; del 5% al 40% de agentes adyuvantes; más del 55% de acetato de polivinilo; más del 20% de ácidos grasos y más del 10% de mono- y diglicéridos de ácidos grasos.

Esta patente atribuye la carencia de adhesión de la goma de chicle particularmente a la exclusión total de algunos ingredientes convencionales de la base de goma, tales como ésteres de rosina de glicerol, ceras naturales y gomas e indica ciertos elastómeros, aceites vegetales o grasas animales total o parcialmente hidrogenados de agentes adyuvantes, así como acetatos de polivinilo, ácidos grasos y mono- y diglicéridos de ácidos grasos como ingredientes de una formulación no pegajosa.

Aunque esta patente es evidentemente válida, es claro que se puede utilizar una reducción drástica del tipo de ingredientes en las formulaciones de la base de goma, lo cual indudablemente está limitando a los formuladores. En la práctica, si el número de ingredientes que pueden ser utilizados está limitado, es menos posible satisfacer de una manera efectiva los diferentes requerimientos del mercado, en términos de propiedades para masticarlo, usos de sabores particulares y la producción de tipos y formatos diferentes de productos acabados.

Sin embargo, es conocido en el sector de las bases para gomas, que el uso de grandes cantidades de acetato de

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polivinilo, con una reducción resultante de algunos ingredientes tales como ésteres de rosina y ceras microcristalinas, le proporciona al chicle propiedades no adhesivas sin impedir el uso de otros ingredientes.

El acetato de polivinilo es un homopolímero higroscópico sintético el cual, en combinación con otros ingredientes, proporciona una base de goma no pegajosa probablemente debido a que por su naturaleza higroscópica, ayuda a mantener la goma húmeda, mientras que reduce su adhesividad.

En particular, la especificación de Patente Norteamericana No. 4 357 355 se refiere a un chicle bomba no pegajoso, el cual contiene entre el 20% y el 55% de acetato de polivinilo de alto peso molecular, del 8% al 20% de un elastómero, del 8 al 30% de un plastificador, entre el 5% y el 25% de adyuvantes, del 0% al 20% de ácidos grasos y otros ingredientes. El método de preparación descrito en esta patente comprende un procesamiento de dos etapas: La preparación de un producto semi-acabado formado por un emulsificador derivado de glicerol del tipo mono-estearato de glicerol, triacetato de glicerol y acetato de polivinilo en una proporción que varía entre el 5% y el 75%, y la incorporación posterior de todos los otros ingredientes de la base de goma en este producto semi-acabado. La preparación de este producto semi-acabado permite una dispersión mejor del

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acetato de polivinilo en la base de goma, proporcionándole propiedades no adhesivas.

La Especificación de Patente Norteamericana 4 518 615 también describe un chicle el cual no se adhiere a los dientes, dentaduras u otras superficies dentales con la siguiente composición: del 15% al 45% de acetato de polivinilo con un peso molecular entre 15,000 y 30,000, del 10% al 30% de un elastómero, del 2% al 10% de un emulsificador, del 0.5% al 15% de polietileno con un peso molecular de 2,000, entre el 0.5 y el 10% de ceras que tienen un punto de fusión de aproximadamente 76°C, del 10% al 40% de un plastificador y del 0% al 5% de agentes adyuvantes, así como el solvente del elastómero seleccionado a partir de ésteres metilo, glicerol y pentaeritritol de rosina y terpenos en cantidades entre el 2% y el 18%.

En la patente anteriormente mencionada, el ingrediente esencial es acetato de polivinilo de un peso molecular entre 15,000 y 30,000 en cantidades variables entre el 15% y el 45% en peso de la base y preferentemente entre el 20% y el 30%. Se describe explícitamente que las cantidades de acetato de polivinilo menores del 15% hacen que la base de goma no sea homogénea y ocasionan una liberación no uniforme del sabor, mientras que las cantidades más altas del 45% hacen el producto demasiado plástico. El peso molecular también parece tener una influencia crucial, debido a que el

acetato de polivinilo con un peso molecular de 15,000 o menor, origina particularmente un producto el cual se quiebra fácilmente cuando es masticado.

La Especificación de Patente Norteamericana No. 5 437 878 también describe un chicle el cual tiene propiedades adhesivas reducidas, utilizando una combinación de ceras y elastómeros. En particular, las formulaciones descritas contienen desde el 16% al 30% de acetato de polivinilo con un peso molecular entre 7,000 y 13,000, del 8% al 18% de poliisobutileno de bajo peso molecular, del 1% al 4% de poliisobutileno de alto peso molecular, del 16% al 35% de agentes adyuvantes, del 1% al 6% de polietileno con un peso molecular promedio de 2,000, del 18% al 30% de grasas seleccionadas de un grupo de aceites vegetales parcialmente hidrogenados y/o hidrogenados, del 1% al 6% de emulsificadores, y del 2% al 10% de ceras microcristalinas, mientras que está descartado el uso de resinas de rosina, ésteres metilo, glicerol y pentaeritritol de rosina y resinas de terpeno ya que de acuerdo con el inventor, son responsables de perjudicar las propiedades deseables del chicle.

La Especificación de Patente US 6231896 describe una composición de hule para chicle (base de goma) que utiliza ácido carnósico como un estabilizador antioxidante mientras que la solicitud de Patente Norteamericana 2003/0124220 describe una composición de hule para chicle que utiliza

ácido carnósico y un estabilizador antioxidante junto con lecitina y un emulsificador para el ácido carnósico.

Sumario de la Invención

Se ha descubierto inesperadamente por la presente invención que es posible formular bases de goma suaves con una buena liberación del sabor, las cuales no se pegan a los dientes y/o las superficies duras, las cuales son muy similares a las bases de goma de alta calidad que contienen generalmente cantidades importantes de acetato de polivinilo y un contenido pequeño de otras resinas, sin el uso de acetato de polivinilo o agentes anti-adhesivos, tales como ácido tánico, etilcelulosa, u otros materiales anti-adhesivos, sin excluir necesariamente cualquier clase de compuestos utilizados generalmente en la producción de la base de goma, y aún con un contenido de resinas de politerpeno y ésteres de rosina mayor que el contenido generalmente utilizado para las gomas no pegajosas.

La característica particular de estos chicles reside en el hecho de que los estándares de sabor son mantenidos en todo el perfil del chicle y se logran propiedades anti-adhesivas excelentes, haciéndolos ideales para productos en forma de tabletas, los cuales es bien conocido que son muy difíciles de producir con las bases de goma pegajosas, aunque sean formulados sin acetato de polivinilo.

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Descripción Detallada de la Invención

La base de goma formulada por la presente invención representa una combinación bien investigada y cuidadosa de las clases de ingredientes utilizados convencionalmente en la producción de la base de goma.

El único ingrediente que ha sido excluido intencionalmente de la formulación es el acetato de polivinilo, ya utilizado ampliamente para la formulación de gomas no pegajosas, con el objeto de hacer que la base de las gomas sea más natural.

En particular, la base de goma presente comprende los siguientes ingredientes expresados en porcentajes en peso con respecto al peso total de la base de goma *:

(a) elastómeros	5-25%
(b) emulsificadores y/o auxiliares tecnológicos	5-30%
(c) adyuvantes	6-50%
(d) resinas vegetales y/o ésteres de resina vegetal	20-45%
(e) antioxidantes	0-2%

* por ejemplo en donde el porcentaje suma de los componentes (a), (b), (c), (d) y (e) es 100.

Los porcentajes del componente (a) son preferentemente entre el 8% y el 16%, el porcentaje del componente (b) entre el 18% y el 30%, el porcentaje del componente (c) entre el 15% y el 40%, el porcentaje del componente (d) entre el 26% y el 41% y el porcentaje del componente (e) entre el 0% y el 2%.

Los elastómeros que pueden ser utilizados en la

composición de la base de goma presente incluyen todos los elastómeros generalmente utilizados en la base de goma, ya sean sintéticos, tales como copolímero de butadieno-estireno, poliisobutileno, y copolímeros de isobutileno-isopreno, o naturales tales como chicle, jelutong, balata, gutapercha, lechi caspi, sorva o combinaciones de los mismos: entre estos, son preferidos el poliisobutileno, el copolímero de isobutileno-isopreno y el copolímero de butadieno-estireno.

Los emulsificadores y/o auxiliares tecnológicos incluyen monoestearato de glicerol, monoglicéridos acetilados, coco hidrogenado, frijol soya, aceites vegetales de palma y semilla de algodón, lecitina y triacetina, los cuales pueden ser utilizados solos o en combinación con otros.

Los adyuvantes incluyen carbonato de calcio, carbonato de magnesio, talco, fosfato de tricalcio y similares, y también son posibles las combinaciones de los mismos.

Las resinas y/o ésteres de resina de origen vegetal que pueden ser agregadas a esta formulación son resinas de terpeno tales como polímeros de α-pineno, β-pineno, o d-limoneno, derivados de rosina, tales como resinas parcial o totalmente hidrogenadas, ésteres de glicerol de rosina natural, ésteres de pentaeritritol con rosina natural y ésteres de glicerol con rosina natural parcialmente hidrogenada, ésteres de pentaeritritol con rosina natural parcialmente hidrogenada, ésteres metilo de rosina hidrogenada, ésteres

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de rosina hidrogenada y glicerol, ésteres de rosina parcialmente dimerizada y glicerol, ésteres de rosina polimerizada y ésteres de glicerol de ácidos de resina de aceite de sebo, los cuales pueden ser utilizados solos o en combinación, siendo particularmente preferidos, las resinas de politerpeno y ésteres de glicerol con rosina natural parcial o totalmente hidrogenada, o mezclas de los mismos. Aún más preferentemente, el componente (d) es una combinación de resinas de terpeno y ésteres de rosina.

Los antioxidantes pueden incluir aquellos materiales utilizados convencionalmente en la composición de una base de goma, tales como hidroxianisol butilado, hidroxitolueno butilado, tocoferol, galato propilo y similares.

De preferencia no se utiliza ácido carnósico como antioxidante, y más preferentemente, no se utiliza lecitina como emulsificador si es utilizado el ácido carnósico como antioxidante.

Con el objeto de explicar la novedad de la presente invención con detalle adicional, se proporcionan ejemplos de las formulaciones de base de goma no adhesivas de la presente invención en la Fórmula 1 y en la Fórmula 2, mientras que la Fórmula 3 y la Fórmula 4 son ejemplos de fórmulas no pegajosas convencionales que contienen acetato de polivinilo:

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	Fórmula 1	Fórmula 2	Fórmula 3	Fórmula 4
Elastómeros	9-16%	8-14%	10-18%	12-16%
Emulsificadores y/o auxiliares tecnológicos	25-30%	18-25%	23-28%	26-32%
Adyuvantes	15-22%	32-40%	16-22%	15-23%
Resinas de terpeno	24-28%	18-24%	-	3-8%
Ésteres de rosina	9-13%	8-12%	12-18%	12-16%
Antioxidantes	0-2%	0-2%	0-2%	0-2%
Acetato de polivinilo	-	-	19-24%	18-22%

Como se puede observar de la tabla anterior, las bases de goma de las fórmulas 1 y 2 difieren de las fórmulas 3 y 4 en los siguientes aspectos:

- la carencia de acetato de polivinilo haciendo que la base de goma sea más natural;
- un contenido mayor de resinas de terpeno y ésteres de rosina de las bases de goma de las fórmulas 1 y 2 que las de las fórmulas 3 y 4.

La carencia de adhesividad de la presente invención no depende de la inclusión en la mezcla de algunos componentes específicos y aditivos especiales, los cuales podrían ser extraídos durante el masticado o los cuales podrían cambiar el sabor y propiedades de sensación del producto, y no es obtenido el efecto anti-adhesivo, excluyendo las clases de compuestos generalmente utilizados en la producción de la base de goma, pero es asegurado por una combinación apropiada en la fórmula descrita de los aceites vegetales

hidrogenados y las resinas de politerpeno, las cuales son excluidas generalmente de, o utilizadas en pequeñas cantidades en las fórmulas no pegajosas convencionales.

La base de goma tal y como se ha descrito se puede obtener utilizando una de las técnicas conocidas en el arte, en particular, el método de producción puede incluir la preparación de productos semi-procesados que contienen elastómeros, adyuvantes, emulsificadores y la incorporación posterior de otros ingredientes en los mezcladores de doble pared calentados por vapor, el procesamiento sencillo en los mismos mezcladores o se pueden obtener mediante un proceso continuo.

La versatilidad de la base de goma de la presente invención la hace adecuada para formulaciones no pegajosas de chicle, con o sin azúcar, el cual puede ser producido en diferentes formatos: gotas, láminas, tabletas para formulaciones de chicle en forma de tableta comprimida.

Esta formulación también es adecuada para productos nutricionales y farmacéuticos, tanto como resultado de sus propiedades anti-adhesivas como por su naturaleza natural.

Con el objeto de evaluar la eficiencia de las nuevas formulaciones en comparación con las fórmulas convencionales, se prepararon tres formulaciones de chicle sin endulzar, tal y como se describe más adelante.

La primera formulación comprende una base de goma

para un chicle sin endulzar de buena calidad, ligeramente pegajoso con respecto a los dientes, con acetato de polivinilo, como en la Fórmula 5 siguiente, la segunda formulación comprende una formulación no pegajosa típica que contiene acetato de polivinilo, tal y como se describió anteriormente en la fórmula 4 y la tercera con la base de goma de la Fórmula 1 de la presente invención, que contiene resinas diferentes al acetato de polivinilo.

Fórmula 5:	
Elastómeros	10-17%
Emulsificadores y/o auxiliares tecnológicos	30-40%
Adyuvantes	9-16%
Ésteres de rosina	20-26%
Antioxidantes	0-2%
Acetato de polivinilo	10-18%

Estas tres bases de goma fueron utilizadas en el laboratorio para producir chicles con la siguiente composición:

Base de Goma	30%
Polialcoholes	67.8%
Saborizante	2%
Edulcorantes intensos	0.2%

Un panel de masticadores de chicle expertos, masticaron tres muestras, para evaluar su pegajosidad, la

liberación del sabor y el perfil de sensación completo de las tres muestras.

El panel observó una diferencia obvia con respecto a la pegajosidad de las muestras con respecto a los dientes y el papel, entre el primer producto y los otros dos productos, mientras que no se observó diferencia entre las muestras no pegajosas que contienen acetato de polivinilo y la muestra que contiene resinas diferentes al acetato de polivinilo de la presente invención.

Se decidió una confirmación adicional de las propiedades de la base de goma de la presente invención para evaluar su comportamiento para los productos en forma de tabletas comprimidas.

Como es conocido, estos productos requieren formulaciones no pegajosas, ya que el método de producción del chicle en forma de tabletas durante sus etapas de molido, colado, mezcla y en particular, la compresión es muy crítica. El riesgo se presenta durante las etapas de molido, colado y mezcla más que en la de obtener los polvos con un tamaño de gránulos gruesos no homogéneos, haciéndose también imposible el molido en el peor de los casos, y en el paso de compresión, el aumento de temperatura de la máquina compresora enfatiza la tendencia a pegarse del polvo y con frecuencia hace imposible la compresión.

Una fórmula de chicle comprimida convencional es la

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siguiente:

Base de Goma	18-30%
Azúcares o edulcorantes	20-70%
Edulcorantes intensivos	0.2%
Saborizante	1-2%
Agentes anti-formación de torta	0-4%

Tiene que ser obtenida una buena formulación de chicle no pegajosa, en particular, mediante la compresión de un polvo de chicle con la siguiente composición, incluida en el rango de los ejemplos descritos en la Solicitud de Patente Europea 02425209.0 presentada en Abril 5, 2002 a nombre de los solicitantes:

Base de goma de la Fórmula 1	30%
Polialcoholes	64.6%
Edulcorantes intensivos	0.2%
Agentes anti-formación de torta	3.8%
Saborizante líquido	1.4%

La formulación de la base de goma 1 descrita anteriormente, no tiene propiedades de pegajosidad durante todo el proceso de producción de las tabletas: el polvo obtenido después de las etapas de molido, colado y mezcla es fino y comparable y no existen problemas tecnológicos en la etapa de compresión. El proceso produce cantidades comparables al equivalente de formulaciones no pegajosas que contienen acetato de polivinilo.

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Con el objeto de evaluar la adhesividad durante el masticado y las propiedades de sensación de la base de goma en cuestión, Se decidió utilizar un panel de masticadores de chicle capacitados y seleccionados.

La base de goma de la presente invención fue utilizada en la producción de tabletas de chicle de acuerdo con las formulaciones establecidas anteriormente.

Las tabletas preparadas utilizando el método tal y como se ha descrito, fueron comparadas por el panel con formulaciones equivalentes de tabletas que contienen acetato de polivinilo y fueron masticadas durante 20 minutos para asegurarse de que todos los ingredientes que se pueden digerir del chicle estuvieran completamente disueltos y removidos.

Al final del masticado, el panel no encontró diferencias importantes con respecto a la falta de adhesividad de las dos muestras. Las dos muestras fueron juzgadas diferentes de manera significante desde el punto de vista de sus propiedades de sensación, en particular, con respecto a su adhesión a los dientes y dentaduras y su liberación del sabor.

CONCLUSIONES

Las formulaciones de base de goma descritas en la presente invención no se adhieren a los dientes, dentaduras y papel y pueden ser incorporadas en cualquier composición de chicle, en cualquier formato con o sin azúcar, en lugar de

todas las formulaciones de base de goma no pegajosa que contienen cantidades importantes de acetato de polivinilo, ya que ellas tienen las mismas propiedades de sensación y las mismas propiedades tecnológicas.

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REIVINDICACIONES

1. Una formulación a base de goma que tiene la siguiente composición en peso:

(a)	Elastómeros	8-16%
(b)	emulsificadores y/o auxiliares tecnológicos	18-30%
(c)	Adyuvantes	15-40%
(d)	Resinas vegetales y/o ésteres de resinas vegetales	26-45%
(e)	Antioxidantes	0-2%

y por no contener polivinil acetato.

2. Una formulación a base de goma como se reivindicó en la reivindicación 1, caracterizada por que el componente (d) es una mezcla de resinas de terpeno y ésteres de colofonia.

3. Una formulación a base de goma como se reivindicó en la reivindicación 1 o 2, caracterizada por que el porcentaje de componente (d) está entre 26 y 41%.

4, Una formulación a base de goma como se reivindicó en la reivindicación 1, que tiene el siguiente porcentaje de composición en peso.

Elastómeros		9-16%
Emulsificadores auxiliares tecnológicos	y/o	25-30%
Adyuvantes		15-22%
Resinas de terpeno		24-28%
Esteres de colofonia		9-13%
Antioxidantes		0-2%

5. Una formulación a base de goma como se reivindicó en la reivindicación 1, que tiene el siguiente porcentaje de composición en peso

Elastómeros		8-14%
Emulsificadores auxiliares tecnológicos	y/o	18-25%
Adyuvantes		32-40%
Resinas de terpeno		18-24%
Esteres de colofonia		8-12%
Antioxidantes		0-2%

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6. Una formulación a base de goma como se reivindicó en una de las reivindicaciones precedentes, caracterizada por que los elastómeros son escogidos de poliisobutileno, copolímero de isobutileno - isopreno, copolímero de estireno-butadieno, chicle, jelutong, balata, gutapercha, lechi caspi , sorva o una combinación de éstos.

7. Una formulación a base de goma como se reivindicó en una de las reivindicaciones precedentes, caracterizado por que los emulsificadores y/o los oxidantes tecnológicos son seleccionados de glicerol monostearato, monoglicéridos acetilados, aceites vegetales hidrogenados, lecitina, triacetina, o una combinación de éstos.

8. Una formulación a base de goma como se reivindicó en la reivindicación 7, caracterizado por que los aceites vegetales hidrogenados son seleccionados de aceite de coco, soya, palma y/o semilla de algodón.

9. Una formulación a base de goma como se reivindicó en una de las reivindicaciones precedentes, caracterizado por que los agentes adyuvantes son seleccionados de carbonato de calcio, talco o

carbonato de magnesio, fosfato de tricalcio, o una combinación de éstos.

10. Una formulación a base de goma como se reivindicó en una de las reivindicaciones precedentes, caracterizado por que las resinas de terpeno son seleccionadas de polímeros de α-pineno, β-pineno y/o de-limoneno.

11. Una formulación a base de goma como se reivindicó en una d las reivindicaciones precedentes, caracterizado por que los derivados de colofonia son seleccionados de resinas hidrogenados o parcialmente hidrogenados, ésteres de glicerol y resina natural, ésteres de pentaeritritol con resina natural, ésteres de glicerol, con colofonia natural parcialmente hidrogenada, ésteres de pentaeritritol con colofonia natural parcialmente hidrogenada, ésteres de metilo de colofonia hidrogenados, ésteres de colofonia hidrogenads y glicerol, ésteres de colofonia parcialmente dimerisados y glicetol, ésteres de colofonia polimerizados y ésteres de ácidos de resina "tall oil", o combinaciones de éstos.

12. Una formulación a base de goma como se reivindicó en una de las reivindicaciones precedentes, caracterizado por que los antioxidantes son seleccionados de hidroxianisol butilado, hidroxitolueno butilado, tocoferol, propil galato y mezclas de éstos.

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13. Una goma de mascar que contiene una formulación a base de goma como se reivindicó en una de las reivindicaciones precedentes.

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RESUMEN

La presente invención se refiere a una formulación de base de goma adecuada para la producción de un chicle con buenas propiedades de sensación y una buena liberación del sabor en combinación con propiedades anti-adhesivas con respecto a los dientes, dentaduras y similares, típicos de las formulaciones que contienen acetato de polivinilo. Estas formulaciones de base de goma no se pegan a los dientes y se caracterizan por tener la siguiente composición en peso: (a) elastómeros del 8 al 16%, (b) emulsificadores auxiliares tecnológicos del 18% al 30%, (c) adyuvantes del 15% al 40% (d) resinas vegetales y/o ésteres de resina vegetal del 26% al 45%, (e) antioxidantes del 0% al 2% y por no contener acetato de polivinilo.

PATENT COOPERATION TREATY

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

PISTOLESI, Roberto
Dragotti & Associati S.r.l
Via Turati 32
I-20121 Milano
ITALIE

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(PCT Rule 71.1)

Date of mailing *(day/month/year)*	17.10.2005

Applicant's or agent's file reference	IMPORTANT NOTIFICATION
04 LG 30 E	

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP2004/007569	06.07.2004	08.07.2003

Applicant
GUM BASE CO. S.P.A. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:

European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
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Authorized Officer

Ruiz Fernandez, J

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PATENT COOPERATION TREATY

PCT

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 04 LG 30 E	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/EP2004/007569	International filing date *(day/month/year)* 06.07.2004	Priority date *(day/month/year)* 08.07.2003
International Patent Classification (IPC) or national classification and IPC A23G3/00		
Applicant GUM BASE CO. S.P.A. et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 2 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
02.02.2005	17.10.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Groh, B Telephone No. +49 89 2399-7655

Form PCT/IPEA/409 (Cover Sheet) (January 2004)

INTERNATIONAL PRELIMINARY REP RT ON PATENTABILITY

International application No.
PCT/EP2004/007569

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-10	as originally filed

Claims, Numbers

11-13	as originally filed
1-10	filed with telefax on 10.02.2005

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/007569

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-10
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-10
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-10
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (SEPARATE SHEET)

International application No.
PCT/EP2004/007569

Re Item V

Reference is made to the following documents:

D1: US 2003/124220 A1 (HILL VALERIE ANNE ET AL) 3 July 2003 (2003-07-03)
D2: US-B1-6 231 896 (HILL VALERIE ANNE ET AL) 15 May 2001 (2001-05-15)
D3: US-A-4 588 592 (ELIAS RONALD J) 13 May 1986 (1986-05-13)
D4: US-A-4 459 311 (D AMELIA RONALD P ET AL) 10 July 1984 (1984-07-10)
D5: US-A-5 601 858 (MANSUKHANI GUL ET AL) 11 February 1997 (1997-02-11)
D6: WO 00/08944 A (WARNER LAMBERT CO) 24 February 2000 (2000-02-24)

1 Novelty (Art. 33(2) PCT)

None of the available prior art discloses gum bases (suitable for chewing gum or similar items) with the composition defined in the independent claim.
Novelty is acknowledged for all claims.

2 Inventive step (Art. 33(3) PCT)

The technical field of the present invention is the filed of chewing gum or similar items.
The technical problem to be solved is to provide a gum base formulation, which shows good sensory properties and good flavour release, not containing polyvinyl acetate, while showing low/non adhesion properties to hard surfaces.

Non stick chewing gum (base) is known in the art (see D5 and D6). However both documents teach the use of polyvinyl acetate.

Other documents of the technical filed are known (see D1, D2 and D3), which disclose chewing gum base formulations, which contain all composition elements (elastomers, resins, emulsifiers, etc.) in the amount of the present invention, and not containing polyvinyl acetate. However no prior art document discloses a gum base formulation with Terpene resins and Rosin esters in the presently claimed amounts for a gum base. Furthermore, no document from the available prior art teaches or suggests in an obvious way to provide a gum base as presently claimed (defined by a quantitative formulation, absence of polyvinyl acetate and being non-adhesive).
Consequently an inventive step is acknowledged for all claims.

3 Other: The reference in claim 1 to itself should be deleted (Art. 6 PCT)

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CLAIMS

1. A gum base formulation as claimed in claim 1, having the following percentage composition by weight:

Elastomers	9-16%
Emulsifiers and/or technological auxiliaries	25-30%
Adjuvants	15-22%
Terpene resins	24-28%
Rosin esters	9-13%
Antioxidants	0-2%

and not containing polyvinyl acetate.

2. A gum base formulation as claimed in claim 1, having the following percentage composition by weight:

Elastomers	8-14%
Emulsifiers and/or technological auxiliaries	18-25%
Adjuvants	32-40%
Terpene resins	18-24%
Rosin esters	8-12%
Antioxidants	0-2%.

3. A gum base formulation as claimed in one of the preceding claims, characterised in that the elastomers are chosen from polyisobutylene, isobutylene-isoprene copolymer, styrene-butadiene copolymer, chicle, jelutong, balata, guttapercha, lechi caspi, sorva or a combination thereof.

4. A gum base formulation as claimed in one of the preceding claims, characterised in that the emulsifiers and/or technological auxiliaries are selected from glyceryl monostearate, acetylated monoglycerides, hydrogenated vegetable oils, lecithin, triacetin, or a combination thereof.

5. A gum base formulation as claimed in claim 4, characterised in that the hydrogenated vegetable oils are selected from coconut, soybean, palm and/or cottonseed oil.

6. A gum base formulation as claimed in one of the preceding claims, characterised in that the adjuvant agents are selected from calcium carbonate, talc or magnesium carbonate, tricalcium phosphate, or a combination thereof.

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7. A gum base formulation as claimed in one of the preceding claims, characterised in that the terpene resins are selected from polymers of α-pinene, β-pinene and/or d-limonene.

8. A gum base formulation as claimed in one of the preceding claims, characterised in that the rosin derivatives are selected from hydrogenated or partially hydrogenated resins, glycerol esters of natural resin, pentaerythritol esters with natural resin, glycerol esters with partially hydrogenated natural rosin, pentaerythritol esters with partially hydrogenated natural rosin, methyl esters of hydrogenated rosin, esters of hydrogenated rosin and glycerol, esters of partially dimerised rosin and glycerol, esters of polymerised rosin and glycerol esters of tall oil resin acids, or combinations thereof.

9. A gum base formulation as claimed in one of the preceding claims, characterised in that the antioxidants are selected from butylated hydroxyanisole, butylated hydroxytoluene, tocopherol, propyl gallate and mixtures thereof.

10. A chewing gum containing a gum base formulation as claimed in one of the preceding claims.

REIVINDICACIONES

1. Una formulación de base de goma, la cual tiene la siguiente composición en porcentaje en peso:

Elastómeros	9-16%
Emulsificadores y/o auxiliares tecnológicos	25-30%
Adyuvantes	15-22%
Resinas de terpeno	24-28%
Ésteres de rosina	9-13%
Antioxidantes	0-2%

y que no contiene acetato de polivinilo.

2. Una formulación de base de goma tal y como se describe en la reivindicación 1, la cual tiene la siguiente composición en porcentaje en peso:

Elastómeros	8-14%
Emulsificadores y/o auxiliares tecnológicos	18-25%
Adyuvantes	32-40%
Resinas de terpeno	18-24%
Ésteres de rosina	8-12%
Antioxidantes	0-2%

3. Una formulación de base de goma tal y como se describe en la reivindicación 1, caracterizada porque los elastómeros son seleccionados a partir de poliisobutileno, copolímero de isobutileno-isopreno, copolímero de estireno-butadieno, chicle, *jelutong*, balata, guttapercha, lechi caspi, sorva o cualquier combinación de los mismos.

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4. Una formulación de base de goma tal y como se describe en la reivindicación 1, caracterizada porque los emulsificadores y/o auxiliares tecnológicos son seleccionados a partir de monostearato de glicerilo, monoglicéridos acetilados, aceites vegetales hidrogenados, lecitina, triacetina, o una combinación de los mismos.

5. Una formulación de base de goma tal y como se describe en la reivindicación 4, caracterizada porque los aceites vegetales hidrogenados son seleccionados de aceite de coco, soya, palma y/o semilla de algodón.

6. Una formulación de base de goma tal y como se describe en la reivindicación 1, caracterizada porque los agentes adyuvantes son seleccionados a partir del carbonato de calcio, talco o carbonato de magnesio, fosfato de tricalcio, o una combinación de los mismos.

7. Una formulación de base de goma tal y como se describe en la reivindicación 1, caracterizada porque las resinas de terpeno son seleccionadas de polímeros de α-pineno, β-pineno y/o d-limoneno.

8. Una formulación de base de goma tal y como se describe en la reivindicación 1, caracterizada porque los derivados de rosina son seleccionados de resinas parcial o totalmente hidrogenadas, ésteres de glicerol de resina natural, ésteres de pentaeritritol con resina natural, ésteres de glicerol con rosina natural parcialmente hidrogenada,

ésteres de pentaeritritol con rosina natural parcialmente hidrogenada, ésteres metílicos de rosina hidrogenada, ésteres de rosina hidrogenada y glicerol, ésteres de rosina dimerizada parcialmente y glicerol, ésteres de rosina polimerizada y ésteres de glicerol de ácidos de resina de aceite de sebo, o una combinación de los mismos.

9. Una formulación de base de goma tal y como se describe en la reivindicación 1, caracterizada porque los antioxidantes son seleccionados a partir de hidroxianisol butilado, hidroxitolueno butilado, tocoferol, propil galato y mezclas de los mismos.

10. Un chicle que contiene una formulación de base de goma tal y como se describe en cualquiera de las reivindicaciones anteriores.

PATENT COOPERATION TREATY

PCT

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
04 LG 30 E		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/EP2004/007569	06/07/2004	08/07/2003
Applicant		
GUM BASE CO. S.P.A.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
      [ ] The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
   b. [ ] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. [ ] **Certain claims were found unsearchable** (See Box II).

3. [ ] **Unity of invention is lacking** (see Box III).

4. With regard to the **title**,
   [X] the text is approved as submitted by the applicant.
   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,
   [X] the text is approved as submitted by the applicant.
   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regards to the **drawings**,
   a. the figure of the drawings to be published with the abstract is Figure No. _____
      [ ] as suggested by the applicant.
      [ ] as selected by this Authority, because the applicant failed to suggest a figure.
      [ ] as selected by this Authority, because this figure better characterizes the invention.
   b. [ ] none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/007569

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A23G3/00

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A23G

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, FSTA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/124220 A1 (HILL VALERIE ANNE ET AL) 3 July 2003 (2003-07-03) cited in the application	1-3,6-13
A	claims 1,6,10,14,17,18	4,5
X	US 6 231 896 B1 (HILL VALERIE ANNE ET AL) 15 May 2001 (2001-05-15)	1-3,6-13
A	claims 1,3,11,16	4,5
X	US 4 588 592 A (ELIAS RONALD J) 13 May 1986 (1986-05-13) column 3, line 66 - column 4, line 4	1,6,9,13
X	US 4 459 311 A (D AMELIA RONALD P ET AL) 10 July 1984 (1984-07-10) column 5; table 1	1,9,13
	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 November 2004	06/12/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040. Tx 31 651 epo nl. Fax: (+31-70) 340-3016	Groh, B

Form PCT/ISA/210 (second sheet) (January 2004)

International Application No
PCT/EP2004/007569

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
A	US 5 601 858 A (MANSUKHANI GUL ET AL) 11 February 1997 (1997-02-11) the whole document	1-13
A	WO 00/08944 A (WARNER LAMBERT CO) 24 February 2000 (2000-02-24) claims 1-20; examples 1-4	1-13

Form PCT/ISA/210 (continuation of second sheet) (January 2004)

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US 2003124220 A1	03-07-2003	BR 0205332 A	20-07-2004
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		EP 1143804 A2	17-10-2001
		HK 1040885 A1	16-07-2004
		JP 2002538761 T	19-11-2002
		WO 0008944 A2	24-02-2000

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP2004/007569	06.07.2004	08.07.2003

International Patent Classification (IPC) or both national classification and IPC
A23G3/00

Applicant
GUM BASE CO. S.P.A.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220

3 For further details, see notes to Form PCT/ISA/220

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Authorized Officer

Groh, B

Telephone No +49 89 2399-7855

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ in written format

   ☐ in computer readable form

   c. time of filing/furnishing:

   ☐ contained in the international application as filed.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

US006231896B1

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

(10) **Patent No.: US 6,231,896 B1**
(45) **Date of Patent: *May 15, 2001**

(54) **CHEWING GUM BASE STABILIZED WITH CARNOSIC ACID**

(75) Inventors: **Barbara Ann Ford; Valerie Anne Hill**, both of Akron, OH (US)

(73) Assignee: **The Goodyear Tire & Rubber Company**, Akron, OH (US)

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

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/658,092**

(22) Filed: **Sep. 8, 2000**

(51) **Int. Cl.**[7] **A23G 3/30**
(52) **U.S. Cl.** **426/3**
(58) **Field of Search** 426/3, 5

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,567,450 * 10/1996 Zuromski et al. 426/5
5,879,728 * 3/1999 Graff et al. 426/5

FOREIGN PATENT DOCUMENTS

59-103665 * 6/1984 (JP).
11-181639 * 7/1999 (JP).

* cited by examiner

Primary Examiner—Arthur L. Corbin
(74) *Attorney, Agent, or Firm*—Alvin T Rockhill

(57) **ABSTRACT**

This invention discloses a chewing gum rubber composition (gum base) that utilizes carnosic acid from a Libiatae plant, such as rosemary or sage, as an antioxidant stabilizer. This invention more specifically discloses a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) carnosic acid, wherein said chewing gum base is void of sweeteners, flavoring agents or colorants and a water-soluble portion.

20 Claims, No Drawings

CHEWING GUM BASE STABILIZED WITH CARNOSIC ACID

BACKGROUND OF THE INVENTION

Today ordinary chewing gums and bubble gums generally utilize as their gum base one or a combination of two or more natural or synthetic elastomers. The gum base that is selected provides the chewing gum with its masticatory properties. A chewing gum base is normally admixed with sugars or synthetic sweeteners, perfumes, flavors, plasticizers, and fillers; and then milled and formed into sticks, sheets, or pellets. Cottonseed oil is sometimes also added to give the gum softness. Styrene butadiene rubber (SBR) is a synthetic elastomer that is widely used as a gum base in chewing gums. However, SBR is not widely used in manufacturing soft chew gums because it lacks the desired physical properties. Polyisobutylene is widely used in manufacturing soft chew gums even though it is much more expensive than SBR.

In any case, chewing gum compositions are typically comprised of a water soluble bulk portion, a water insoluble chewing gum base portion and typically water insoluble flavoring agents. The water soluble portion dissipates with a portion of the flavoring agent over a period of time during chewing. The gum base portion is retained in the mouth throughout the chewing process.

The gum base includes a number of ingredients that are subject to deterioration through oxidation during storage. The insoluble gum base is generally comprised of elastomers, elastomer plasticizers, waxes, fats, oils, softeners, emulsifiers, fillers, texturizers and miscellaneous ingredients, such as antioxidants, preservatives, colorants and whiteners. The compounds containing carbon-carbon double bonds, such as fats, oils, unsaturated elastomers and elastomer plasticizers, are susceptible to oxidation. The gum base constitutes between 5–95% by weight of the chewing gum composition, more typically 10–50% by weight of the chewing gum, and more commonly 15–35% by weight of the chewing gum.

In chewing gum base natural or artificial antioxidants are utilized to stabilize the rubbery polymer. For instance, beta-carotenes, acidulants (e.g. Vitamin C), propyl gallate, BHA, and BHT are commonly used to stabilize the rubber used in manufacturing chewing gum. Such antioxidants are included in chewing gum base as a stabilizer to inhibit oxidation.

Antioxidants are widely used in food products susceptible to degeneration, in one form or another, due to oxidation. "Antioxidants" are defined by the Food and Drug Administration (21 CFR §170.3) as "substances used to preserve food by retarding deterioration, rancidity, or discoloration due to oxidation." Commercial applications include use in processed meat and poultry, salad dressings, seasonings, snacks, nuts, soup bases, edible fats and oils, natural foods, pet foods and packaging. In addition to foods, antioxidants have been used to prevent oxidation in various cosmetic and toiletry products and in medicinal or pharmaceutical preparations. The primary purpose in each of these applications is to prevent deterioration of desirable product characteristics by inhibiting oxidation.

More recently, antioxidants in food sources and dietary supplements have received attention for their potential to prevent or delay the onset of certain cancers and other chronic health conditions including heart disease, cataracts and aging. The theory is that, by preventing oxidation, these materials inhibit the formation of oxygen containing free radicals that are believed to play a significant role in initiation of these conditions and other chronic disorders.

The use of spices to prevent food deterioration as well as to impart flavor has been known for centuries. Because of their cost and availability, however, synthetic antioxidants, such as butyl hydroxyanisole ("BHA") and butylated hydroxytoluene ("BHT"), have been predominant in commercial food preparation. These antioxidants have proven to be quite effective. However, there is currently a desire to utilize natural antioxidants in food products and chewing gum.

There is a growing desire for chewing gum base that is stabilized with a natural stabilizer. U.S. Pat. No. 4,489,099 discloses the use of Vitamin E in combination with dilauryl thiodipropionate (DLTDP), as a stabilizer for a styrene-butadiene rubber in chewing gum. U.S. Pat. No. 5,132,121, U.S. Pat. No. 5,200,213, and U.S. Pat. No. 5,270,060 disclose a use of 0.01–1.00% by weight of a tocopherol mixture comprising 7–20% by weight alpha tocopherol, 45–75% by weight gamma tocopherol and 18–32% by weight delta tocopherol to stabilize chewing gum base.

Carnosic acid is a phenolic diterpene that corresponds to the empirical formula $C_{20}H_{28}O_4$. It occurs naturally in plants of the Libiatae family. For instance, carnosic acid is a constituent of the species *Salvia officinalis* (sage) and *Rosmarinus officinalis* (rosemary) where it is mainly found in the leaves. Carnosic acid is also found in thyme and marjoram. It was discovered by Linde in *Salvia officinalis* [Helv. Chim Acta 47, 1234 (1962)] and by Wenkert et al. in *Rosmarinus officinalis* [J. Org. Chem. 30, 2931 (1965)]. It was then positively identified in various other species of sage, such as for example *Salvia canariensis* [Savona and Bruno, J. Nat. Prod. 46, 594 (1983)] or *Salvia willeana* [de la Torre et al., Phytochemistry 29, 668 (1990)]. It is also present in *Salvia triloba* and *Salvia sclarea*.

Carnosic acid is a powerful antioxidant [Brieskorn and Domling, Z. Lebensm. Unters. Forsch. 141, 10 (1969)] and, according to a number of Russian works where it bears the name salvine, an antibiotic against Staphylococcus aureus [CA 86, 117603r; 90, 49011 b; 97, 67513r, 69163a, 69164b; 104, 221930w; 111, 130594t] and against certain microorganisms responsible for dental caries and bad breath [CA 97, 84835q]. In connection with this latter property, it is disclosed in Japanese Patent Publication 59–103665 to Lion Corporation that carnosic acid can be incorporated into tooth paste and chewing gum to remove smells for the mouth. Japanese Patent Publication 11180839 also discloses that carnosic acid, carnosol, and rosmanol can be used in dentifrice, mouthwash, tablets for gargling, troches, candies, and chewing gum as a deodorant for the oral cavity.

Dried leaves of rosemary or sage contain between 1.5 and 2.5% carnosic acid and about 0.3–0.4% carnosol which is also an antioxidant. Rosmanol and rosmaridiphenol are present in smaller concentrations. Accordingly, from the point of view of the economy of a production process, carnosic acid has an indisputable advantage. According to the data disclosed in U.S. Pat. No. 4,450,097 it may be calculated that the yield of rosmanol isolated from rosemary is only 0.01%.

Wenkert et al. have demonstrated that carnosol is an oxidative artifact of carnosic acid. This oxidation takes place in the presence of oxygen both after the harvesting of rosemary or sage in the leaves left to dry in air (it can be demonstrated that the freshly cut leaves of rosemary do not contain carnosol) and when the leaves are subjected to extraction with solvents or when the extracts themselves are

subjected to conventional operations of fractionation, enrichment and purification. There is every reason to assume that rosmanol, which has been identified in a rosemary fraction subjected to an alkaline treatment, is itself a subsequent product of the oxidation of carnosic acid, as Wenkert et al. have suggested. The same may also be reasonably assumed of rosmaridiphenol. Carnosic acid is therefore the only phenolic diterpene present in the native state in rosemary and sage.

Some methods for the preparation of carnosic acid by chemical synthesis have also been proposed in the literature by W. L. Meyer et al. [Tetrahedron Letters 1966, 4261; 1968, 2963; J. Org. Chem. 41, 1005 (1976)]. However, the syntheses involved are long and complex and, for economic reasons, cannot be applied to an industrial process. In addition, these syntheses lead to racemic mixtures of carnosic acid precursors and not to the pure enantiomers. It should also be pointed out that these works stop at the preparation of carnosic acid precursors and omit to describe the final preparation step(s). Another method of obtaining carnosic acid has been described in the literature by Brieskorn and Domling [Arch. Pharm. 302, 641 (1969)], comprising the catalytic reduction of carnosol. Once again, the application of this process on a large scale could not be envisaged on account of the non-availability of carnosol.

U.S. Pat. No. 5,859,293 and U.S. Pat. No. 5,256,700 disclose techniques for extracting high purity carnosic acid from rosemary and sage. For example, U.S. Pat. No. 5,256,700 discloses a process for obtaining carnosic acid comprising extracting a vegetable material selected from the group consisting of sage and rosemary with an apolar solvent to obtain an extract containing apolar compounds including carnosic acid, contacting the extract with an adsorbent material having an affinity for polar compounds for adsorbing the carnosic acid to separate the carnosic acid from the apolar compounds of the extract, desorbing the adsorbent material with a polar solvent to obtain the carnosic acid in the solvent and then evaporating the polar solvent from the carnosic acid to obtain a residue containing the carnosic acid.

SUMMARY OF THE INVENTION

This invention is based upon the discovery that carnosic acid can be used to stabilize rubbery polymers, such as chewing gum base. For instance, carnosic acid can be used to protect chewing gum rubber from oxidation and to stabilize it during processing and subsequently in the gum base and chewing gum. The carnosic acid will stabilize virtually any type of rubbery polymer used in chewing gum, such as styrene-butadiene rubber, polyisobutylene, isobutylene-isoprene copolymer elastomers, polyvinylacetate, natural gums, and mixtures thereof. Some specific examples of natural gums that can be stabilized with carnosic acid include jelutong, lechi caspi, perillo, massaranduba balata, massaranduba chocolate, nispero, rosindinha, chicle, gutta hang kang, and mixtures thereof.

Carnosic acid can also be used as an antioxidant in rubbers that are used in non-food applications. For example, it can be used to stabilize rubbers used in tires and industrial products, such as hoses and power transmission belts. In fact, carnosic acid will act as an antioxidant in any unsaturated rubber (any rubber containing carbon-carbon double bonds). Thus, carnosic acid can be used to stabilize styrene-butadiene rubber, high cis-1,4-polybutadiene rubber, medium vinyl polybutadiene rubber, synthesic polyisoprene rubber, natural rubber, styrene-isoprene rubber (SIR), styrene-isoprene-butadiene rubber (SIBR), nitrile rubber, carboxylated nitrile rubber, bromobutyl rubber, chlorobutyl rubber, and the like.

The present invention more specifically discloses a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) carnosic acid, wherein said chewing gum base is void of sweeteners.

The subject invention also reveals a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) carnosic acid, wherein said chewing gum base is void of flavoring agents.

The present invention further discloses a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) carnosic acid, wherein said chewing gum base is void of colorants.

The present invention also reveals a stabilizer rubber which is comprised of a rubbery polymer and carnosic acid, wherein said stabilized rubber is void of sweeteners and/or flavoring agents. Such stabilized rubbers can also be void of colorants and humectants. The rubbery polymer can be virtually any synthetic or natural rubber, such as styrene-butadiene rubber, polybutadiene rubber, natural rubber synthetic polyisoprene rubber, styrene-isoprene rubber, styrene-isoprene-butadiene rubber, nitrile rubber, carboxylated nitrile rubber, and the like.

DETAILED DESCRIPTION OF THE INVENTION

This invention reveals the use of carnosic acid as a stabilizer system for rubbery polymers. Carnosic acid is particularly useful for stabilizing chewing gum rubber compositions. The carnosic acid protects the rubber during processing and provides it with adequate antioxidant protection during the service life of the final product, such as chewing gum, tires, hoses, belts, and the like. The carnosic acid used will typically come from a plant in the Labiatae family, such as rosemary, sage, thyme or marjoram. Unfortunately, antioxidants extracted from naturally occuring spices generally exhibit flavors, odors, and colors that can be undesirable in some applications. Accordingly, efforts are typically made to extract the carnosic acid from the plant material in high purity. High purity carnosic acid is typically recovered by extraction and isolation from plant matter of the Labiatae family. Various techniques for recovering carnosic acid from Labiatae plants is disclosed in U.S. Pat. No. 5,859,293, U.S. Pat. No. 5,256,700, U.S. Pat. No. 5,061,403, and U.S. Pat. No. 4,450,097. The teachings of these patents are hereby incorporated herein by reference in their entirety.

It should be noted that other compounds having antioxidant characteristics will also frequently be present in the carnosic acid source. For instance, carnosol, rosmanol and rosmaridiphenol will also frequently be present. It is

believed that carnosol, rosmanol and rosmaridiphenol help to further improve the stability of rubbery polymers. Thus, there is no need to make an effort to remove them from the carnosic acid source. In fact, the carnosol, rosmanol and/or rosmaridiphenol may act synergistically with the carnosic acid to improve the stability of the rubbery polymer. In some applications, the flavor of the spice, such as rosemary, is desirable. In such cases it is not necessary to highly purify the carnosic acid in an effort to remove the flavor of the spice. A rosemary extract having the aroma and flavor characteristics of rosemary is commercially available from Cultor Food Science, Inc.

The chewing gum base compositions of this invention are comprised of(1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) carnosic acid. The rubbery elastomer used in the chewing gum base will typically be a styrene-butadiene rubber, a polyisobutylene rubber, a isobutylene-isoprene copolymer elastomers, a polyvinylacetate, or a natural gum, such as jelutong, lechi caspi, perillo, massaranduba balata, massaranduba chocolate, nispero, rosindinha, chicle, gutta hang kang, and mixtures thereof. The rubbery elastomer can, of course, also be a mixture of such natural and synthetic rubbery polymers. These chewing gum rubber compositions can then be used with excellent results as the gum base in the production of chewing gum. The chewing gum base compositions of this invention will be employed in conjunction with other chewing gum ingredients (additives) to form chewing gum. More specifically, sweeteners, flavoring agents, and colorants are added to the chewing gum base in manufacturing chewing gum. A humectant, such as aqueous sorbitol or glycerin, is also normally added to chewing gum base in manufacturing chewing gum. This is because chewing gum base, including the chewing gum base of this invention, is void of sweeteners, flavoring agents, colorants (including whiteners), and humectants.

The carnosic acid can be distributed throughout rubbery polymer using a variety of techniques known to those skilled in the art. The preferred means of distributing the carnosic acid throughout synthetic rubbers synthesized by emulsion polymerization is by emulsifying it with a food grade emulsifier and then to add it to the emulsion to the rubber. The latex can then be coagulated using a standard salt-acid coagulation system known to those skilled in the art. The rubber composition which contains the carnosic acid can then be processed into chewing gum or other rubber products using standard techniques. The stabilized rubber compositions of this invention will typically contain about 0.0001 phr to about 1 phr (parts by weight per 100 parts by weight of rubber) of carnosic acid. The stabilized rubber compositions of this invention will more typically contain about 0.0005 phr to about 0.1 phr of carnosic acid. The stabilized rubber compositions of this invention will preferably contain about 0.001 phr to about 0.05 phr of carnosic acid. The stabilized rubber compositions of this invention will preferably contain about 0.01 phr to about 0.03 phr of carnosic acid.

The emulsifier used should be suitable for emulsifying the carnosic acid. A number of food grade emulsifiers are satisfactory for this purpose. Saponified fatty acids can be used for this purpose. For instance, the emulsifier can be a vegetable oil, a mono-glyceride, a diglyceride, a triglyceride, lecithin, a hydrogenated fat or oil, a partially hydrogenated fat or oil, an edible animal fat or oil, or a salt of a fatty acid. Salts of fatty acids, such as oleic acid, palmitic acid, steric acid, and linoleic acid are preferred. For instance, the soap employed can be the sodium oleate, potassium oleate, sodium palmitate, potassium palmitate, sodium sterate, potassium sterate, sodium linoleate, potassium linoleate, or a mixture of such salts. For example, oleic acid (cis-9-octadecenoic acid) which has been saponified with potassium hydroxide can be use as the emulsifier in the synthesis of the rubber and as the emulsifier for the carnosic acid. Oleic acid should be protected from both air and light since on exposure to air, especially when impure, it oxidizes and acquires a yellow to brown color and rancid odor.

After being recovered and dried the rubber containing carnosic acid can be used in making chewing gum base. The chewing gum will incorporate the rubbery polymer and, optionally, various other water-insoluble elastomeric components that contribute to the elasticity of the chewing gum and the longevity of the chew. The elastomeric component generally constitute about 5 to about 95 weight percent of the gum base, more preferably about 10 to about 70 weight percent of the gum base and most preferably about 15 to about 45 weight percent of the gum base.

In addition to the rubbery elastomer, the gum base will typically include elastomer plasticizers, waxes, softeners/emulsifiers, fillers/texturizers, colorants, a stabilizer, and whiteners. Elastomer plasticizers constitute from about 0 to about 75 percent by weight of the gum base, preferably 5 to 45 per cent by weight and most preferably 10 to 30 per cent by weight. Elastomer plasticizers include natural rosin esters such as glycerol ester of partially hydrogenated rosin, glycerol ester of polymerized rosin, glycerol ester of partially dimerized rosin, glycerol ester of rosin, pentaerythritol ester of partially hydrogenated rosin, methyl and partially hydrogenated methyl esters of rosin, pentaerythritol ester of rosin or mixtures thereof. Elastomer plasticizers also include synthetics materials, such as terpene resins derived from alpha-pinene, beta-pinene and/or d-limonene.

The stabilizer included in the gum base will of course contain carnosic acid. The stabilizer system will also frequently contain carnosol, rosmanol, and rosmaridiphenol since they are frequently present in the carnosic acid source. Other antioxidants such as Vitamin C, Vitamin E, and various mixtures of tocopherols, such as those described in U.S. Pat. No. 5,270,060 can also be included in the stabilizer system.

Waxes include synthetic (e.g. polyethylene and Fischer-Tropsch waxes) and natural (candelilla carnauba, beeswax, rice bran or mixtures thereof) and petroleum (e.g. microcrystalline and paraffin). Waxes, when used, generally constitute up to 30 weight percent of the gum base.

Softeners/emulsifiers include tallow, hydrogenated tallow, hydrogenated and partially hydrogenated vegetable oils, cocoa butter, glycerol monostearate, glycerol triacetate, lecithin, monoglycerides, diglycerides and triglycerides, acetylated glycerides and fatty acids (e.g. stearic, palmitic, oleic, linoleic and linolenic acids) or mixtures thereof. Softeners/emulsifiers generally constitute between 0.5 and 40 weight per cent of the gum base.

Fillers/texturizers include magnesium and calcium carbonate, ground limestone and silicate types such as magnesium and aluminum silicate, clay, alumina, talc as well as titanium oxide, monocalcium phosphite, dicalcium phosphite and tricalcium phosphate, cellulose polymers such as ethyl, methyl and wood or mixtures thereof. Preferably, the filler comprises about 1 to about 65 percent by weight of the gum base

Colorants and whiteners include FD&C-type dyes and lakes, fruit and vegetable extracts, titanium dioxide or mixtures thereof.

The gum base is typically prepared by adding an amount of the elastomer, elastomer plasticizers and filler to a heated sigma blade mixer with a front to rear blade speed ratio of typically 2:1. The initial amounts of ingredients are determined by the working capacity of the mixing kettle in order to attain a proper consistency. After the initial ingredients have massed homogeneously, the balance of the elastomer plasticizer, filler, softeners, etc. are added in a sequential manner until a completely homogeneous molten mass is attained. This can usually be achieved in about one to about four hours, depending on the formulation. The final mass temperature can be between 60° C. and 150° C., more preferably between 80° C. and 120° C. The completed molten mass is emptied from the mixing kettle into coated or lined pans, extruded or cast into any desirable shape and allowed to cool and solidify.

The water-soluble portion of the chewing gum may comprise softeners, sweeteners, flavoring agents and combinations thereof. Softeners are added to the chewing gum in order to optimize the chewability and mouth feel of the gum. Softeners, also known in the art as plasticizers or plasticizing agents, generally constitute between about 0.5 to about 15.0 percent by weight of the chewing gum. Softeners contemplated by the present invention include glycerin, lecithin, and combinations thereof. Further, aqueous sweetener solutions such as those containing sorbitol, hydrogenated starch hydrolysates, corn syrup and combinations thereof may be used as softeners and binding agents in gum.

Bulk sweeteners constitute between 20–80% by weight of the chewing gum and may include both sugar and sugarless sweeteners and components. Sugar sweeteners may include saccharide-containing components including but not limited to sucrose, maltose, dextrin, dried invert sugar, levulose, galactose, corn syrup solids, and the like, alone or in combination. The sugar can also be a monosaccharides of 5 or 6 carbon atoms, such as arabinose, xylose, ribose, glucose, mannose, galactose, fructose, dextrose, or sorbose or mixtures of two or more of the foregoing monosaccharides, disaccharides, for example, sucrose such as cane or beet sugar, lactose, maltose or cellobiose; polysaccharides, such as partially hydrolyzed starch or dextrin.

Sugarless sweeteners include components with sweetening characteristics but are devoid of the commonly known sugars. Sugarless sweeteners include, but are not limited to, sugar alcohols such as sorbitol, mannitol, xylitol, hydrogenated starch hydrolysates, maltitol, and the like, alone or in combination. Some additional examples of artificial sweeteners which may be employed include sodium, calcium or ammonium saccharin salts, free saccharin and, dihydrochalcones, dipotassium glycyrrhizin, glycyrrhizic acid ammonium salt, L-aspartyl-L-phenylalanine methyl ester (aspartame), the sodium or potassium salt of 3,4-dihydro-6-methyl-1,2,3-oxathiazine-4-one-2,2-dioxide (Ace-sulfame-K), as well as *Stevia rebaudiana* (Stevioside), *Richardella dulcifica* (Miracle Berry), *Diascoreophyllum cumminsii* (Serendipity Berry), cyclamate salts, and the like, or mixtures of any two or more of the above.

High intensity sweeteners can also be present. Such high intensity sweeteners may include but are not limited to sucralose, aspartame, salts of acesulfame, alitame, saccharin and its salts, cyclamic acid and its salts, dihydrochalcones, thaumatin, monellin, and the like, alone or in combination.

Combinations of sugar and/or sugarless sweeteners may be used in the chewing gum. The sweetener may also function in the chewing gum in whole or in part as a water soluble bulking agent. Additionally, the softener may also provide additional sweetness, such as with aqueous sugar or alditol solutions.

One or more flavoring agents may be present in the chewing gum in an amount within the range of about 0.1 to about 10.0 percent and preferably from about 0.5 to about 5.0 weight percent of the gum. The flavoring agents may comprise essential oils, natural or synthetic flavors or mixtures thereof including but not limited to oils derived from plants and fruits such as citrus oils, fruit essences, peppermint oil, spearmint oil, other mint oils, clove oil, oil of wintergreen, anise, and the like. Artificial flavoring agents and components are also contemplated. Those skilled in the art will recognize that natural and artificial flavoring agents may be combined in various acceptable fashions. Optional ingredients such as emulsifiers and pharmaceutical agents may also be added to the chewing gum. For instance, from about 0.05 weight percent to about 3 weight percent of a fluoridating ingredient can be added to the chewing gum for the prevention of dental caries. Some representative examples of fluoridating agents that can be used include alkali metal fluorides, ammonium fluoride, stannous fluoride, stannous chlorofluoride, potassium stannous fluoride, alkali metal monofluorophosphates, ammonium monofluorophosphate, and the like.

In general, chewing gum is manufactured by sequentially adding the various chewing gum ingredients to a commercially available mixer known in the art. After the ingredients have been thoroughly mixed, the gum mass is discharged from the mixer and shaped into the desired form such as by rolling into sheets and cutting into sticks, extruding into chunks, or casting into pellets.

Generally, the ingredients are mixed by first softening (e.g. with heat) the gum base and adding it to the running mixer. The gum base can also be softened in the mixer itself. Color or emulsifiers may also be added at this time. A softener, such as glycerin, may also be added at this time along with syrup and a portion of the bulking agent. Further portions of the bulking agent portion may then be added to the mixer. A flavoring agent is typically added with the final portion of the bulking agent.

The entire mixing procedure typically takes from five to fifteen minutes, but longer mixing times may sometimes be required. Those skilled in the art will recognize that variations of the above described procedure, or different procedures, may be followed.

This invention is illustrated by the following example that are merely for the purpose of illustration and are not to be regarded as limiting the scope of the invention or the manner in which it can be practiced. Unless specifically indicated otherwise, parts and percentages are given by weight.

EXAMPLE

In this experiment SBR latex was stabilized by adding 0.3 phr of Guardian GP (from Cultor Food Science) thereto. Guardian GP is a natural extract of rosemary containing carnosic acid having the aroma and flavor characteristics of rosemary. The SBR latex was subsequently coagulated and dried.

The stabilized SBR was then aged at 70° C. in a forced air circulating oven for 28 days. The elastic modulus (G') at 50 rpm and Mooney ML1+4 viscosity at 100° C. of the SBR sample were measured after 3 days, 7 days, 14 days, 21 days,

and 28 days. A control SBR that was stabilized with 0.3 phr of BHA was also evaluated. The results of this evaluation are shown in Table I (Mooney ML1+4 viscosity) and Table II (G').

TABLE I

Mooney ML 1 + 4 Viscosity at 100°

Days of Aging	Carnosic Acid Stabilized	BHA Stabilized
0	55.7	54.7
3	60.2	55.7
7	60.3	50
14	50.4	32.8
21	50.4	30.8
28	55	33.6

TABLE II

G' at 50 rpm

Days of Aging	Carnosic Acid Stabilized	BHA Stabilized
0	81.3	81.9
3	80.3	78.0
7	79.6	68.9
14	77.3	46.7
21	77.3	27.6
28	75.7	25.2

This experiment shows that the carnosic acid in the rosemary extract was highly effective at maintaining original elastic properties after heat aging for 28 days. In fact, the carnosic acid proved to be superior for stabilizing the SBR as compared to BHA.

While certain representative embodiments and details have been shown for the purpose of illustrating the subject invention, it will be apparent to those skilled in this art that various changes and modifications can be made therein without departing from the scope of the subject invention.

What is claimed is:

1. A chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) a sufficient amount of carnosic acid to stabilize the gum base, wherein said chewing gum base is void of sweeteners and a water-soluble portion.

2. A chewing gum base as specified in claim 1 wherein the carnosic acid is present at a level which is within the range of about 0.0001 phr to about 1 phr.

3. A chewing gum base as specified in claim 2 wherein the rubbery elastomer is styrene-butadiene rubber.

4. A gum base as specified in claim 3 wherein said gum base contains from about 10 weight percent to about 70 weight percent of the styrene-butadiene rubber.

5. A gum base as specified in claim 4 wherein the carnosic acid is present at a level which is within the range of about 0.0005 phr to about 0.1 phr.

6. A gum base as specified in claim 5 wherein said gum base further includes an additional antioxidant selected from the group consisting of carnosol, rosmanol and rosmaridiphenol.

7. A gum base as specified in claim 5 wherein said gum base contains from about 15 weight percent to about 45 weight percent of the styrene-butadiene rubber.

8. A gum base as specified in claim 4 wherein the carnosic acid is present at a level which is within the range of about 0.001 phr to about 0.05 phr.

9. A gum base as specified in claim 4 wherein the carnosic acid is present at a level which is within the range of about 0.01 phr to about 0.03 phr.

10. A gum base as specified in claim 3 wherein said gum base contains from about 5 to about 45 weight percent of the elastomer plasticizer.

11. A gum base as specified in claim 10 wherein the elastomer plasticizer is a natural rosin ester.

12. A gum base as specified in claim 10 wherein the elastomer plasticizer is a synthetic terpene resin.

13. A gum base as specified in claim 3 wherein said gum base contains from about 10 to about 30 weight percent of the elastomer plasticizer.

14. A gum base as specified in claim 3 wherein said gum base further includes up to 30 weight percent of a wax selected from the group consisting of natural waxes, synthetic waxes, petroleum waxes, and mixtures thereof.

15. A gum base as specified in claim 3 further comprising between 0.5 and 40 weight percent of a softener selected from the group consisting of tallow, hydrogenated tallow, hydrogenated and partially hydrogenated vegetable oils, cocoa butter, glycerol monostearate, glycerol triacetate, lecithin, monoglycerides, diglycerides, triglycerides, fatty acids, and mixtures thereof.

16. A gum base as specified in claim 3 wherein the filler material is selected from the group consisting of magnesium carbonate, calcium carbonate, ground limestone, magnesium silicate, aluminum silicate, clay, alumina, talc, titanium oxide, monocalcium phosphate, dicalcium phosphate, tricalcium phosphate, cellulose polymers, wood and mixtures thereof.

17. A gum base as specified in claim 1 wherein said gum base is void of humectants.

18. A gum base as specified in claim 17 wherein said gum base is void of flavoring agents.

19. A chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) a sufficient amount of carnosic acid to stabilize the gum base, wherein said chewing gum base is void of flavoring agents and a water-soluble portion.

20. A chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) a sufficient amount of carnosic acid to stabilize the gum base, wherein said chewing gum base is void of colorants and a water-soluble portion.

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United States Patent [19]

Elias

[11] **Patent Number: 4,588,592**

[45] **Date of Patent: May 13, 1986**

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[54] **CHEWING GUM PRODUCT AND COMPOSITION AND PROCESS FOR THE PREPARATION THEREOF**

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[21] Appl. No.: **631,924**

[22] Filed: **Jul. 18, 1984**

[51] Int. Cl.[4] **A23G 3/30**

[52] U.S. Cl. **426/5**

[58] Field of Search **426/3–6, 426/96**

[56] **References Cited**

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[57] **ABSTRACT**

A shaped chewing gum product made from a composition in the form of a semifluid conglomerate consisting essentially of an intimate mixture of substantially dry granulated sugar, the predominant particle size of which is between about 210 microns and about 850 microns, and substantially dry chewing gum base, with coloring and flavoring additives incorporated therein. The chewing gum product may contain different coloring and/or flavoring additives which are distinctly, visually and/or gustatively discernable in the product.

37 Claims, No Drawings

CHEWING GUM PRODUCT AND COMPOSITION AND PROCESS FOR THE PREPARATION THEREOF

BACKGROUND OF THE INVENTION

The present invention relates to a novel chewing gum product and to a composition and process for making the same. More specifically, the present invention relates to the preparation of a novel chewing gum product having desirable chewing quality from a substantially dry, semifluid batch material which may be readily formed into any desired shape. The batch material may include a plurality of different coloring and/or flavoring additives, with the additives being distinctly discernable in the finished product.

In U.S. Pat. No. 3,262,784, which is commonly assigned with the present application, there is described a chewing gum product composed of dry, finely divided sugar and essentially water-free chewing gum base, with conventional chewing gum flavoring and coloring additives incorporated therein. In preparing this patented product, dry powdered sugar (preferably of a particle size such that at least about 95% passes through an 80 mesh screen) is mixed with essentially moisture-free chewing gum base until the powdered sugar is completely dispersed in the chewing gum base. The resulting product is a dry, non-tacky, friable, free-flowing material which is formed into a desired shape under relatively high compressive force, in a conventional tableting machine. The compressed, finished chewing gum product is disclosed as having excellent chewing qualities, and possessing other desirable properties, including resistance to moisture and oxidative-deterioration and enhanced flavor characteristics, as compared to conventional chewing gum products.

The substantial elimination of water from the gum product of U.S. Pat. No. 3,262,784, as briefly described above, represents a significant departure from the approach generally employed in making chewing gum products. Chewing gums, including adult chewing gum and bubble gum, are typically prepared by mixing heated chewing gum base, an aqueous sugar syrup (principally corn syrup or glucose), dry sugar (sucrose or dextrose) and a flavoring additive. The aqueous syrup has generally been regarded by those skilled in the art as a necessary component insofar as conventional commercial manufacture is concerned. The batch material discharged from the mixing vessel is a tough, taffy- or dough-like mass containing from 3 to 5 percent, by weight, of moisture, and is formed into the finished product by extrusion or rolling, and scoring or cutting. Moreover, conventional chewing gum products are sensitive to atmospheric moisture, requiring wrapping of each individual piece in a moisture-resistant wrapper, or providing the pieces with a moisture-resistant coating. Conventional chewing gum products also possess poor resistance to oxidative-deterioration.

SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention, there is provided a composition, in the form of a semifluid conglomerate consisting essentially of an intimate mixture of substantially dry granulated sugar, and substantially dry chewing gum base. The predominant particle size of the granulated sugar used in the practice of this invention is between about 210 microns and about 850 microns. A minor amount, i.e. generally less than ten percent, of particles whose size is less than than 210 microns or greater than 850 microns, may be tolerated. This composition is employed as the batch material in making the novel chewing gum product of this invention. The particle size of the sugar component of the composition of this invention is significantly larger than the powdered sugar used in making the chewing product of the above-mentioned U.S. Pat. No. 3,262,784 the latter having an average particle size of about 75 microns. The use of relatively larger size sugar particles gives rise to certain desirable characteristics in the composition of this invention, not possessed by the patented composition. For example, the composition of the present invention is a semifluid, relatively cohesive conglomerate having a consistency similar to wet, shaved coconut, which enables the production of gum products in a variety of shapes and sizes by various forming operations commonly employed in the manufacture of chewing gum and confectionary products. By contrast, the non-tacky, friable, free-flowing composition of the above-mentioned patent requires a compression forming operation employing, for example, a tableting machine, as previously noted, generally operated at a pressure of about five to ten tons. Thus, the size and shape of the final product produced according to U.S. Pat. No. 3,262,784 is relatively limited, unless special presses are utilized.

According to another aspect of the present invention, there is provided novel shaped chewing gum products made from the above-described composition. The chewing gum product of the present invention may have incorporated therein different coloring and/or flavoring additives, which are distinctly discernable in the finished product. The batch material employed in the above-mentioned patent is not adaptable to the production of such multi-colored and multi-flavored products. This is because the smaller particle size of the powdered sugar component employed therein permits different coloring or flavoring additives to merge together upon blending, thus preventing the discernment of distinct colors and flavors in the finished product.

The chewing gum product of the present invention also has longer lasting flavor as compared with the product of U.S. Pat. No. 3,262,784. This flavor enhancement is due to the slow solubility rate of the relatively large particle size of the sugar component used in the product of this invention.

Another desirable property of the product of the present invention is its relatively low density, generally between 0.5 and 1.0 g./cc., which imparts thereto a unique, spongy chewing quality not possessed by chewing gum products commercially available heretofore.

The chewing gum product described herein also shares certain desirable properties in common with the product of U.S. Pat. No. 3,262,784, in that it is resistant to deterioration due to moisture loss and oxidation, as compared to conventional chewing gum.

According to a further aspect of the present invention, there is provided a process for making a shaped chewing gum product by mixing substantially dry molten chewing gum base with substantially dry granulated sugar, within the above-noted particle size range, to provide a batch material in the form of a semifluid or flowable conglomerate of sugar particles coated with chewing gum base, and subjecting the batch material to a forming operation in a mold to produce a shaped product of desired configuration and size.

The process of the present invention is decidedly more efficient than that disclosed in the above-mentioned patent. In the latter process, powdered sugar must be added in increments to the chewing gum base, and care must taken not to add to great an amount of sugar at any one time. In addition, it is disclosed in the above-mentioned patent that attempts to add chewing gum base to the sugar were unsuccessful. No such restrictions are applicable to the process of the present invention. The granulated sugar and chewing gum base may be mixed en masse, with chewing gum base being added to the granulated sugar. Indeed, addition of the chewing gum base to the sugar is the preferred manner for carrying out the present process, in order to prevent sticking of the gum base to the walls of the mixer.

In a modification of the process just described, which is also within the scope of the present invention, a plurality of separate batch materials may be prepared, each having a different coloring additive incorporated therein, and combined to form a master batch material which is molded into a final product. The various coloring additives are distinctly visually discernable in the finished product, imparting a multi-colored appearance thereto. This modified process may also be used with different flavoring additives to produce a final product in which the various flavoring additives are distinctly gustatively discernable imparting a multi-flavored taste thereto. Various combinations of different coloring and flavoring additives may be used, if desired.

Other details, objects and advantages of the present invention will become apparent from the following detailed description thereof.

DETAILED DESCRIPTION OF THE INVENTION

The two principal components of the chewing gum product of the present invention are chewing gum base and granulated sugar. The chewing gum base employed is essentially free of water, i.e. it contains no more than about 1% by weight of water. Any gum base normally used in making chewing gum, including adult chewing gum and bubble gum, may be used in practicing this invention. As is well known, chewing gum base is composed of natural and/or synthetic gums or elastomers, plasticizers and film-forming extenders. Examples of natural gums or elastomers are natural rubber, chicle, lechi caspi and jelutong, and typical synthetic elastomers are polyisobutylene, isobutylene-isoprene copolymer, and butadiene-styrene copolymer. Suitable plasticizers include oleaginous or fatty materials, such as cocoa butter and hydrogenated vegetable oils. Film-forming extenders are usually synthetic resins, examples of which are polyvinyl acetate and ester gums, including esters of rosin and hydrogenated esters of rosin, such as the glycerol esters of hydrogenated rosin, and the like. In addition, in compounding chewing gum base, small amounts of an emulsifier, such as glycerol monostearate; and an antioxidant, such as butylated hydroxyanisole and butylated hydroxytoluene, may be used. The principal difference between bubble gum base and adult chewing gum base is in the elastomer content of each, the former generally averaging about 8 to 14% of elastomer and the latter generally averaging about 3 to 8% of elastomer, the balance in both cases being made up essentially of film-forming extender resin and plasticizer. A suitable bubble gum base for use in the present invention comprises, by weight, 10.0 percent butadiene-styrene copolymer, 42.0 percent glycerol ester of hydrogenated rosin, 20.9 percent calcium carbonate, 6.25 percent paraffin wax, 9.5 percent cocoa butter, 10.3 percent hydrogenated vegetable oil and 1.05 percent glycerol monostearate. A representative adult chewing gum base comprises 16.0 percent chicle, 10.0 percent lechi caspi, 1.9 percent butadiene-styrene copolymer, 1.6 percent natural rubber, 24.8 percent glycerol ester of hydrogenated rosin, 21.2 percent calcium carbonate, 14.1 percent paraffin wax, 0.5 percent cocoa butter, 1.3 percent hydrogenated vegetable oil, 1.0 percent glycerol monostearate, 2.6 percent starch and 5.0 percent microcrystalline wax. Of course, other gum base formulations may also be used. However, the preferred gum base for use in the present invention is bubble gum.

Unlike the manufacture of conventional chewing gum, which requires the use of an aqueous sugar syrup, typically corn syrup or glucose, as a substantial part of the sweetner component, the present invention employs only dry, granulated sugar, i.e. sugar containing no more than one percent, by weight, of water. The term "granulated sugar" is used herein to refer to any sugar the predominant particle size of which is between about 210 microns and about 850 microns. Sugars which may be used in the practice of the present invention include sucrose, dextrose, (anhydrous or the monohydrate), mannitol or sorbitol, or a combination thereof, in dry granular form, having the the aforementioned particle size. Any water of crystallization associated with the sugar, as in dextrose monohydrate, will not interfere with obtaining a batch material having the properties described above. Other dry, granular sugars may be used, such as spray-dried glucose, lactose and fructose, or a combination thereof. Because of the greater expense of fructose, it is preferred that, when used, it constitute only a minor proportion of the sugar content, advantageously less than about 15% of the final product.

Coloring and flavoring additives may be incorporated in the product if desired, as is common in chewing gum manufacture. The color, when used, will be a certified vegetable or synthetic dye. The coloring agent may be added as a powder or as a liquid concentrate. Any water associated with the color is negligible as far as the overall chewing gum composition is concerned. Typical flavors include peppermint, fruit extracts, and the like. The flavoring agent may be added in the form of a powder or liquid (oil). Such additives may be preliminarily incorporated in the chewing gum base or subsequently added thereto during mixing with the sugar. In addition, small amounts of other additives may be incorporated in the product, as by introduction initially in the chewing gum base, by mixing in with the sugar or by mixing into the final batch material. Such additives may include, for example, waxes, such as microcrystalline wax and paraffin wax; solid fats; calcium carbonate, and the like, which serve to control chewing and other properties of the product.

The proportions of the principal ingredients, i.e. granulated sugar and chewing gum base, may vary over relatively broad ranges. In general, the product may contain, by weight, from about 70 to about 95 percent sugar and from about 5 to about 30 percent chewing gum base. Preferably, the product contains, by weight, from about 80 to about 90 percent sugar and from about 10 to about 20 percent gum base. Any flavoring additive is added to taste in accordance with recognized practice. The same applies to the coloring additive. The

amount of coloring and/or flavoring additives incorporated in the finished product is relatively small, generally comprising, by weight, from about 0.4 to about 2.0 percent thereof. The other amounts of the possible additives referred to above are essentially incidental as far as the final product is concerned. Thus, the product may be considered as consisting essentially of the chewing gum base and granulated sugar. The specific proportions of components selected may depend upon various factors which will occur to those skilled in the art, especially the nature of the particular chewing gum base and the nature of the granulated sugar employed.

The batch material employed in the present invention is conveniently prepared using conventional chewing gum mixing apparatus. A sigma blade mixer equipped with a steam-heated jacket is suitable for this purpose. An appropriate amount of granular sugar is placed in the mixer and heated to a temperature between about 125° F. to about 200° F., and preferably between about 180° F. and about 190° F. Molten chewing gum base, along with any coloring or flavoring additive is then introduced into the mixer. The chewing gum base is rendered molten by heating to a temperature of about 130° F. to about 250° F. As previously noted, the sugar goes into the mixer before the chewing gum base, in order to prevent sticking of the gum base to the walls of the mixer.

During mixing, the components of the batch material are subject to a combined pulling, kneading and rubbing action by virtue of the revolving sigma blades, so that the sugar particles are pushed into the chewing gum base and the mass is continuously being broken into pieces and the pieces recombined and pressed together. Mixing is continued for a time sufficient for the formation of the previously described semifluid conglomerate, made up of sugar particles coated with the chewing gum base. A suitable mixing time for a batch material weighing approximately one hundred pounds and having a sugar content of approximately eighty-five percent is on the order of five minutes. Appropriate mixing times for larger or smaller batches, or batches of different sugar content may readily be determined by trial.

The batch material is discharged from the mixer while it is still hot, its temperature generally being in the neighborhood of about 190° F. to about 200° F. Of course, the temperature may vary depending on the initial temperature of the sugar and gum base.

The batch material may undergo various forming operations to produce the final product. Generally, forming operations involving the application of light pressure are preferred to ensure the production of a relatively low density products. Such operations include forming a molded product in a mold or framed plate, forming a sheeted product on a conveyor belt, or forming a particulate product of various particle sizes by applying the batch material and comminuting it while cold.

The molding operation is conveniently carried out using conventional confectionary molds. The batch material is transferred while hot to the molds and allowed to cool to form the finished chewing gum product. Charging of the molds with the batch material may be done manually, or it may be automated, using equipment well known to those skilled in the art.

Alternatively, the batch material may be applied while hot to a conveyor belt, forming a sheet, which is then scored vertically and horizontally, as in the manufacture of stick chewing gum. The batch material is conveniently formed into continuous sheets sixteen inches wide by and about one and one half inch thick. The dimensions of the scored portions of the sheet may vary, depending, or, upon the criteria of the product and/or the suitability of the conventional packaging equipment.

Because the batch material is subjected only to relatively light pressure in the aforesaid forming operations, the resultant product has a density considerably lower than that of conventional chewing gum, and lower than the density of the chewing gum product of the above-mentioned U.S. Pat. No. 3,262,784, as well. In general, the density of the finished product is between 0.5 and 1.0 g./cc., and typically toward the middle of that range, giving the product its desirable spongy chewing quality.

The batch material may also be converted to a particulate product. This may be accomplished by cooling the batch material, e.g. to a temperature of about 20°-40° F., and comminuting the batch material into particles of various sizes. Suitable comminuting apparatus for this purpose are well know to those skilled in the art. The particles may be graded to a desired particle size, and packaged as such.

The following examples further describes the manner and process of making the present invention and set forth the best mode contemplated for carrying out the invention, but are not be construed as limiting the invention.

EXAMPLE I

127.5 pounds of granular sucrose having an average particle size of approximately 375 microns (less than 5% passed through a 100 mesh (U.S.) screen) was placed in a Baker Perkins sigma blade mixer equipped with a steam-heated jacket. The sugar was heated to a temperature of approximately 200° F. and the steam was turned off. In a separate vessel bubble gum base was melted at a temperature of approximately 200° F. An aliquot of 20.8 pounds of the gum base was added to the mixer containing the sugar. At the same time 1.5 pounds of N & A (natural and artificial) liquid tutti-fruitti flavor and approximately 0.22 pounds of FD&C yellow #5 lake was added. Mixing was carried out until a semiliquid conglomerate of the sugar particles coated with the gum base was obtained, which required approximately five minutes. The resultant batch material was removed from the mixer while still hot and charged manually into confectionery molds. After the molded product cooled to room temperature, the individual pieces were removed from the molds ready for packaging.

EXAMPLE II

The procedure of Example I was repeated except that the bubble gum base was replaced by an adult stick gum base, and the batch size was scaled down to 2000 grams.

The resulting batch material yielded a final product having the characteristics described hereinabove.

EXAMPLE III

A first batch material was prepared in the manner described in Example I. with the exception of a scaled down batch size of 2000 grams.

A second batch material was prepared as described in Example I, except that FD&C Red #40 lake was substituted for the FD&C Yellow #5 lake, and the batch size was 2000 grams.

The two batch materials were mixed together until a uniform master batch was obtained.

The master batch was formed into a final product as described in Example I. The red and yellow coloring additives were distinctly visually discernable in the final product.

EXAMPLE IV

A first batch material was made according to the procedure of Example I except the batch size was 2000 grams.

A second batch material was prepared as described in Example I, except that the tutti frutti flavor was replaced by cherry flavor except the batch size was 2000 grams.

The two batch materials were blended until a uniform master batch was obtained.

The master batch was formed into a final product as described in Example I. The cherry and tutti frutti flavoring additives were distinctly gustatively discernable in the final product.

While the invention has been described in the terms of a presently preferred embodiment, many other embodiments will be readily apparent to those skilled in the art. The invention is therefore not limited to the embodiment described but is capable of variations and modifications without departing from the spirit and scope of the appended claims.

What is claimed is:

1. A chewing gum composition in the form of a flowable conglomerate consisting essentially of, by weight, from about 70 to about 95 percent of substantially dry granulated sugar, the predominant particle size of which is between about 210 and about 850 microns, intimately mixed with from about 5 to about 30 percent of substantially dry chewing gum base.

2. A composition according to claim 1, wherein said sugar is selected from the group of sucrose, dextrose, sorbitol, mannitol or a combination thereof.

3. A composition according to claim 1, wherein the gum base is selected from the group of bubble gum or adult chewing gum.

4. A composition of matter according to claim 1, which additionally contains at least one additive selected from the group of a coloring additive or a flavoring additive.

5. A composition according to claim 4, in the form of a shaped chewing gum product.

6. A product according to claim 5, which includes a plurality of different coloring additives, said coloring additives being distinctly visually discernable in said product.

7. A product according to claim 5, which includes a plurality of different flavoring additives, said flavoring additives being distinctly gustatively discernable in said product.

8. A composition according to claim 1, wherein the sugar is sucrose and the chewing gum base is bubble gum.

9. A composition according to claim 8, which additionally contains at least one additive selected from the group of a coloring additive or a flavoring additive.

10. A composition according to claim 9, in the form of a shaped chewing gum product.

11. A product according to claim 10, which includes a plurality of different coloring additives, said coloring additives being distinctly visually discernable in said product.

12. A product according to claim 10, which includes a plurality of different flavoring additives, said flavoring additives being distinctly gustatively discernable in said product.

13. A composition of matter in the form of a flowable conglomerate consisting essentially of an intimate blend of substantially dry granulated sugar, selected from the group consisting of sucrose, dextrose, sorbitol, mannitol or a combination thereof, the predominant particle size of said sugar being between about 210 microns and about 850 microns, substantially dry chewing gum base selected from the group of bubble gum or adult chewing gum, and at least one additive selected from the group of a coloring additive or a flavoring additive, said composition containing, by weight, from about 80 to about 90 percent of said sugar, from about 10 to about 20 percent of said chewing gum base and from about 0.4 to about 2.0 percent of said additive.

14. A composition according to claim 13, wherein the sugar is sucrose and the chewing gum base is bubble gum.

15. A process for making a shaped chewing gum product, said process comprising:

(a) preparing a batch material by mixing substantially dry, molten chewing gum base with substantially dry granulated sugar for a time sufficient for the formation of a flowable conglomerate of said sugar particles coated with said chewing gum base; the predominant particle size of said sugar being between about 210 microns and about 850 microns, and said sugar being heated to a temperature between about 125° F. and about 200° F.; and

(b) forming said batch material into a shaped chewing gum product.

16. A process according to claim 15, wherein said chewing gum base is rendered molten by heating to a temperature of about 130° F. to about 250° F.

17. A process according to claim 15, wherein said batch material contains, by weight, from about 70 to about 95 percent sugar and from about 5 to about 30 percent chewing gum base.

18. A process according to claim 15, wherein the sugar is selected from the group of sucrose, dextrose, sorbitol, mannitol or a combination thereof, and the chewing gum base is selected from the group of bubble gum and adult chewing gum.

19. A process according to claim 15, wherein the sugar is sucrose and the chewing gum base is bubble gum.

20. A process according to claim 15, wherein said batch material contains at least one additive selected from the group of a coloring additive or a flavoring additive.

21. A process according to claim 15, wherein the forming step involves molding said batch material into a molded chewing gum product.

22. A process according to claim 15, wherein the forming step involves sheeting said batch material and horizontally and/or vertically scoring the resultant sheet.

23. A process according to claim 15, wherein the forming step involves cooling said batch material and comminuting said cooled batch material into discrete particles.

24. A process for making a shaped chewing gum product, said process comprising:

(a) heating substantially dry granulated sugar to a temperature between about 125° F. to about 200°

F.; said sugar being selected from the group of sucrose, dextrose, sorbitol, mannitol or a combination thereof, the predominant particle size of said sugar being between about 210 microns and about 850 microns;

(b) adding to said heated sugar substantially dry molten chewing gum base, selected from the group of bubble gum or adult chewing gum, and at least one additive selected from the group of a coloring additive, or a flavoring additive;

(c) mixing said sugar said chewing gum base and said additive for a time sufficient for the formation of a flowable conglomerate of said sugar particles coated with said chewing gum base, said additive being uniformly distributed throughout said conglomerate, the resulting mixture comprising, by weight, from about 80 to about 90 percent said sugar from about 10 to about 20 percent of said chewing gum base and from about 0.5 to about 2.0 percent of said additive; and

(d) forming said mixture into a shaped chewing gum product.

25. A product made according to the process of claim 24.

26. A process according to claim 25, wherein the sugar is sucrose and the chewing gum base is bubble gum.

27. A product made according to the process of claim 26.

28. A process for preparing a shaped, multi-colored chewing gum product, said process comprising:

(a) preparing a first batch material by mixing substantially dry, molten chewing gum base with substantially dry granulated sugar and a first coloring additive, for a time sufficient for the formation of a flowable conglomerate of said sugar particles coated with said chewing gum base, said first coloring additive being uniformly distributed throughout said conglomerate;

(b) preparing a second batch material by mixing substantially dry, molten chewing gum base with substantially dry granulated sugar and a second coloring additive, for a time sufficient for the formation of a flowable conglomerate of said sugar particles coated with said chewing gum base, said second coloring additive being uniformly distributed throughout said conglomerate;

(c) combining said first batch material and said second batch material into a master batch material; and

(d) forming said master batch material into a shaped chewing gum product characterized in that the first and second coloring additives are distinctly visually discernable in said product, thereby imparting a multi-colored appearance to said product.

29. A process according to claim 25, wherein at least one flavoring additive is incorporated in the master batch material.

30. A product made according to the process of claim 29.

31. A process according to claim 29, wherein the sugar is sucrose and the chewing gum base is bubble gum.

32. A product made according to the process of claim 31.

33. A process for preparing a shaped, multi-flavored chewing gum product, said process comprising:

(a) preparing a first batch material by mixing substantially dry, molten chewing gum base with substantially dry granulated sugar and a first flavoring additive, for a time sufficient for the formation of a flowable conglomerate of said sugar particles coated with said chewing gum base, said first flavoring additive being uniformly distributed throughout said conglomerate;

(b) preparing a second batch material by mixing substantially dry, molten chewing gum base with substantially dry granulated sugar and a second flavoring additive, for a time sufficient for the formation of a flowable conglomerate of said sugar particles coated with said chewing gum base, said second flavoring additive being uniformly distributed throughout said conglomerate;

(c) combining said first batch material and said second batch material into a master batch material; and

(d) forming said master batch material into a shaped chewing gum product characterized in that the first and second flavoring additives are distinctly gustatively discernable in said product, thereby imparting a multi-flavored taste to said product.

34. A process according to claim 33, wherein at least one flavoring additive is incorporated in the master batch material.

35. A product made according to the process of claim 33.

36. A process according to claim 33, wherein the sugar is sucrose and the chewing gum base is bubble gum.

37. A product made according to the process of claim 36.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 4,588,592

DATED : May 13, 1986

INVENTOR(S) : Ronald J. Elias

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

Claim 26, column 9, line 26, "25" should be --24--.

Claim 36, column 10, line 47, "whwerein" should be --wherein--.

Signed and Sealed this

Eleventh Day of November, 1986

Attest:

DONALD J. QUIGG

Attesting Officer *Commissioner of Patents and Trademarks*

United States Patent [19]

DeTora et al.

[11] **Patent Number: 4,459,311**

[45] **Date of Patent: Jul. 10, 1984**

73

[54] **PROCESS FOR PREPARING GUM BASE**

[75] Inventors: **Sigismondo DeTora, Pearl River; Ronald P. D'Amelia, Hicksville, both of N.Y.**

[73] Assignee: **Nabisco Brands, Inc., Parsippany, N.J.**

[21] Appl. No.: **455,152**

[22] Filed: **Jan. 3, 1983**

[51] **Int. Cl.**³ **A23G 3/30**
[52] **U.S. Cl.** **426/3**
[58] **Field of Search** **426/3-6**

[56] **References Cited**

U.S. PATENT DOCUMENTS

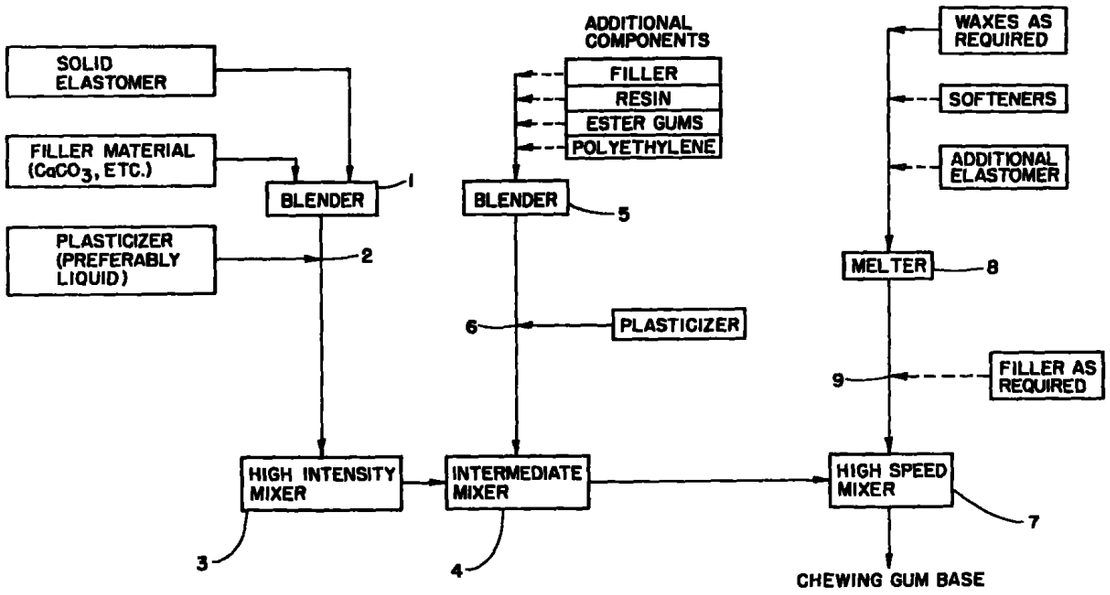
3,984,574	10/1976	Consollo	426/4
3,995,064	11/1976	Ehrgott et al.	426/3
4,187,320	2/1980	Koch et al.	426/3
4,329,369	5/1982	Tezuka et al.	426/3
4,352,822	10/1982	Cherukuri et al.	426/3

Primary Examiner—Jeanette M. Hunter
Attorney, Agent, or Firm—R. Kornutik

[57] **ABSTRACT**

An improved process for producing gum base having a hard elastomer component by plasticizing the hard elastomer in the presence of a filler material prior to subjecting the hard elastomer to intensive mixing.

16 Claims, 1 Drawing Figure


SOLID ELASTOMER
FILLER MATERIAL ($CaCO_3$, ETC.)
PLASTICIZER (PREFERABLY LIQUID)
BLENDER
1
2
ADDITIONAL COMPONENTS
FILLER
RESIN
ESTER GUMS
POLYETHYLENE
BLENDER
5
6
PLASTICIZER
WAXES AS REQUIRED
SOFTENERS
ADDITIONAL ELASTOMER
MELTER
8
9
FILLER AS REQUIRED
HIGH INTENSITY MIXER
INTERMEDIATE MIXER
HIGH SPEED MIXER
3
4
7
CHEWING GUM BASE

PROCESS FOR PREPARING GUM BASE

BACKGROUND OF THE INVENTION

The present invention relates to the art of producing chewing gum base and, in particular, to an improved method by which gum base may be made more efficiently at reduced energy consumption.

Chewing gums, as they are known today include a water-soluble portion which dissipates over a period of time upon chewing, and a base portion which is insoluble and inert and, thus, remains in the oral cavity throughout mastication. Flavor and sweetness are generally attributable to the water-soluble portion, while organoleptic characteristics such as texture, resiliency, film-forming capabilities, adhesivity, softness, etc. are usually attributable to the base portion. To attain desired properties in a gum product, the base is prepared with components selected for their particular organoleptic properties, their processability and for their compatibility.

As the search for new types of gum products for commercialization continues, various different base components have been sought to achieve novel attributes in the ultimate gum product. Consequently, increased demands have been placed on gum base processing in order to incorporate the newly-discovered components. Relative to very hard components, i.e., those which are resistant to local deformation whether by penetration or shear, it has been necessary to use relatively high energy methods to break down the material before mixing with other base components. Examples of such material include hard elastomer materials especially the synthetic elastomers such as polyisobutylene, styrene-butadiene copolymer, and isobutylene-isoprene copolymer. Other components which are only difficultly mixed with gum base components include but are not limited to resins such as high and low molecular weight polyvinyl acetate which produces excellent film forming properties in the resultant base and ultimate gum composition.

For example, U.S. Pat. No. 4,187,320 to Koch, et al. discloses a two-stage process for preparing chewing gum base utilizing a solid elastomer, such as butadiene-styrene copolymer, polyisobutylene and isobutylene-isoprene copolymer, wherein the solid elastomer is initially subjected to high intensity mixing under high shear conditions to obtain a substantially uniform, lump-free mass followed by the step-wise addition of an elastomer solvent to the mixer containing the masticated solid and thence the step-wise addition of an oleaginous plasticizer. High intensity mixing is conducted during the step-wise addition of both the elastomer solvent and the oleaginous plasticizer and is continued until a substantially molten, uniform mass is obtained. The second stage in the process is the step-wise addition of the remaining chewing gum base ingredients such as a hydrophobic plasticizer, a non-toxic vinyl polymer, as well as additional oleaginous plasticizer and an emulsifier. Additional optional ingredients including fillers may be added either during stage one or stage two, although, preferably, the filler is added during stage two, typically as the first stage two ingredient.

Further in this regard, U.S. Pat. No. 3,995,064 to Ehrgott, et al., describes a process for preparing a chewing gum base on a batchwise or a continuous basis which includes mixing chewing gum elastomer and solvent under high shear conditions to form a first dry solids mixture; mixing the first dry solids mixture with hydrophobic plasticizer and hydrophilic plasticizer under reduced shear conditions and increased folding action to form a second mixture; then mixing the second mixture with oleaginous plasticizer and emulsifier under rapid folding action and substantially no shear to form chewing gum base. Similarly, U.S. Pat. No. 4,329,369 to Tezuka, et al., is listed as of interest in that it shows a "one-step" method of preparing a chewing gum composition by inclusion of all necessary gum components in an intensive mixing apparatus and kneading until thoroughly mixed.

Processes such as those set forth above require, as previously explained, a high energy consuming method of preparing for/and mixing the base components. Adherence to predominantly mechanical mastication methods may well be attributable to a belief that opening up a macromolecular structure, such as that of an elastomer or resin, in any other fashion would contribute to the degradation of the very property for which it is used.

Furthermore, whether by batch method or continuous process, time is required to break the components open and for mixing them until a single relatively homogeneous gum base is attained. By the present invention, however, these problems as well as others encountered in the preparation of gum base have been to a great extent overcome.

SUMMARY OF THE INVENTION

This invention is a process for producing gum base containing a difficultly-mixed macromolecular component such as a hard elastomer by first admixing such component, preferably in particulate form, with a filler component and then subjecting the admixture to a plasticizer before introducing it to further processing such as high shear mixing, and adding further gum base components. Preferably the plasticizer is in liquid form, while the filler material can be any mineral adjuvant normally found in gum base, such as calcium carbonate ($CaCO_3$), etc.

The ratio of plasticizer to hard elastomer component, is from about 0.1:1.0 to about 3.0:1.0, but is preferably from about 0.25:1.0 to about 2.00:1.0, and most preferably is about 0.5:1.0 to about 1.0:1.0, while the ratio of filler material to hard elastomer component is from about 15.0:1.0 to about 1.0:1.0, and is preferably from about 8.0:1.0 to about 2.0:1.0, and most preferably about 3.0:1.0.

Advantageously, hard polyisobutylene elastomer can be mixed in this manner using calcium carbonate and a microcrystalline wax prior to introducing additional gum base components and undergoing further appropriate processing steps with reduced torque needed in the intensive mixing steps and a higher throughput of processed gum base. As a result, the energy requirement is reduced, resulting in the capability of increasing the throughput. Thus, the entire process is rendered more efficient than any other gum base process known to date. In fact, by use of the present invention gum base throughput can be intensively mixed at no more than about 0.32 amps per pound of product, and in most cases at less than about 0.16 amps per pound of throughput.

Moreover, since the present invention can be used with both batch and continuous processes, gum base processing systems which are in place can easily be

adapted to include, the energy-saving features disclosed herein.

For a better understanding of the present invention, together with other and further objects, reference is made to the following description, taken in conjunction with the accompanying drawing, and its scope will be pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWING

The drawing is a schematic flow sheet showing the process of the invention. The dotted lines indicate optional additions.

DETAILED DESCRIPTION OF THE INVENTION

A typical chewing gum base is formulated from natural gums or elastomers, examples of which include natural rubber, chicle, balata, sorva, guttapercha, lechi, caspi and jelutong, and/or synthetic gums or elastomers such as polyisobutylene, isobutylene-isoprene copolymer and butadiene-styrene copolymer. Among these, the synthetic elastomers, butadiene-styrene copolymer, polyisobutylene, isobutylene-isoprene copolymer or mixtures thereof are preferred.

The elastomer of choice, preferably in particulate form, is mixed with a filler, which is usually an inorganic material such as $CaCO_3$, $MgCO_3$, Al_2O_3, talc and the like, by blending the elastomer and filler material in blender 1. This admixture is then subjected to a suitable plasticizer which is preferably added in the form of a liquid prior to introducing the mixture into a high intensity mixing apparatus, e.g., at point 2 of the accompanying drawing.

It has been found that oleaginous plasticizers are particularly effective for use in this inventive process to prepare elastomers for further mixing and processing. The oleaginous plasticizers include waxes such as petroleum waxes, like paraffin waxes, as well as polyethylene waxes and oleaginous materials such as cocoa butter, and hydrogenated vegetable oils. Experience to date has indicated that microcrystalline waxes, such as those sold under the Trade Names Mobilwax and Bareco wax, are particularly effective in the present invention. Other plasticizers include fatty acid esters such as n-butyl stearate, butyl sebacate, butyl benzyl sebacate, butyl oleate, oleic acid, mono-, di-, or tri-glyceryl esters of the saturated or unsaturated fatty acids of oleic acid, caprylic acid, butyric acid, capric acid, caproic acid, lauric acid, mineral oil, liquid petroleum hydrocarbons, squalane, squalene, castor oil and other ricinoleate derivatives, diethylene or propylene glycols and derivatives, tributyl acetyl citrate, tributyl citrate, lecithin, coconut oil, glyceryl tributyrate, Zn laurate, Ca stearate, propylene glycol monostearate, propylene glycol monolaurate, fatty acids, diacetyl tartaric acid esters of mono- and diglycerides of edible fat oils or edible fat forming acids, petrolatum, stearyl monoglycerides citrate, limonene, polylimonene, natural waxes, butyl lactate.

Prior to the present discovery, practice dictated that a liquid elastomer plasticizer which effectively dissociates elastomer intra- and intermolecular bonding by "opening up" the elastomer for further processing in an intensive mixer/grinder would be considered unuseable because the broken down elastomer would result in a throughput much too "thin" for processing in an intensive mixing apparatus. The present invention overcomes this problem, by inclusion of an amount of filler in the plasticized elastomer which gives body to the throughput. As a result of the combination of the plasticizer and the filler material the hard elastomer component can be "opened up" sufficiently to reduce the energy needed for processing in the intensive mixing apparatus while at the same time retaining sufficient body or consistency in the gum base throughput for purposes of effective processing.

While the present invention is not to be considered dependent or limited by any theory set forth herein, "opening up" is believed to occur by the increase of the mobility of the hard elastomer macromolecule so as to bring the bulk nearest to the fluid state. The plasticizer increases the softness, flexibility, and extensibility while decreasing the yield point, modulus of elasticity, and tensile strength of the hard elastomer component. The plasticizer serves to reduce the intermolecular forces allowing the molecules to move with respect to one another. There has been a belief extant in the art of making gum base that any external "opening up" would cause an irretrievable loss of macromolecular qualities. By use of the present invention, however, the practitioner is able to "open-up" the hard elastomer component sufficiently to facilitate efficient processing without loss of desired macromolecular characteristics in the gum base product.

Specifically, it has been found that by use of this novel process the power requirement of the high intensity mixing apparatus 3 (Baker Perkins M.P. Mixer), is reduced by fifty percent, while the speed of processing can be nearly doubled—an incredible increase in efficiency and reduction in energy consumption.

The novel process of the present invention is adapted to be carried out advantageously in batchwise or continuous manner, with the latter being preferred. After processing through the high intensity mixer, the effluent, which is a homogeneous rubber product having no undispersed elastomer particles, is transferred to an intermediate mixer 4 (such as a Reitz Mixer) where further gum components are added and mixed with the plasticized elastomer. The intermediate mixer is one which provides less of a shearing action and more of a folding action because clearances between moving surfaces are greater. Examples of base ingredients which can be added at this point, include additional filler material, resins, ester gums, and polyethylene, which are usually mixed together as in blender 5 and then plasticized as needed prior to mixing with the elastomer rope, e.g., such as at point 6 in the drawing.

Resins which might be considered for addition to the gum base include vinyl polymers such as polyvinyl acetate or partially hydrolyzed polyvinyl alcohol, vinyl acetate-vinyl laurate copolymers, ethylene vinyl acetate copolymers or mixtures thereof, while ester gums include rosin derivatives such as dimerized rosin ester, or glycerol ester of polymerized rosin or a terpene resin, such as polymers of alpha-pinene or beta-pinene. To assure compatibilization with the elastomer and with each other, a suitable plasticizer can be added to the blended ingredients. When high molecular weight, polyvinyl acetate is one of the additional base ingredients it has been found that glyceryl triacetate (triacetin) is particularly useful as an effective compatibilizer. Traditional plasticizers also contemplated for use herein are esters of rosin and hydrogenated esters of rosin, such as the glyceryl esters of hydrogenated rosin or the glyceryl esters of partially hydrogenated rosin and the like. Other unique plasticizers include glyceryl tributyrate,

trimethyl citrate, benzyl benzoate, benzyl butyrate, cresyl acetate, ethyl acetate, diethyl malonate, diethyl sebacate, ethylacetoacetate, diethyl tartrate, ethyl lactate, butyl lactate, acetyl triethyl citrate, diethyl succinate, diethyl malate, lactic acid, sucrose octaacetate, diacetyl tartaric acid ester of mono- and diglycerides, stearyl mono-glyceridyl citrate, castor oil and other ricinoleate derivatives, succinylated monoglycerides, or lactylic or glyceryl lacto esters of fatty acids, alone or in combination with acetylated monoglyceride. The types of plasticizer used will of course depend on the nature of the additional components added at this point as well as the desired consistency and characteristics of the gum base.

The processed gum effluent exiting the intermediate mixer, a dough-like substance which can be stretched into a homogeneous film exhibiting no individual particles, is then fed to a final high speed mixer 7 (Identify Liffleford Mixer) into which further base components are simultaneously introduced. This rapid mixing apparatus provides essentially no shearing action but a very rapid folding action. These final groups of components normally include waxes, softeners, additional elastomer, and filler if desired. The waxes, which may consist of an additional amount of elastomer plasticizer used in preparing the elastomer, are preferably melted optionally together with softeners and additional elastomer in melter 8, after which additional filler material can optionally be added at point 9 on the drawing.

It is noted at this point that the term "plasticizer" as employed herein includes masticatory substances which function as softening agents, but that the term softeners, in fact, contemplates the same or similar substances used in a slightly different role and/or at different steps in the processing.

The various ingredients are generally employed in the following percentages by weight

Gum Base Ingredients	Percentage by Weight of the Gum Base
Elastomer	5–15%
Elastomer Plasticizer	8–15%
Filler	5–35%
Resin	25–35%
Resin Plasticizer	8–15%
Waxes	0–12%

When the base is prepared by a continuous process each group of components is preferably separately blended before being fed into the respective mixing step. However, it will be appreciated that each ingredient may be separately metered into its respective mixer without being previously blended. Furthermore, the various mixing operations carried out employing the mixers subsequent to the initial plasticization may be carried out employing a single variable mixer. In any event, all blenders and mixers are jacketed so that heat may be supplied when necessary to insure efficient mixing, particularly when starting the process.

The following examples illustrate the present invention without, however, limiting the same thereto.

EXAMPLE 1

Hard polyisobutylene particulate was fed into a blender along with $CaCO_3$ filler at a rate of 30 lbs/hour and 100 lbs/hour, respectively. The blended elastomer/filler effluent was fed at a rate of 130 lbs/hour in combination with melted microcrystalline was (Mobilwax) which, in turn, was fed at 14.2 lbs/hour into a high intensity mixing apparatus (an M.P. Mixer) operating at 100 r.p.m.

The power requirement of the high intensity mixer during this operation was less than 25 amps, and the operating temperature of the mixer was 340° F. This is to be contrasted with an energy requirement of no less than 55 amps at 100 r.p.m. necessary without the elastomer plasticizer as well as an operating temperature of at least about 400° F. Consequently, the high intensity mixer can be operated at between about 60 and 100 r.p.m. rather than the usual rate of 50 r.p.m. or below, resulting in a significantly higher volume flow of gum base throughput.

The effluent exiting from the high intensity mixer was found to be a smooth homogeneous rope of rubber base material having no particles or discontinuities commonly referred to as "eyes".

EXAMPLE 2

Another gum base was prepared as in Example 1 except that talc was used as the filler material at a rate of 99 lbs/hour while the melted microcrystalline wax (Mobilwax) was fed at a rate of 21.8 lbs/hour into the high intensity mixing apparatus (M.P. Mixer) which was run at 100 r.p.m.

The power requirement of the high intensity mixer was between 15 and 17 amps throughout the mixing operation, while the operating temperature of the mixer was no more than about 340° F. The resulting effluent was smooth and free of discontinuities and/or unwanted rubbery particles.

EXAMPLE 3

In this example hard polyisobutylene particulate was fed into a blender at 30 lbs/hour while talc was added at a rate of 315 lbs/hour. This blended elastomer/filler was fed in combination with solid polyethylene microcrystalline wax at 22.5 lbs/hour and melted Mobilwax at 31 lbs/hour into a high intensity mixer operating at 100 r.p.m.

A very acceptable gum base rope was produced as in the previous examples drawing less than 40 amps. during the entire process.

SBR EXAMPLES

In order to demonstrate the effectiveness of the present invention utilizing styrene-butadiene rubber as the hard elastomer, the following examples were prepared comparing the present process with SBR processes known to date in which the high intensity mixer could not be run at a rate greater than 60 r.p.m.

EXAMPLE 4

In this example SBR was introduced into a blender along with $CaCO_3$ filler at a rate of 100 lbs/hour and 400 lbs/hour, respectively. The elastomer/filler blend was fed in combination with solid Bareco wax fed at a rate of 21.8 lbs/hour into a high intensity mixer operated at 100 r.p.m.

A soft extruded gum base rope was produced utilizing no more than about 40 amps. This was contrasted to previous experience in which intensive mixing of SBR could not be conducted at more than about 60 r.p.m.

EXAMPLE 5

A final example was prepared using SBR at a feed rate of 92 lbs/hour along with $CaCO_3$ at 149 lbs/hour.

The plasticizer, n-butyl stearate, was combined with the filler/elastomer combination at a rate of 60 lbs/hour into the high intensity mixer operated at 100 r.p.m. A good quality extrudate was produced using only 25 amps during peak operation.

These examples conclusively demonstrate the efficiency provided by the present invention without loss of product quality.

Thus while there have been described what are presently believed to be the preferred embodiments of the invention, those skilled in the art will realize that changes and modifications may be made thereto without departing from the spirit of the invention, and it is intended to claim all such changes and modifications as fall within the true scope of the invention.

I claim:

1. A process for producing gum base having a hard elastomer component comprising the steps of:

(a) blending only filler material with hard elastomer wherein the filler material is added in a weight ratio of about 15.0:1.0 to about 1.0:1.0 of filler material to hard elastomer, respectively, which is effective to give the hard elastomer sufficient body for further processing; and

(b) mixing a plasticizing agent with said filler-hard elastomer blend in a weight ratio of from about 0.1:1.0 to about 3.0:1.0 of plasticizing agent to hard elastomer, respectively, to open up said elastomer;

wherein steps (a) and (b) are completed before subjecting said plasticized blend to high intensity mixing and before adding the remainder of desired gum base components in subsequent mixing steps and the power requirement for the high intensity mixing is less than about 0.32 amps per pound of throughput at 100 r.p.m.

2. The process of claim 1 wherein said hard elastomer is in particulate form.

3. The process of claim 1 wherein said hard elastomer is selected from the group consisting of polyisobutylene, isoprene-isobutylene copolymer, and styrene-butadiene copolymer.

4. The process of claim 1 wherein said plasticizing agent is in liquid form.

5. The process of claim 1 wherein said plasticizing agent is selected from the group consisting of n-butyl stearate, oleic acid; mono-, di-, or tri-glyceryl esters of the saturated or unsaturated fatty acids of oleic acid, caprylic acid, butyric acid, capric acid, caproic acid, lauric acid, mineral oil, liquid petroleum hydrocarbons, squalane, squalene, castor oil and other ricinoleate derivatives, diethylene or propylene glycols and derivatives, tributyl acetyl citrate, tributyl citrate, lecithin, coconut oil, glyceryl tributyrate, Zn laurate, Ca stearate, propylene glycol monostearate, propylene glycol monolaurate, fatty acids, butyl sebacate, butyl benzyl sebacate, diacetyl tartaric acid esters of mono- and diglycerides of edible fat oils or edible fat forming acids, petrolatum, stearyl monoglycerides citrate, limonene, polylimonene, natural waxes, butyl lactate, and butyl oleate.

6. The process of claim 1 wherein said elastomer is polyisobutylene and said plasticizing agent is liquid microcrystalline wax.

7. The process of claim 1 wherein said elastomer is styrene-butadiene copolymer and said plasticizer is n-butyl stearate.

8. The process of claim 1 wherein said filler material is selected from the group consisting of $CaCO_3$, $MgCO_3$, Al_2O_3 and talc.

9. The process of claim 8 wherein said filler material is $CaCO_3$.

10. The process of claim 1 wherein said ratio is from about 0.25:1.0 to about 2.00:1.0.

11. The process of claim 10 wherein said ratio is from about 0.5:1.0 to about 1.0:1.0.

12. The process of claim 1 wherein said ratio is from about 8.0:1.0 to about 2.0:1.0.

13. The process of claim 12 wherein said ratio is about 3.0:1.0.

14. The process of claim 1 which further comprises a continuous process wherein additional gum base components are included by a subsequent intermediate intensity mixing step, and then a high speed mixing step.

15. The process of claim 1 wherein said high intensive mixing apparatus is run at from about 60 to about 100 r.p.m. with low power requirement.

16. The process of claim 15 wherein said power requirement is not more than about 0.16 amps.

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US005601858A

United States Patent [19]

Mansukhani et al.

[11] Patent Number: 5,601,858

[45] Date of Patent: Feb. 11, 1997

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[54] NON-STICK CHEWING GUM

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[21] Appl. No.: 365,650

[22] Filed: Dec. 29, 1994

[51] Int. Cl.[6] A23G 3/30

[52] U.S. Cl. 426/3; 426/6

[58] Field of Search 426/3–6

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[57] ABSTRACT

A non-stick, chewing gum base composition which is free from fats, waxes, and elastomer solvent resins, and a non-stick chewing gum composition made from the gum base. The resulting chewing gum is easily removable from a variety of surfaces.

26 Claims, No Drawings

NON-STICK CHEWING GUM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention concerns a non-stick chewing gum base composition which is free from fats, waxes, and elastomer plasticizing materials known as elastomer solvent resins, and a chewing gum composition prepared using the gum base.

2. Description of the Background Art

Chewing gums are conventionally prepared by adding sweeteners, flavoring agents and the like to a chewing gum base. Conventional gum bases normally contain, as a principal ingredient, any of a number of different resinous gum materials such as: (1) natural rubber elastomers (e.g., rubber latex, guayule, and the like); (2) natural gum elastomers (e.g., chicle, jelutong, balata, guttapercha, lechi capi, sorva, pendare, perillo, leche de vaca, niger gutta, tunu, chiquibul, crown gum, and the like); (3) synthetic rubber elastomers (e.g., styrene-butadiene rubber, polyisobutylene, isobutylene-isoprene copolymers, polybutadiene, and the like); (4) hydrophobic synthetic polymers (e.g., polyvinyl acetates, ethylene/vinyl acetate, vinyl laurate/vinyl acetate copolymer, and the like); and (5) mixtures thereof. Other functional ingredients are typically present in conventional chewing gum bases to modify and tailor the overall properties of the resulting chewing gum, such as one or more of fats, waxes, elastomer solvent resins, fillers, softeners, emulsifiers, plasticizers, antioxidants, etc. The particular combination of ingredients used in a chewing gum base depends on factors such as the particular kind and amount of resinous gum material employed and the overall desired texture and consistency characteristics of the resulting chewing gum composition (e.g., chew, stickiness, flavor release, springiness, film forming characteristic, elasticity, etc.).

Fats, waxes and elastomer solvent resins aid in softening and plasticizing the resinous gum material and also provide other desirable properties. For example, fats provide chewing gum smoothness, waxes improve the elasticity of its chew character, and elastomer solvent resins provide it with chew bulkiness. However, fats, waxes, and elastomer solvent resins also adversely affect the characteristics of the chewing gum; for example, they result in increased stickiness and reduced flavor release. For example, fats such as hydrogenated or partially hydrogenated vegetable oils including cottonseed and soybean oils, hydrogenated or partially hydrogenated animal fats, cocoa butter, and the like reduce the viscosity of the gum base, causing it to become sticky. Waxes such as paraffin wax, microcrystalline wax, petroleum wax, natural waxes, and the like also result in more stickiness. Elastomer solvent resins used as softeners and tackifiers for the resinous gum material, such as methyl, glycerol, or pentaerythritol esters of rosins or modified rosins, including hydrogenated, dimerized, or polymerized rosins, terpene resins including polyterpene and polymers of alpha-pinene or beta-pinene, and the like, also contribute to tackiness. As a result, conventional chewing gums have been criticized by some who believe that gums that have been consumed and improperly discarded pollute the environment by sticking to the surfaces on which they have been deposited.

Because conventional chewing gums adhere strongly to a variety of surfaces including wood, floors, asphalt pavement, concrete, carpet, leather, hair, and cloth, discarded chewing gums that are stuck to those surfaces are often difficult and costly to remove. Oftentimes, even after the chewing gums have been removed, stains are left on the surfaces. As a result, vendors have been banned from selling conventional chewing gums to consumers in many public places such as train stations, arenas, amusement parks, and schools. The country of Singapore has flatly banned the selling of chewing gums. Accordingly, a chewing gum that is easily removable from the surfaces on which it is discarded or deposited would be highly desirable.

Conventional chewing gums that have non-stick characteristics are typically designed not to adhere to natural teeth and synthetic dental products during chewing. These chewing gums, however, still adhere to other surfaces when they are discarded. For example, U.S. Pat. Nos. 3,984,574, 4,357,355, 4,518,615, and 5,266,336 disclose non-tack chewing gum compositions that do not adhere to dentures, fillings, or natural teeth, but none-the-less stick to other surfaces.

U.S. Pat. Nos. 4,794,003 and 4,721,620 disclose bubble gum compositions that do not stick to the face. These compositions, however, contain waxes, fats, and elastomer solvent resins.

U.S. Pat. No. 5,116,626 discloses a transparent gum base composition containing a variety of ingredients such as synthetic rubber elastomers, polyvinyl acetates, softeners, and fillers, and optionally fats, waxes, and elastomer solvent resins.

U.S. Pat. No. 3,285,750 discloses a chewing gum composition that is said to have low adherence to various surfaces. However, that chewing gum composition must contain a resinous adhesion resistant agent in powder form.

SUMMARY OF THE INVENTION

The present invention provides a non-stick chewing gum base composition which is free from fats, waxes, and elastomer solvent resins, comprising:

(1) a blend of polyvinyl acetates having different molecular weights in an amount effective to provide good chew properties;

(2) an amount of a non-fat, non-wax and non-elastomer solvent resin plasticizer effective to provide chew bulkiness and softness; and

(3) an amount of a filler effective to provide flavor release and integrity.

The present invention further provides a non-stick chewing gum composition, substantially free from fats, waxes, and elastomer solvent resins, comprising:

(1) an amount of the non-stick gum base composition of the invention effective to provide good chew properties;

(2) an amount of a surfactant having hydrophobic-lipophobic balance greater than about 7 effective to provide softness;

(3) an amount of a flow control agent effective to provide flowability: and

(4) an amount of a plasticizer effective to provide texture and consistency.

DETAILED DESCRIPTION OF THE INVENTION

The present invention concerns a non-stick chewing gum base composition that is free from fats, waxes, and elastomer solvent resins and is easily removable from surfaces on which it is deposited. The invention further concerns a

finished chewing gum composition prepared using the gum base. The chewing gum composition of this invention is easily removable from a variety of surfaces on which it is deposited including wood, floors, asphalt pavement, concrete, carpet, leather, hair, and cloth. Moreover, it has high perceived flavor-release characteristics and retains chewing characteristics comparable to those of conventional chewing gums. This chewing gum is, therefore, highly desirable and should have great consumer appeal.

The gum base composition according to the present invention contains a blend of polyvinyl acetates having different molecular weights. More specifically, the gum base composition contains a blend of at least two of the following polyvinyl acetates: a low molecular weight polyvinyl acetate, a medium molecular weight polyvinyl acetate, and a high molecular weight polyvinyl acetate. The amounts of the different molecular weight polyvinyl acetates present in the gum base composition should be effective to provide the finished chewing gum with the desired non-stickiness and chew properties, such as integrity, softness, chew bulkiness, film-forming characteristic, hydrophilic character, and flavor release. The total amount of polyvinyl acetate used in the gum base composition is usually from about 45% to about 92% by weight based on the total gum base composition. It is preferred to use an amount of polyvinyl acetate from about 60% to about 85%, especially about 75% by weight of the total gum base composition.

Typically, the low molecular weight polyvinyl acetate has a weight average molecular weight of from about 2,000 to about 14,000, and preferably from about 11,000 to about 13,000. The amount of the low molecular weight polyvinyl acetate used in the gum base composition is usually from about 39% to about 75%, preferably from about 40% to about 50%, and most preferably about 44%, by weight based on the total weight of the gum base composition.

The medium molecular weight polyvinyl acetate typically has a weight average molecular weight of from about 15,000 to 55,000, and preferably from about 45,000 to about 55,000. The medium molecular weight polyvinyl acetate is typically employed in the gum base composition in an amount of from about 5% to about 41%, preferably from about 20% to about 40%, and most preferably about 32%, by weight based on the total weight of the gum base composition.

The high molecular weight polyvinyl acetate typically has a weight average molecular weight of from about 56,000 to about 500,000. The high molecular weight polyvinyl acetate is typically employed in the gum base composition in an amount of up to about 10%, and preferably up to about 5%. The weight average molecular weight may be determined by conventional methods such as by gel permeation chromatography.

Preferably, at least one other resinous gum material is employed in the gum base composition of this invention. The amount of such additional resinous gum material present should be effective to provide a finished chewing gum with the desired chew bulkiness, springiness, flavor release, film forming characteristic, and elasticity. Typically the additional resinous gum material is present in an amount of up to about 10%, and preferably from about 5% to about 10%, and most preferably about 8% by weight based on the total weight of the gum base composition. Examples of suitable additional resinous gum materials include synthetic rubber elastomers such as styrene-butadiene rubber, polyisobutylene, polyisobutylene-isoprene copolymers (butyl rubber), polybutadiene, and the like, natural rubber elastomers such as rubber latex, guayule, and the like, and natural gum elastomers such as chicle, jelutong, balata, guttapercha, lechi caspi, sorva, pendare, perillo, leche de vaca, niger gutta, tunu, chiquibul, crown gum, and the like, and mixtures thereof.

A non-fat, non-wax and non-elastomer solvent resin plasticizer is added to the gum base composition of the present invention. Examples of suitable plasticizers include glycerol triacetate, acetylated monoglyceride, and mixtures thereof. The preferred plasticizer employed in the present invention is glycerol triacetate. The amount of the plasticizer present should be effective to provide a finished chewing gum with the desired chew bulkiness and softness. Typically, the plasticizer is employed in an amount of from about 3% to about 15% in the gum base composition, preferably from about 4% to about 12%, and most preferably about 7%, by weight based on the total weight of the gum base composition.

The gum base composition of this invention further contains a filler. Examples of suitable fillers include calcium carbonate, magnesium carbonate, alumina, talc, tricalcium phosphate, and synthetic and natural clay, and mixtures thereof. A preferred filler is calcium carbonate. The amount of the filler present should be effective to provide a finished chewing gum with the desired flavor release, integrity, and non-stickiness. Typically, the filler is employed in the gum base composition in an amount of up to about 30%, usually 5% to 30%, preferably from about 5% to about 20%, and most preferably about 10%, by weight based on the total weight of the gum base composition.

The manner is which the constituents of the gum base composition are blended is not critical and may be performed using standard techniques and equipment known to those skilled in the art. Typically, any additional resinous gum material, such as a rubber elastomer, is agitated in a mixing kettle until a homogeneous mixture is obtained. The filler is then blended into the mixture. The polyvinyl acetate components are then added to the mixture. It is preferred that the high molecular weight polyvinyl acetate is added and blended first followed by the medium and then the low molecular weight polyvinyl acetates. In this manner, uniform blending can be achieved without the creation of isolated pockets of polyvinyl acetate in the elastomer.

If no additional resinous gum material is employed in the gum base composition the polyvinyl acetate is blended as described and the filler is then blended into the polyvinyl acetate. The remaining ingredients may then be added in bulk, incrementally, or stepwise while mixing until a homogeneous mass is obtained. The homogeneous mass is usually discharged into a pan and allowed to cool and thereafter the gum base composition is incorporated into a chewing gum composition.

The chewing gum composition according to the present invention will now be discussed in more detail. Preferably, the chewing gum composition is substantially free from fats, waxes, and elastomer solvent resins. A minor amount of fats, waxes, or elastomer solvent resins may be present so long as the non-sticky characteristics of the finished chewing gum are not unacceptably or adversely affected. Typically, the amount of any fats, waxes, or elastomer solvent resins present should not exceed about 1% by weight based on the total weight of the chewing gum composition.

The amount of the gum base composition of this invention present in the chewing gum composition should be effective to provide the finished chewing gum with the desired non-stickiness and good chew properties. Typically, the

chewing gum composition contains the gum base composition of this invention in an amount of from about 10% to about 50%, preferably from about 15% to about 35%, and most preferably from about 22% to about 26%, by weight based on the total weight of the chewing gum composition.

The chewing gum composition further contains a surfactant. Suitable surfactants should have an hydrophobic-lipophobic balance (HLB) of greater than about 7. Examples of suitable surfactants include polyoxyethylene (20) sorbitan monoloate, polyoxyethylene (20) sorbitan monolaurate, polyoxethylene (4) sorbitan monolaurate, polyoxyethylene (20) sorbitan monopalmitate, polyoxyethylene (20) sorbitan monostearate, polyoxyethylene (4) sorbitan monostearate, polyoxyethylene (20) sorbitan tristearate, polyoxyethylene (5) sorbitan monooleate, polyoxyethylene (20) sorbitan trioleate, sorbitan monolaurate, and the like. The amount of surfactant present should be effective to provide the finished chewing gum with the desired softness and non-stickiness. Typically, the surfactant is employed in the chewing gum composition in an amount of from about 0.5% to about 1.5% and preferably about 1.0%, by weight based on the total weight of the chewing gum composition.

A flow control agent is added to the chewing gum composition according to the present invention. The amount of the flow control agent present should be effective to provide the finished chewing gum with the desired flowability and non-stickiness. Preferably, the flowability of the finished chewing gum is such that when the finished chewing gum had been chewed and deposited on a surface, the chewing gum would retain substantially its shape. Typically, the flow control agent is present in an amount of from about 0.5% to about 1.5% and preferably from about 0.5% to about 1.0%, by weight based on the total weight of the chewing gum composition. Examples of suitable flow control agent include amorphous silica, fumed silica, precipitated alumina, natural and synthetic clays, talc, cellulose fiber, and mixtures thereof.

In addition to the plasticizer in the gum base composition, plasticizers, as well as emulsifiers, are typically employed in the chewing gum composition according to the present invention, in conventional amounts. These (additional) plasticizers and the emulsifiers are preferably non-fat, non-wax, and non-elastomer solvent resin materials. Plasticizers provide a variety of desirable textures and consistency properties such as chew bulkiness and softness to the finished chewing gum and emulsifiers aid in dispersing the immiscible components of the chewing gum composition into a single stable system. Examples of suitable (additional) plasticizers include glycerol triacetate, acetylated monoglyceride, and mixtures thereof. Typically, the (additional) plasticizer is employed in the chewing gum composition in an amount of from about 0.1% to about 0.8% by weight based on the total weight of the chewing gum composition. Preferably, when glycerol triacetate is used as the (additional) plasticizer, the amount employed is from about 0.15% to about 0.25% by weight. When acetylated monoglyceride is used as the (additional) plasticizer, the preferred amount is about 0.6% by weight. Examples of suitable emulsifiers include lecithin, glycerol, glycerol monooleate, lactylic esters of fatty acids, lactylated fatty acid esters of glycerol and propylene glycol, mono-, di-, and tri-stearylacetates, monoglyceride citrate, stearic acid, stearyl monoglyceridyl citrate, stearyl-2-lactylic acid, triacytyl glycerin, trithyl citrate, polyethylene glycol, and mixtures thereof. The preferred emulsifiers are lecithin and stearic acid. Typically, the emulsifier is employed in the chewing gum composition in an amount of up to about 2%, by weight based on the total weight of the chewing gum composition.

An effective amount of a softening agent may also be added to the chewing gum composition of the present invention. Examples of suitable softening agents include glycerin, high fructose corn syrup, corn syrup, sorbitol solution, hydrogenated starch hydrolysate, fully unsaturated vegetable oils such as non-hydrogenated cotton seed oil, and mixtures thereof. A preferred softening agent is anhydrous glycerin, such as the commercially available United States Pharmacopeia (USP) grade. Glycerin is a syrupy liquid with a sweet warm taste and has a sweetness of about 60% of that of cane sugar. Because glycerin is hygroscopic, it is important that the anhydrous glycerin be maintained under anhydrous conditions throughout the preparation of the chewing gum composition. The amount of softening agent employed in the chewing gum composition is up to about 20% and preferably from about 10% to about 15%, by weight based on the total weight of the chewing gum composition. When a fully unsaturated vegetable oil is employed as a softening agent, the amount of the oil present should not exceed about 1% by weight, based on the total weight of the chewing gum composition. When the amount of oil present exceeds about 1% by weight, the non-stick characteristics of the finished chewing gum may be adversely or unacceptably affected.

The chewing gum composition according to the present invention may contain an effective amount of at least one sweetener. The sweetener may comprise saccharide sweeteners, sugar alcohols, or intense sweeteners, or mixtures thereof.

Examples of suitable saccharide sweeteners include monosaccharides, disaccharides, and polysaccharides such as xylose, ribose, glucose, mannose, galactose, fructose, levulose, dextrose, sucrose, maltose, partially hydrolyzed starch, corn syrup, and high fructose corn syrup. Examples of suitable sugar alcohols include sorbitol, xylitol, mannitol, maltitol, isomalt, and hydrogenated starch hydrolysate.

Examples of suitable intense sweeteners include (A) water-soluble naturally-occurring intense sweeteners such as dihydrochalcones, monellin, steviosides, glycyrrhizin, dihydroflavenol, and L-aminodicarboxylic acid aminoalkenoic acid ester amides, such as those disclosed in U.S. Pat. No. 4,619,834, and mixtures thereof; (B) water-soluble artificial sweeteners including the soluble saccharin salts such as sodium or calcium saccharin salts, cyclamate salts, the sodium, ammonium or calcium salts of 3,4-dihydro-6-methyl-1,2,3-oxathiazine-4-one-2,2-dioxide, the potassium salt of 3,4-dihydro-6-methyl-1,2,3-oxathiazine-4-one-2,2-dioxide (Acesulfam-K), the free acid form of saccharin, and the like, and mixtures thereof; (C) dipeptide based sweeteners including L-aspartic acid derived sweeteners, such as 1-aspartyl-L-phenylalanine methyl ester (Aspartame) and materials described in U.S. Pat. No. 3,492,131, L-alphaaspartyl-N-(2,2,4,4-tetramethyl-3-thietanyl)-D-alaninamide hydrate (Alitame), methyl esters of L-aspartyl-L-phenylglycerine and L-aspartyl-L-2,5-dihydrophenyl-glycine, L-aspartyl-2,5-dihydro-L-phenylalanine, L-aspartyl-L-(1-cyclohexene)-alanine, and the like, and mixtures thereof; (D) water-soluble intense sweeteners derived from naturally-occurring water-soluble sweeteners, such as chlorinated derivatives of ordinary sugar (sucrose), e.g., chlorodeoxysugar derivatives such as derivatives of chlorodeoxysucrose or chlorodeoxygalactosucrose, known, for example, under the product designation of Sucralose®; examples of chlorodeoxysucrose and chlorodeoxygalactosucrose derivatives include but are not limited to: 1-chloro-1'-deoxysucrose; 4-chloro-4-deoxy-alpha-D-galactopyranosyl-alpha-D-fructofuranoside, or 4-chloro-4-deoxygalactosucrose; 4-chloro-4-deoxy-alpha-D-

galactopyranosyl-1-chloro-1-deoxy-beta-D-fructofuranoside, or 4,1'-dichloro-4,1'-dideoxygalactosucrose; 1',6'-dichloro-1',6'-dideoxysucrose; 4-chloro-4-deoxy-alpha-D-galactopyranosyl-1,6-dichloro-1,6-dideoxy-beta-D-fructofuranoside, or 4,1',6'-trichloro-4,1',6'-trideoxygalactosucrose; 4,6-dichloro-4,6-dideoxy-alpha-D-galactopyranosyl-6-chloro-6-deoxy-beta-D-fructofuranoside, or 4,6,6'-trichloro-4,6,6'-trideoxygalactosucrose; 6,1',6'-trichloro-6,1',6'-trideoxysucrose; 4,6-dichloro-4,6-dideoxy-alpha-D-galactopyranosyl-1,6-dichloro-1,6-dideoxy-beta-D-fructofuranoside, or 4,6,1',6'-tetrachloro-4,6,1',6'-tetradeoxygalacto-sucrose; and 4,6,1',6'-tetradeoxy-sucrose, and mixtures thereof; and (E) protein based intense sweeteners such as thaumaococcus danielli (Thaumatin I and II).

The amount of sweetener employed in the chewing gum composition will vary with the sweetener selected for a particular chewing gum. Thus, for any given sweetener a sufficient amount of sweetener is used to provide the level of sweetness desired. The saccharide sweeteners and sugar alcohols described above are usually used in an amount of from about 1% to about 70% and preferably in an amount of from about 40% to about 50%, by weight based on the total weight of the chewing gum composition. The intense sweeteners described above are usually used in an amount of up to about 1%, preferably from about 0.05% to about 0.4%, by weight based on the total weight of the chewing gum composition.

A flavoring agent may also be added to the chewing gum composition according to the present invention, in conventional amounts. Examples of suitable flavoring agents include any natural, artificial, or synthetic flavors such as spearmint oil; cinnamon oil; oil of wintergreen (methylsalicylate); peppermint oils; citrus oils including lemon, orange, lime and grapefruit; fruit essences including apple, pear, peach, grape, strawberry, raspberry, cherry, plum, pineapple, and apricot; and mixtures thereof. The amount of flavoring agent employed is normally a matter of preference subject to factors such as flavor type and strength desired. In general, the chewing gum composition may contain from about 0.5% to about 3.0% by weight of the flavoring agent based on the total weight of the chewing gum composition. Other ingredients such as antioxidants and colorants may also be added to the chewing gum composition.

The chewing gum according to the present invention can be prepared by conventional methods. Generally, the gum base composition is added to a gum kettle in molten form, other ingredients such as the sweeteners, surfactants, plasticizers, flow control agents, softening agents, and flavoring agents are then added to the gum kettle, and mixed until a homogeneous mass is produced. The homogeneous mass is then fed into a rolling and scoring machine where the gum is rolled and scored to proper dimensions. The chewing gum may also be produced by a continuous process such as that described in U.S. Pat. No. 5,045,325, the disclosure of which is hereby incorporated by reference.

The present invention will now be illustrated by the following non-limiting Examples.

EXAMPLE 1

A gum base composition was prepared with the following ingredients:

INGREDIENTS	PERCENT BY WEIGHT
Butyl Rubber[1]	2.00
Polyisobutylene[2]	6.00
Polyvinyl Acetate (MW = 12,800)	43.75
Polyvinyl Acetate (MW = 47,000)	31.50
Glycerol Triacetate	6.75
Calcium Carbonate	10.00

[1]Polyisobutylene-isoprene copolymer having a weight average molecular weight of 400,000.
[2]Polyisobutylene having a weight average molecular weight of 42,600 to 46,100.

Butyl rubber was added to a mixing kettle that had been preheated for 1 hour to a temperature of about 115° to 120° C. using steam under a pressure of 30 psi and then masticated for about 1 hour. The rubber broke into small pieces and was then softened with steam heat and mechanical action on the kettle. One third portion of the polyisobutylene was then added to the kettle and mixed for about 10 to 15 minutes until the mixture became homogeneous. Another one third portion of the polyisobutylene was then added to the kettle and mixed for 10 to 15 minutes until the mixture became homogeneous. The remaining one third portion was then added to the kettle and mixed for 30 to 45 minutes until the whole mixture became homogeneous and had a consistent texture. The mixture was then discharged into the pan and allowed to cool to room temperature.

The mixture was then added to the mixing kettle, which had again been preheated for 1 hour to a temperature of 110° to 120° C. using steam under a pressure of 30 psi, and mixed for 10 to 15 minutes. Calcium carbonate was then added to the kettle and mixed for 10 to 15 minutes until a homogeneous mixture was obtained. Polyvinyl acetate having a molecular weight of 47,000 was then added to the kettle and mixed for about 20 to 25 minutes until it was softened and blended into the homogeneous mixture. Polyvinyl acetate having a molecular weight of 12,800 was then added to the kettle and mixed for 20 to 25 minutes until the mixture became smooth. The steam was then shut off. Glycerol triacetate was then slowly added to the kettle in 10 to 15 minutes. The homogeneous mixture was then discharged into the pan and allowed to cool to room temperature from the discharge temperature of 105° to 110° C. to obtain a gum base composition.

EXAMPLES 2–4

Gum base compositions were prepared with the following ingredients:

	PERCENT BY WEIGHT		
Ingredients	Example 2	Example 3	Example 4
Butyl Rubber	—	—	2.00
Polyisobutylene	6.00	—	—
Styrene-butadiene Rubber	2.00	8.00	6.00
Polyvinyl Acetate (MW = 12,800)	43.75	43.75	43.75
Polyvinyl Acetate (MW = 47,000)	31.50	31.50	31.50
Glycerol Triacetate	6.75	6.75	6.75
Calcium Carbonate	10.00	10.00	10.00

The gum base compositions were prepared in the same manner as in Example 1, except that in Examples 2 and 3, styrene-butadiene rubber was added to the preheated mixing kettle instead of butyl rubber. in Examples 3 and 4, polyisobutylene was not added, and in Example 3, styrene-butadiene rubber and butyl rubber were added together to the preheated mixing kettle.

EXAMPLE 5

A non-stick chewing gum was prepared with the following ingredients:

INGREDIENTS	PERCENT BY WEIGHT
Gum Base from Example 1	26.000
Glycerol Triacetate	0.250
Lecithin	0.500
Crystalline Sorbitol	40.780
Mannitol	15.000
Glycerin	12.000
Peppermint Flavors	1.800
Aspartame	0.170
Encapsulated Aspartame	1.000
Amorphous Silica	1.000
Polyoxyethylene (20) Sorbitan Monooleate	1.000
Non-Hydrogenated Cotton Seed Oil	0.500

The gum base from Example 1 was melted at a temperature of 80° to 85° C. The molten gum base was then poured into a mixing kettle. Lecithin, polyoxyethylene (20) sorbitan monooleate, non-hydrogenated cotton seed oil, and glycerol triacetate were then added to the kettle and mixed for 1 to 2 minutes. ½ crystalline sorbitol, mannitol, and amorphous silica were then added to the kettle and mixed for 2 minutes. The mixture was held for 1 minute and then glycerin was added while mixing the mixture. The remaining ½ crystalline sorbitol was then added and mixed for 2 minutes. While mixing, the peppermint flavors were added. The aspartame sweeteners were then added and mixed for 3 minutes. The gum mixture was then discharged to a pan at temperature of 43° to 46° C. The gum was then rolled and scored to the proper dimensions on a Rolling and Scoring Machine.

The adhesive characteristics of the chewing gum thus produced were tested in two experiments. In the first experiment, the chewing gum was first chewed for about 15 minutes and was then pressed on various surfaces, i.e., floor tile, concrete, and hairs. Thereafter, it was removed from those surfaces. The removals were observed by 3 investigators. The results showed that the chewing gum was 100% removable from those surfaces with little or no effort.

In the second experiment, samples of concrete were placed into a Fisher Iso-Temp forced draft oven at selected temperatures of 30°, 40°, 50°, 60°, and 70° C. As the concrete samples reached the desired temperatures, chewing gum that had been chewed for about 15 minutes was pressed on the concrete samples and kept at those temperatures for two days to simulate the effects of exposure to a warm environment. The chewing gum was then removed from the concrete samples while under the observation of 3 investigators. The results showed that the chewing gum was 100% removable with little or no effort up to 60° C. At 70° C., approximately 10% of the chewing gum remained on the concrete surface.

Various organoleptic attributes of the non-stick chewing gum prepared from Example 5 that had been stored for about 4 ½ weeks were evaluated by fifty people (25 men, 25 women). The results based on a hedonic liking scale of from 1 (disliked extremely) to 9 (liked extremely) are shown below:

ATTRIBUTES	RESULTS
Overall Liking	4.48
Initial Flavor Liking	5.34
Later Flavor Liking	4.58
Initial Cooling Mouthfeel	5.30
Later Cooling Mouthfeel	4.88
Initial Chew Texture Liking	3.82
Later Chew Texture Liking	4.82
Sweetness Liking	5.16
Long Lasting Flavor	5.66

EXAMPLES 6–8

Non-stick chewing gums were prepared with the following ingredients:

	PERCENT BY WEIGHT		
Ingredients	Example 6	Example 7	Example 8
Gum Base from Example 2	25.000	—	—
Gum Base from Example 3	—	25.000	—
Gum Base from Example 4	—	—	25.000
Glycerol Triacetate	0.150	0.150	0.150
Lecithin	0.700	0.700	0.700
Peppermint Flavors	1.400	1.400	1.400
Glycerin	11.000	11.000	11.000
Mannitol	15.000	15.000	15.000
Crystalline Sorbitol	42.830	42.830	42.830
Aspartame	0.170	0.170	0.170
Encapsulated Aspartame	0.600	0.600	0.600
Stearic Acid	1.000	1.000	1.000
Sorbitan Monolaurate	1.000	1.000	1.000
Precipitated Silica	0.500	0.500	0.500
Non-Hydrogenated Cotton Seed Oil	0.650	0.650	0.650

The non-stick chewing gums were prepared in the same manner as in Example 5, except for substituting the different gum bases, surfactant, and flow control agent. In addition stearic acid was added in Examples 6 to 8 and mixed with the molten gum base.

The adhesive characteristics of the chewing gums prepared from Example 6 to 8 were tested by first chewing the chewing gums for about 15 minutes and pressing the chewed gums against carpet and concrete surfaces at room temperature. Thereafter, the pressed chewing gums were removed from those surfaces. The removal was observed by 3 investigators. The results showed that the chewing gums were 100% removable from those surfaces with little or no effort.

While the present invention has been described with respect to what is presently considered to be the preferred embodiments, it is to be understood that the invention is not limited to the disclosed embodiments. The present invention is intended to cover various modifications and equivalent formulations included within the spirit and scope of the appended claims.

What is claimed is:

1. A non-stick chewing gum base composition which is free from fats, waxes, and elastomer solvent resins, comprising:

(1) a blend of polyvinyl acetates having different molecular weights in an amount of from about 45% to about 92% by weight, effective to provide good chew properties;

(2) a non-fat, non-wax and non-elastomer solvent resin plasticizer in an amount of from about 3% to about 15% by weight, effective to provide chew bulkiness and softness; and

(3) a filler in an amount of from about 5% to about 30% by weight, effective to provide flavor release and integrity;

wherein said percentages by weight are based on the total weight of the gum base composition.

2. The non-stick gum base composition according to claim 1, wherein said blend of polyvinyl acetates comprises at least two of a low molecular weight polyvinyl acetate, a medium molecular weight polyvinyl acetate, and a high molecular weight polyvinyl acetate.

3. The non-stick gum base composition according to claim 2, comprising:

(1) from about 39% to about 75% by weight of said low molecular weight polyvinyl acetate;

(2) from about 5% to about 41% by weight of said medium molecular weight polyvinyl acetate;

(3) up to about 10% by weight of said high molecular weight polyvinyl acetate;

wherein said percentages by weight are based on the total weight of the gum base composition.

4. The non-stick gum base composition according to claim 1, further comprising at least one other resinous gum material.

5. The non-stick gum base composition according to claim 4, wherein said composition contains from about 5% to 10% by weight of said at least one other resinous gum material.

6. The non-stick gum base composition according to claim 4, wherein said at least one other resinous gum material is selected from the group consisting of synthetic rubber elastomers, natural rubber elastomers, natural gum elastomers, and mixtures thereof.

7. The non-stick gum base composition according to claim 1, wherein said plasticizer is glycerol triacetate.

8. The non-stick gum base composition according to claim 1, wherein said filler is calcium carbonate.

9. The non-stick gum base composition according to claim 2, wherein said low molecular weight polyvinyl acetate has a weight average molecular weight of from about 2,000 to about 14,000.

10. The non-stick gum base composition according to claim 2, wherein said medium molecular weight polyvinyl acetate has a weight average molecular weight of from about 15,000 to about 55,000.

11. The non-stick gum base composition according to claim 2, wherein said high molecular weight polyvinyl acetate has a weight average molecular weight of from about 56,000 to about 500,000.

12. The non-stick gum base composition according to claim 3, comprising (1) about 44% by weight of said low molecular weight polyvinyl acetate, (2) about 32% by weight of said medium molecular weight polyvinyl acetate, (3) about 8% by weight of said another resinous gum material, (4) about 7% by weight of said plasticizer, and (5) about 10% by weight of said filler.

13. A non-stick chewing gum composition substantially free from fats, waxes, and elastomer solvent resins, comprising:

(1) the non-stick gum base composition of claim 1 in an amount of from about 10% to about 50% by weight, effective to provide good chew properties;

(2) a surfactant having a hydrophobic-lipophobic balance greater than about 7 in an amount of from about 0.5% to about 1.5% by weight, effective to provide softness;

(3) a flow control agent in an amount of from about 0.5% to about 1.5% by weight, effective to provide flowability; and

(4) a plasticizer in an amount of from about 0.1% to about 0.8% by weight effective to provide texture and consistency;

wherein said percentages by weight are based on the total weight of the gum base composition.

14. The non-stick chewing gum composition according to claim 13, wherein said surfactant is polyoxyethylene (20) sorbitan monooleate or sorbitan monolaurate.

15. The non-stick chewing gum composition according to claim 13, wherein said flow control agent is selected from the group consisting of amorphous silica, fumed silica, precipitated silica, natural and synthetic clays, talc, cellulose fiber, and mixtures thereof.

16. The non-stick chewing gum composition according to claim 13, wherein said plasticizer is glycerol triacetate, acetylated monoglyceride, or mixtures thereof.

17. The non-stick chewing gum composition according to claim 13, further comprising a sweetener.

18. The non-stick chewing gum composition according to claim 17, wherein said sweetener comprises a saccharide sweetener.

19. The non-stick chewing gum composition according to claim 17, wherein said sweetener comprises a sugar alcohol.

20. The non-stick chewing gum composition according to claim 19, wherein said sugar alcohol comprises a mixture of sorbitol and mannitol.

21. The non-stick chewing gum composition according to claim 17, wherein said sweetener comprises an intense sweetener.

22. The non-stick chewing gum composition according to claim 13, further comprising at least one emulsifier.

23. The non-stick chewing gum composition according to claim 22, wherein said emulsifier is lecithin, stearic acid, or mixtures thereof.

24. The non-stick chewing gum composition according to claim 13, further comprising up to 20% by weight of at least one softening agent.

25. The non-stick chewing gum composition according to claim 24, wherein said softening agent is glycerin.

26. The non-stick chewing gum composition according to claim 24, wherein said softening agent is a fully unsaturated vegetable oil.

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US 20030124220A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2003/0124220 A1

Hill et al. (43) Pub. Date: Jul. 3, 2003

(54) STABILIZED CHEWING GUM BASE

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(21) Appl. No.: 10/331,260

(22) Filed: Dec. 30, 2002

Related U.S. Application Data

(60) Provisional application No. 60/344,576, filed on Dec. 28, 2001.

Publication Classification

(51) Int. Cl.[7] A23G 3/30

(52) U.S. Cl. 426/3

(57) ABSTRACT

Styrene butadiene rubber (SBR) is widely used as a chewing gum base in lieu of natural gums. It is necessary to protect chewing gum SBR with a food grade antioxidant stabilizer system. This invention discloses a chewing gum rubber composition (gum base) that utilizes carnosic acid from a Libiatae plant, such as rosemary or sage, as an antioxidant stabilizer. In the practice of this invention the chewing gum base also contains lecithin that can be used as an emulsifier for the carnosic acid. This invention more specifically discloses a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; (4) carnosic acid, and (5) lecithin, wherein said chewing gum base is void of sweeteners. The subject invention also reveals a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; (4) carnosic acid, and (5) lecithin, wherein said chewing gum base is void of flavoring agents. The present invention further discloses a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; (4) carnosic acid, and lecithin, wherein said chewing gum base is void of colorants.

STABILIZED CHEWING GUM BASE

[0001] This application claims the benefit of U.S. Provisional Patent Application Serial No. 60/344,576, filed on Dec. 28, 2001.

BACKGROUND OF THE INVENTION

[0002] Today ordinary chewing gums and bubble gums generally utilize as their gum base one or a combination of two or more natural or synthetic elastomers. The gum base that is selected provides the chewing gum with its masticatory properties. A chewing gum base is normally admixed with sugars or synthetic sweeteners, perfumes, flavors, plasticizers, and fillers; and then milled and formed into sticks, sheets, or pellets. Cottonseed oil is sometimes also added to give the gum softness. Styrene butadiene rubber (SBR) is a synthetic elastomer that is widely used as a gum base in chewing gums. However, SBR is not widely used in manufacturing soft chew gums because it lacks the desired physical properties. Polyisobutylene is widely used in manufacturing soft chew gums even though it is much more expensive than SBR.

[0003] In any case, chewing gum compositions are typically comprised of a water soluble bulk portion, a water insoluble chewing gum base portion and typically water insoluble flavoring agents. The water soluble portion dissipates with a portion of the flavoring agent over a period of time during chewing. The gum base portion is retained in the mouth throughout the chewing process.

[0004] The gum base includes a number of ingredients that are subject to deterioration through oxidation during storage. The insoluble gum base is generally comprised of elastomers, elastomer plasticizers, waxes, fats, oils, softeners, emulsifiers, fillers, texturizers and miscellaneous ingredients, such as antioxidants, preservatives, colorants and whiteners. The compounds containing carbon-carbon double bonds, such as fats, oils, unsaturated elastomers and elastomer plasticizers, are susceptible to oxidation. The gum base constitutes between 5-95% by weight of the chewing gum composition, more typically 10-50% by weight of the chewing gum, and more commonly 15-35% by weight of the chewing gum.

[0005] In chewing gum base natural or artificial antioxidants are utilized to stabilize the rubbery polymer. For instance, beta-carotenes, acidulants (e.g. Vitamin C), propyl gallate, BHA, and BHT are commonly used to stabilize the rubber used in manufacturing chewing gum. Such antioxidants are included in chewing gum base as a stabilizer to inhibit oxidation.

[0006] Antioxidants are widely used in food products susceptible to degeneration, in one form or another, due to oxidation. "Antioxidants" are defined by the Food and Drug Administration (21 CFR §170.3) as "substances used to preserve food by retarding deterioration, rancidity, or discoloration due to oxidation." Commercial applications include use in processed meat and poultry, salad dressings, seasonings, snacks, nuts, soup bases, edible fats and oils, natural foods, pet foods and packaging. In addition to foods, antioxidants have been used to prevent oxidation in various cosmetic and toiletry products and in medicinal or pharmaceutical preparations. The primary purpose in each of these applications is to prevent deterioration of desirable product characteristics by inhibiting oxidation.

[0007] More recently, antioxidants in food sources and dietary supplements have received attention for their potential to prevent or delay the onset of certain cancers and other chronic health conditions including heart disease, cataracts and aging. The theory is that, by preventing oxidation, these materials inhibit the formation of oxygen containing free radicals that are believed to play a significant role in initiation of these conditions and other chronic disorders.

[0008] The use of spices to prevent food deterioration as well as to impart flavor has been known for centuries. Because of their cost and availability, however, synthetic antioxidants, such as butyl hydroxyanisole ("BHA") and butylated hydroxytoluene ("BHT"), have been predominant in commercial food preparation. These antioxidants have proven to be quite effective. However, there is currently a desire to utilize natural antioxidants in food products and chewing gum.

[0009] There is a growing desire for chewing gum base that is stabilized with a natural stabilizer. U.S. Pat. No. 4,489,099 discloses the use of Vitamin E in combination with dilauryl thiodipropionate (DLTDP), as a stabilizer for a styrene-butadiene rubber in chewing gum. U.S. Pat. No. 5,132,121, U.S. Pat. No. 5,200,213, and U.S. Pat. No. 5,270,060 disclose a use of 0.01-1.00% by weight of a tocopherol mixture comprising 7-20% by weight alpha tocopherol, 45-75% by weight gamma tocopherol and 18-32% by weight delta tocopherol to stabilize chewing gum base.

[0010] Carnosic acid is a phenolic diterpene that corresponds to the empirical formula $C_{20}H_{28}O_4$. It occurs naturally in plants of the Libiatae family. For instance, carnosic acid is a constituent of the species *Salvia officinalis* (sage) and *Rosmarinus officinalis* (rosemary) where it is mainly found in the leaves. Carnosic acid is also found in thyme and marjoram. It was discovered by Linde in *Salvia officinalis* [Helv. Chim Acta 47, 1234 (1962)] and by Wenkert et al. in *Rosmarinus officinalis* [J. Org. Chem. 30, 2931 (1965)]. It was then positively identified in various other species of sage, such as for example *Salvia canariensis* [Savona and Bruno, J. Nat. Prod. 46, 594 (1983)] or *Salvia willeana* [de la Torre et al., Phytochemistry 29, 668 (1990)]. It is also present in *Salvia triloba* and *Salvia selarea*.

[0011] Carnosic acid is a powerful antioxidant [Brieskorn and Domling, Z. Lebensm. Unters. Forsch. 141, 10 (1969)] and, according to a number of Russian works where it bears the name salvine, an antibiotic against *Staphylococcus aureus* [CA 86, 117603r; 90, 49011h; 97, 67513r, 69163a, 69164b; 104, 221930w; 111, 130594t] and against certain microorganisms responsible for dental caries and bad breath [CA 97, 84835q]. In connection with this latter property, it is disclosed in Japanese Patent Publication 59-103665 to Lion Corporation that carnosic acid can be incorporated into tooth paste and chewing gum to remove smells for the mouth. Japanese Patent Publication 11180839 also discloses that carnosic acid, carnosol, and rosmanol can be used in dentifrice, mouthwash, tablets for gargling, troches, candies, and chewing gum as a deodorant for the oral cavity.

[0012] Dried leaves of rosemary or sage contain between 1.5 and 2.5% carnosic acid and about 0.3-0.4% carnosol which is also an antioxidant. Rosmanol and rosmaridiphenol are present in smaller concentrations. Accordingly, from the point of view of the economy of a production process,

carnosic acid has an indisputable advantage. According to the data disclosed in U.S. Pat. No. 4,450,097 it may be calculated that the yield of rosmanol isolated from rosemary is only 0.01%.

[0013] Wenkert et al. have demonstrated that carnosol is an oxidative artifact of carnosic acid. This oxidation takes place in the presence of oxygen both after the harvesting of rosemary or sage in the leaves left to dry in air (it can be demonstrated that the freshly cut leaves of rosemary do not contain carnosol) and when the leaves are subjected to extraction with solvents or when the extracts themselves are subjected to conventional operations of fractionation, enrichment and purification. There is every reason to assume that rosmanol, which has been identified in a rosemary fraction subjected to an alkaline treatment, is itself a subsequent product of the oxidation of carnosic acid, as Wenkert et al. have suggested. The same may also be reasonably assumed of rosmaridiphenol. Carnosic acid is therefore the only phenolic diterpene present in the native state in rosemary and sage.

[0014] Some methods for the preparation of carnosic acid by chemical synthesis have also been proposed in the literature by W. L. Meyer et al. [Tetrahedron Letters 1966, 4261; 1968, 2963; J. Org. Chem. 41, 1005 (1976)]. However, the syntheses involved are long and complex and, for economic reasons, cannot be applied to an industrial process. In addition, these syntheses lead to racemic mixtures of carnosic acid precursors and not to the pure enantiomers. It should also be pointed out that these works stop at the preparation of carnosic acid precursors and omit to describe the final preparation step(s). Another method of obtaining carnosic acid has been described in the literature by Brieskorn and Domling [Arch. Pharm. 302, 641 (1969)], comprising the catalytic reduction of carnosol. Once again, the application of this process on a large scale could not be envisaged on account of the non-availability of carnosol.

[0015] U.S. Pat. No. 5,859,293 and U.S. Pat. No. 5,256,700 disclose techniques for extracting high purity carnosic acid from rosemary and sage. For example, U.S. Pat. No. 5,256,700 discloses a process for obtaining carnosic acid comprising extracting a vegetable material selected from the group consisting of sage and rosemary with an apolar solvent to obtain an extract containing apolar compounds including carnosic acid, contacting the extract with an adsorbent material having an affinity for polar compounds for adsorbing the carnosic acid to separate the carnosic acid from the apolar compounds of the extract, desorbing the adsorbent material with a polar solvent to obtain the carnosic acid in the solvent and then evaporating the polar solvent from the carnosic acid to obtain a residue containing the carnosic acid.

[0016] U.S. Pat. No. 6,180,144 discloses a chewing gum rubber composition (gum base) that utilizes carnosic acid from a Libiatae plant, such as rosemary or sage, as an antioxidant stabilizer. U.S. Pat. No. 6,180,144 more specifically discloses a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) carnosic acid. U.S. Pat. No. 6,180,144 further discloses a chewing gum which comprises: (1) about 5 weight percent to about 95 weight percent styrene-butadiene rubber, wherein said styrene-butadiene rubber has a bound styrene content of about 1 weight percent to about 10 weight percent, and wherein said styrene-butadiene rubber has a RPA t.sub.80 of at least 0.060 minutes; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) carnosic acid, (5) a sweetener, and (6) a flavor.

[0017] U.S. Pat. No. 6,231,896 discloses discloses a chewing gum rubber composition (gum base) that utilizes carnosic acid from a Libiatae plant, such as rosemary or sage, as an antioxidant stabilizer. This invention more specifically discloses a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) carnosic acid, wherein said chewing gum base is void of sweeteners, flavoring agents or colorants and a water-soluble portion.

SUMMARY OF THE INVENTION

[0018] This invention is based upon the discovery that lecithin can be employed to emulsify carnosic acid that is used to stabilize rubbery polymers, such as chewing gum base. Carnosic acid that has been emulsified with lecithin can be used to protect chewing gum rubber from oxidation and to stabilize it during processing and subsequently in the gum base and chewing gum. The carnosic acid will stabilize virtually any type of rubbery polymer used in chewing gum, such as styrene-butadiene rubber, polyisobutulene, isobutylene-isoprene copolymer elastomers, polyvinylacetate, natural gums, and mixtures thereof. Some specific examples of natural gums that can be stabilized with carnosic acid include jelutong, lechi caspi, perillo, massaranduba balatu, massaranduba chocolate, nispero, rosindinha, chicle, gutta hang kang, and mixtures thereof.

[0019] Carnosic acid that is emulsified with lecithin can also be used as an antioxidant in rubbers that are used in non-food applications. For example, it can be used to stabilize rubbers used in tires and industrial products, such as hoses and power transmission belts. In fact, carnosic acid that is emulsified with lecithin will act as an antioxidant in any unsaturated rubber (any rubber containing carbon-carbon double bonds). Thus, carnosic acid that is emulsified with lecithin can be used to stabilize styrene-butadiene rubber, high cis-1,4-polybutadiene rubber, medium vinyl polybutadiene rubber, synthesic polyisoprene rubber, natural rubber, styrene-isoprene rubber (SIR), styrene-isoprene-butadiene rubber (SIBR), nitrile rubber, carboxylated nitrile rubber, bromobutyl rubber, chlorobutyl rubber, and the like.

[0020] The present invention more specifically discloses a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight

percent to about 65 weight percent of a filler material; (4) carnosic acid, and (5) lecithin, wherein said chewing gum base is void of sweeteners.

[0021] The subject invention also reveals a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; (4) carnosic acid, and (5) lecithin, wherein said chewing gum base is void of flavoring agents.

[0022] The present invention further discloses a chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; (4) carnosic acid, and (5) lecithin, wherein said chewing gum base is void of colorants.

[0023] The present invention also reveals a stabilizer rubber which is comprised of a rubbery polymer, carnosic acid, and lecithin, wherein said stabilized rubber is void of sweeteners and/or flavoring agents. Such stabilized rubbers can also be void of colorants and humectants. The rubbery polymer can be virtually any synthetic or natural rubber, such as styrene-butadiene rubber, polybutadiene rubber, natural rubber synthetic polyisoprene rubber, styrene-isoprene rubber, styrene-isoprene-butadiene rubber, nitrile rubber, carboxylated nitrile rubber, and the like.

DETAILED DESCRIPTION OF THE INVENTION

[0024] This invention reveals the use of carnosic acid that is emulsified with lecithin as a stabilizer system for rubbery polymers. Carnosic acid is particularly useful for stabilizing chewing gum rubber compositions. The carnosic acid protects the rubber during processing and provides it with adequate antioxidant protection during the service life of the final product, such as chewing gum, tires, hoses, belts, and the like. The carnosic acid used will typically come from a plant in the Libiatae family, such as rosemary, sage, thyme or marjoram. Unfortunately, antioxidants extracted from naturally occurring spices generally exhibit flavors, odors, and colors that can be undesirable in some applications. Accordingly, efforts are typically made to extract the carnosic acid from the plant material in high purity. High purity carnosic acid is typically recovered by extraction and isolation from plant matter of the Labiatae family. Various techniques for recovering carnosic acid from Labiatae plants is disclosed in U.S. Pat. No. 5,859,293, U.S. Pat. No. 5,256,700, U.S. Pat. No. 5,061,403, and U.S. Pat. No. 4,450,097. The teachings of these patents are hereby incorporated herein by reference in their entirety.

[0025] It should be noted that other compounds having antioxidant characteristics will also frequently be present in the carnosic acid source. For instance, carnosol, rosmanol and rosmaridiphenol will also frequently be present. It is believed that carnosol, rosmanol and rosmaridiphenol help to further improve the stability of rubbery polymers. Thus, there is no need to make an effort to remove them from the carnosic acid source. In fact, the carnosol, rosmanol and/or rosmaridiphenol may act synergistically with the carnosic acid to improve the stability of the rubbery polymer. In some applications, the flavor of the spice, such as rosemary, is desirable. In such cases it is not necessary to highly purify the carnosic acid in an effort to remove the flavor of the spice. A rosemary extract having the aroma and flavor characteristics of rosemary is commercially available from Cultor Food Science, Inc.

[0026] The chewing gum base compositions of this invention are comprised of (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; and (4) carnosic acid. The rubbery elastomer used in the chewing gum base will typically be a styrene-butadiene rubber, a polyisobutylene rubber, a isobutylene-isoprene copolymer elastomers, a polyvinylacetate, or a natural gum, such as jelutong, lechi caspi, perillo, massaranduba balata, massaranduba chocolate, nispero, rosindinha, chicle, gutta hang kang, and mixtures thereof. The rubbery elastomer can, of course, also be a mixture of such natural and synthetic rubbery polymers. These chewing gum rubber compositions can then be used with excellent results as the gum base in the production of chewing gum. The chewing gum base compositions of this invention will be employed in conjunction with other chewing gum ingredients (additives) to form chewing gum. More specifically, sweeteners, flavoring agents, and colorants are added to the chewing gum base in manufacturing chewing gum. A humectant, such as aqueous sorbitol or glycerin, is also normally added to chewing gum base in manufacturing chewing gum. This is because chewing gum base, including the chewing gum base of this invention, is void of sweeteners, flavoring agents, colorants (including whiteners), and humectants.

[0027] The carnosic acid can be distributed throughout rubbery polymer using a variety of techniques known to those skilled in the art. The preferred means of distributing the carnosic acid throughout synthetic rubbers synthesized by emulsion polymerization is by emulsifying it with a food grade emulsifier and then to add it to the emulsion of the rubber. The latex can then be coagulated using a standard salt-acid coagulation system known to those skilled in the art. The rubber composition which contains the carnosic acid can then be processed into chewing gum or other rubber products using standard techniques. The stabilized rubber compositions of this invention will contain a sufficient amount of carnosic acid to stabilize the chewing gum base. Normally the stabilized rubber will contain about 0.0001 phr to about 1 phr (parts by weight per 100 parts by weight of rubber) of carnosic acid. The stabilized rubber compositions of this invention will more typically contain about 0.0005 phr to about 0.1 phr of carnosic acid. The stabilized rubber compositions of this invention will preferably contain about 0.001 phr to about 0.05 phr of carnosic acid. The stabilized rubber compositions of this invention will preferably contain about 0.01 phr to about 0.03 phr of carnosic acid.

[0028] A number of food grade emulsifiers are satisfactory for emulsification of the carnosic acid. The food grade emulsifier will, of course, be used in a sufficient amount to emulsify the carnosic acid. Normally, from about 0.25 phr to about 5 phr of the food grade emulsifier will be utilized.

More typically, from about 0.5 phr to about 2 phr of the food grade emulsifier will be employed. Saponified fatty acids can be used for this purpose. For instance, the emulsifier can be a vegetable oil, a mono-glyceride, a diglyceride, a triglyceride, lecithin, a hydrogenated fat or oil, a partially hydrogenated fat or oil, an edible animal fat or oil, or a salt of a fatty acid. Lecithin (phosphatidylcholine) is a food grade emulsifier that is highly preferred for this purpose. Lecithin is a phosphatide that is found in all living organisms (animal and plant) and is a significant constituent of nervous tissue and brain substance. It is widely used by the food industry because it is edible and digestible.

[0029] After being recovered and dried the rubber containing carnosic acid can be used in making chewing gum base. The chewing gum will incorporate the rubbery polymer and, optionally, various other water-insoluble elastomeric components that contribute to the elasticity of the chewing gum and the longevity of the chew. The elastomeric component generally constitute about 5 to about 95 weight percent of the gum base, more preferably about 10 to about 70 weight percent of the gum base and most preferably about 15 to about 45 weight percent of the gum base.

[0030] In addition to the rubbery elastomer, the gum base will typically include elastomer plasticizers, waxes, softeners/emulsifiers, fillers/texturizers, colorants, a stabilizer, and whiteners. Elastomer plasticizers constitute from about 0 to about 75 percent by weight of the gum base, preferably 5 to 45 per cent by weight and most preferably 10 to 30 per cent by weight. Elastomer plasticizers include natural rosin esters such as glycerol ester of partially hydrogenated rosin, glycerol ester of polymerized rosin, glycerol ester of partially dimerized rosin, glycerol ester of rosin, pentaerythritol esters of partially hydrogenated rosin, methyl and partially hydrogenated methyl esters of rosin, pentaerythritol ester of rosin or mixtures thereof. Elastomer plasticizers also include synthetics materials, such as terpene resins derived from alpha-pinene, beta-pinene and/or d-limonene.

[0031] The stabilizer included in the gum base will of course contain carnosic acid. The stabilizer system will also frequently contain carnosol, rosmanol, and roomaridiphenol since they are frequently present in the carnosic acid source. Other antioxidants such as Vitamin C, Vitamin E and various mixtures of tocopherols, such as those described in U.S. Pat. No. 5,270,060 can also be included in the stabilizer system.

[0032] Waxes include synthetic (e.g. polyethylene and Fischer-Tropsch waxes) and natural (candelilla carnauba, beeswax, rice bran or mixtures thereof) and petroleum (e.g. microcrystalline and paraffin). Waxes, when used, generally constitute up to 30 weight percent of the gum base.

[0033] Softeners/emulsifiers include tallow, hydrogenated tallow, hydrogenated and partially hydrogenated vegetable oils, cocoa butter, glycerol monostearate, glycerol triacetate, lecithin, monoglycerides, diglycerides and triglycerides, acetylated glycerides and fatty acids (e.g. stearic, palmitic, oleic, linoleic and linolenic acids) or mixtures thereof. Softeners/emulsifiers generally constitute between 0.5 and 40 weight per cent of the gum base.

[0034] Fillers/texturizers include magnesium and calcium carbonate, ground limestone and silicate types such as magnesium and aluminum silicate, clay, alumina, talc as well as titanium oxide, monocalcium phosphite, dicalcium phosphite and tricalcium phosphate, cellulose polymers such as ethyl, methyl and wood or mixtures thereof. Preferably, the filler comprises about 1 to about 65 percent by weight of the gum base. Colorants and whiteners include FD&C-type dyes and lakes, fruit and vegetable extracts, titanium dioxide or mixtures thereof.

[0035] The gum base is typically prepared by adding an amount of the elastomer, elastomer plasticizers and filler to a heated sigma blade mixer with a front to rear blade speed ratio of typically 2:1. The initial amounts of ingredients are determined by the working capacity of the mixing kettle in order to attain a proper consistency. After the initial ingredients have massed homogeneously, the balance of the elastomer plasticizer, filler, softeners, etc. are added in a sequential manner until a completely homogeneous molten mass is attained. This can usually be achieved in about one to about four hours, depending on the formulation. The final mass temperature can be between 60° C. and 150° C., more preferably between 80° C. and 120° C. The completed molten mass is emptied from the mixing kettle into coated or lined pans, extruded or cast into any desirable shape and allowed to cool and solidify.

[0036] The water-soluble portion of the chewing gum may comprise softeners, sweeteners, flavoring agents and combinations thereof. Softeners are added to the chewing gum in order to optimize the chewability and mouth feel of the gum. Softeners, also known in the art as plasticizers or plasticizing agents, generally constitute between about 0.5 to about 15.0 percent by weight of the chewing gum. Softeners contemplated by the present invention include glycerin, lecithin, and combinations thereof. Further, aqueous sweetener solutions such as those containing sorbitol, hydrogenated starch hydrolysates, corn syrup and combinations thereof may be used as softeners and binding agents in gum.

[0037] Bulk sweeteners constitute between 20-80% by weight of the chewing gum and may include both sugar and sugarless sweeteners and components. Sugar sweeteners may include saccharide-containing components including but not limited to sucrose, maltose, dextrin, dried invert sugar, levulose, galactose, corn syrup solids, and the like, alone or in combination. The sugar can also be a monosaccharides of 5 or 6 carbon atoms, such as arabinose, xylose, ribose, glucose, mannose, galactose, fructose, dextrose, or sorbose or mixtures of two or more of the foregoing monosaccharides, disaccharides, for example, sucrose such as cane or beet sugar, lactose, maltose or cellobiose; polysaccharides, such as partially hydrolyzed starch or dextrin.

[0038] Sugarless sweeteners include components with sweetening characteristics but are devoid of the commonly known sugars. Sugarless sweeteners include, but are not limited to, sugar alcohols such as sorbitol, mannitol, xylitol, hydrogenated starch hydrolysates, maltitol, and the like, alone or in combination. Some additional examples of artificial sweeteners which may be employed include sodium, calcium or ammonium saccharin salts, free saccharin and, dihydrochalcones, dipotassium glycyrrhizin, glycyrrhizic acid ammonium salt, L-aspartyl-L-phenylalanine methyl ester (aspartame), the sodium or potassium salt of 3,4-dihydro-6-methyl- 1,2,3-oxathiazine-4-one-2,2-dioxide

(Ace-sulfame-K), as well as *Stevia rebaudiana* (Stevioside), *Richardella dulcifica* (Miracle Berry), *Diascoreophyllum cumminsii* (Serendipity Berry), cyclamate salts, and the like, or mixtures of any two or more of the above.

[0039] High intensity sweeteners can also be present. Such high intensity sweeteners may include but are not limited to sucralose, aspartame, salts of acesulfame, alitame, saccharin and its salts, cyclamic acid and its salts, dihydrochalcones, thaumatin, monellin, and the like, alone or in combination.

[0040] Combinations of sugar and/or sugarless sweeteners may be used in the chewing gum. The sweetener may also function in the chewing gum in whole or in part as a water soluble bulking agent. Additionally, the softener may also provide additional sweetness, such as with aqueous sugar or alditol solutions.

[0041] One or more flavoring agents may be present in the chewing gum in an amount within the range of about 0.1 to about 10.0 percent and preferably from about 0.5 to about 5.0 weight percent of the gum. The flavoring agents may comprise essential oils, natural or synthetic flavors or mixtures thereof including but not limited to oils derived from plants and fruits such as citrus oils, fruit essences, peppermint oil, spearmint oil, other mint oils, clove oil, oil of wintergreen, anise, and the like. Artificial flavoring agents and components are also contemplated. Those skilled in the art will recognize that natural and artificial flavoring agents may be combined in various acceptable fashions. Optional ingredients such as emulsifiers and pharmaceutical agents may also be added to the chewing gum. For instance, from about 0.05 weight percent to about 3 weight percent of a fluoridating ingredient can be added to the chewing gum for the prevention of dental caries. Some representative examples of fluoridating agents that can be used include alkali metal fluorides, ammonium fluoride, stannous fluoride, stannous chlorofluoride, potassium stannous fluoride, alkali metal monofluorophosphates, ammonium monofluorophosphate, and the like.

[0042] In general, chewing gum is manufactured by sequentially adding the various chewing gum ingredients to a commercially available mixer known in the art. After the ingredients have been thoroughly mixed, the gum mass is discharged from the mixer and shaped into the desired form such as by rolling into sheets and cutting into sticks, extruding into chunks, or casting into pellets.

[0043] Generally, the ingredients are mixed by first softening (e.g. with heat) the gum base and adding it to the running mixer. The gum base can also be softened in the mixer itself. Color or emulsifiers may also be added at this time. A softener, such as glycerin, may also be added at this time along with syrup and a portion of the bulking agent. Further portions of the bulking agent portion may then be added to the mixer. A flavoring agent is typically added with the final portion of the bulking agent.

[0044] The entire mixing procedure typically takes from five to fifteen minutes, but longer mixing times may sometimes be required. Those skilled in the art will recognize that variations of the above described procedure, or different procedures, may be followed.

[0045] This invention is illustrated by the following example that are merely for the purpose of illustration and are not to be regarded as limiting the scope of the invention or the manner in which it can be practiced. Unless specifically indicated otherwise, parts and percentages are given by weight.

EXAMPLE

[0046] In this experiment SBR latex was stabilized by adding 0.3 phr of Guardian GP (from Cultor Food Science) thereto. Guardian GP is a natural extract of rosemary containing carnosic acid having the aroma and flavor characteristics of rosemary. The SBR latex was subsequently coagulated and dried.

[0047] The stabilized SBR was then aged at 70° C. in a forced air circulating oven for 28 days. The elastic modulus (G') at 50 rpm and Mooney ML1+4 viscosity at 100° C. of the SBR sample were measured after 3 days, 7 days, 14 days, 21 days, and 28 days. A control SBR that was stabilized with 0.3 phr of BHA was also evaluated. The results of this evaluation are shown in Table I (Mooney ML1+4 viscosity) and Table II (G').

TABLE I

	Mooney ML1 + 4 Viscosity at 100°	
Days of Aging	Carnosic Acid Stabilized	BHA Stabilized
0	55.7	54.7
3	60.2	55.7
7	60.3	50
14	58.4	32.8
21	58.4	30.8
28	55	33.6

[0048]

TABLE II

	G' at 50 rpm	
Days of Aging	Carnosic Acid Stabilized	BHA Stabilized
0	81.3	81.9
3	80.3	78.0
7	79.6	68.9
14	77.3	46.7
21	77.3	27.6
28	75.7	25.2

[0049] This experiment shows that the carnosic acid in the rosemary extract was highly effective at maintaining original elastic properties after heat aging for 28 days. In fact, the carnosic acid proved to be superior for stabilizing the SBR as compared to BHA.

[0050] While certain representative embodiments and details have been shown for the purpose of illustrating the subject invention, it will be apparent to those skilled in this art that various changes and modifications can be made therein without departing from the scope of the subject invention.

What is claimed is:

1. A chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an

elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; (4) carnosic acid, and (5) lecithin, wherein said chewing gum base is void of sweeteners.

2. A chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; (4) carnosic acid, and (5) lecithin, wherein said chewing gum base is void of flavoring agents.

3. A chewing gum base comprising: (1) about 5 weight percent to about 95 weight percent of a rubbery elastomer; (2) about 0 weight percent to about 75 weight percent of an elastomer plasticizer selected from the group consisting of natural rosin esters and synthetic terpene resins; (3) about 1 weight percent to about 65 weight percent of a filler material; (4) carnosic acid, and (5) lecithin, wherein said chewing gum base is void of colorants.

4. A chewing gum base as specified in claim 1 wherein the carnosic acid is present at a level which is within the range of about 0.0001 phr to about 1 phr.

5. A chewing gum base as specified in claim 4 wherein lecithin emulsifies the carnosic acid.

6. A gum base as specified in claim 5 wherein the rubbery polymer is styrene-butadiene rubber and wherein said gum base contains from about 10 weight percent to about 70 weight percent of the styrene-butadiene rubber.

7. A gum base as specified in claim 6 wherein the carnosic acid is present at a level which is within the range of about 0.0005 phr to about 0.1 phr.

8. A gum base as specified in claim 6 wherein the carnosic acid is present at a level which is within the range of about 0.001 phr to about 0.05 phr.

9. A gum base as specified in claim 6 wherein the carnosic acid is present at a level which is within the range of about 0.01 phr to about 0.03 phr.

10. A gum base as specified in claim 7 wherein said gum base is further comprised of an additional antioxidant selected from the group consisting of carnosol, rosmanol and rosmaridiphenol.

11. A gum base as specified in claim 7 wherein said gum base contains from about 15 weight percent to about 45 weight percent of the styrene-butadiene rubber.

12. A gum base as specified in claim 5 wherein said gum base contains from about 5 to about 45 weight percent of the elastomer plasticizer.

13. A gum base as specified in claim 5 wherein said gum base contains from about 10 to about 30 weight percent of the elastomer plasticizer.

14. A gum base as specified in claim 12 wherein the elastomer plasticizer is a natural rosin ester.

15. A gum base as specified in claim 12 wherein the elastomer plasticizer is a synthetic terpene resin.

16. A gum base as specified in claim 5 wherein said gum base is further comprised of up to 30 weight percent of a wax selected from the group consisting of natural waxes, synthetic waxes, petroleum waxes, and mixtures thereof.

17. A gum base as specified in claim 5 further comprising between 0.5 and 40 weight percent of a softener selected from the group consisting of tallow, hydrogenated tallow, hydrogenated and partially hydrogenated vegetable oils, cocoa butter, glycerol monostearate, glycerol triacetate, lecithin, monoglycerides, diglycerides, triglycerides, fatty acids, and mixtures thereof.

18. A gum base as specified in claim 5 wherein the filler material comprises one or more materials selected from the group consisting of magnesium carbonate, calcium carbonate, ground limestone, magnesium silicate, aluminum silicate, clay, alumina, talc, titanium oxide, monocalcium phosphate, dicalcium phosphate, tricalcium phosphate, cellulose polymers, wood and mixtures thereof.

19. A gum base as specified in claim 1 wherein said gum base is void of humectants.

20. A gum base as specified in claim 19 wherein said gum base is void of flavoring agents.

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International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : A23G 3/30 | A2

(11) International Publication Number: WO 00/08944

(43) International Publication Date: 24 February 2000 (24.02.00)

(21) International Application Number: PCT/US99/15388

(22) International Filing Date: 8 July 1999 (08.07.99)

(30) Priority Data:
09/131,771 11 August 1998 (11.08.98) US

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(81) Designated States: AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, UZ, VN, YU, ZA, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
Without international search report and to be republished upon receipt of that report.

(54) Title: NON–STICK CHEWING GUM MADE FROM PLASTICIZED PROTEINACEOUS MATERIALS AND COMPOSITIONS CONTAINING THE SAME

(57) Abstract

A non–stick chewing gum composition containing from about 2 to 25 % of a plasticized proteinaceous material and a combination of gum base materials, absent elastomer solvent and wax, which render the composition non–stick with respect to non–porous surfaces such as denture materials as well as common surfaces such as floors and including porous surfaces such as carpets.

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NON-STICK CHEWING GUM MADE FROM PLASTICIZED PROTEINACEOUS MATERIALS AND COMPOSITIONS CONTAINING THE SAME

BACKGROUND OF THE INVENTION

Field of the Invention:

The invention relates to the use of plasticized proteinaceous materials and composition containing the same especially for the preparation of chewing gums which have unique non-stick properties. The chewing gums, in addition to non-stick properties on a wide variety of substrates including porous and non-porous substrates, possess high flavor properties similar to conventional chewing gums.

The plasticized proteinaceous material is made by first combining at least one protein and at least one plasticizer into a solid state combination which is then treated under heat and controlled shear conditions to produce a plasticized proteinaceous material having properties, which when blended with other

ingredients employed in the chewing gum composition, provide the chewing gum with non-stick properties.

Description of the Prior Art:

Chewing gums are traditionally comprised of a water insoluble base portion and a water soluble portion which contains flavors and sweeteners. The base portion includes a gum base part which includes a masticatory substance which imparts the chew characteristics to the final product. The gum base typically defines the release profile of flavors, and sweeteners and plays a significant role in the gum product. The flavors and sweeteners provide the sensory appeal aspects of the chewing gum.

Chewing gum bases conventionally contain materials called elastomers which provide the bounce or rubber character to the gum. Elastomers are water-insoluble polymers, both natural, such as natural rubbers and chicle, and synthetic polymers, such as styrene butadiene copolymers, polyisobutylene, polyethylene and the like. The elastomers are usually combined with polyvinyl acetates (PVAc) of varying molecular weight to provide stretch or elasticity to the gum base. Conventional gums will also contain materials such as resins which are used as elastomer solvents to soften the elastomer; waxes; fats and/or oils which can act as plasticizers; fillers and optionally, antioxidants and emulsifiers.

Conventional ingredients and techniques for the manufacture of chewing gums are known such as described in Sugar Confectionery Manufacture, 2nd Edition, E.B. Jackson, editor, Blackie Academic & Professional, Glasgow, NZ (1995), at pages 259-286, incorporated herein by reference.

Efforts have been made to provide chewing gum compositions with non-stick properties, typically by eliminating waxes. For example, U.S. Patent No. 5,482,722 and U.S. Patent No. 5,462,754 disclose a gum composition containing a wax free gum base, natural and synthetic elastomers, fats and oils and/or softeners.

U.S. Patent No. 5,424,081 discloses a non-adhesive chewing gum base including a gluten component and a protein condensing agent. U.S. Patent No. 4,241,090 is directed to a non-adhesive chewing gum composition containing alpha cellulose and one or more thickening agents including hydrolyzed cereal solids, malto-dextrin, modified food starch and the like.

International Publication No's. WO 95/32,634 and WO 95/32,637 disclose non-stick gum compositions containing medium chain triglycerides. U.S. Patent No. 5,431,930 concerns a non-stick gum composition with medium chain triglycerides and lecithin. Other non-stick gum compositions are disclosed in U.S. Patent No's. 5,437,875; 5,437,876; 5,437,877; as well as, International Publication No's. WO 93/17570; WO 93/17572; and WO 93/17575.

Prior art non-stick gum compositions of the type mentioned above are disadvantageous because they are non-stick only on smooth non-porous surfaces such as denture material and/or have inadequate sweetness and/or flavor release properties.

An effort to provide a gum composition that is non stick on both porous and non-porous surfaces is disclosed in U.S. Patent No. 5,601,858 which discloses a non-stick chewing gum base composition which is free from fats, waxes, and elastomer solvent resins. The gum base includes (a) a blend of polyvinylacetates having different molecular weights, (b) a non-elastomer solvent resin plasticizer including glycerol triacetate, acetylated monoglyceride and mixtures thereof and (c) a filler such as calcium carbonate, alumina, talc, clay and the like. The gum composition is non-stick with respect to a variety of surfaces including, denture material, wood, asphalt, concrete, carpet, hair and cloth.

Native proteins, due to their general lack of flexibility, do not exhibit or mimic properties of gum base such as elasticity, extensibility and chewability. Denatured proteins have been used in chewing gums but the art has not provided protein-based gums on a sensory level with conventional gums nor with non-stick properties. For example, U.S. Patent No. 5,482,722 discloses a proteinaceous chewable base for use with confectionery products in which prolamine is dissolved in an alcohol/water solvent system and a texturizing agent is added to form a precipitate with the texturizing agent entrapped therein.

While such systems can be used to form proteinaceous materials that can be substituted for elastomers conventionally used in gums and confectionery compositions, such materials still do not effectively convey the same sensory properties that are associated with conventional chewing gums nor do they provide for non-stick properties.

It would therefore be a significant advance in the art of developing chewing gums to provide the same with non-stick properties that are effective on a wide variety of surfaces, including porous and non-porous surfaces such as leather, rubber and the like and which have the same or similar sensory characteristics as conventional gums.

SUMMARY OF THE INVENTION

The present invention is in part directed to non-stick chewing compositions containing plasticized proteinaceous materials which are derived from the combination or blend of at least one protein (i.e. a protein component) and at least one plasticizer (i.e. a plasticizer component). The blend is preferably heated under controlled shear conditions to produce a plasticized proteinaceous material which in combination with certain conventional ingredients of chewing gums imparts desired non-stick properties to the product while providing the product with desirable taste and sensory characteristics.

More specifically, the present invention is directed to a non-stick chewing gum composition comprising:

a) from about 2 to 25% by weight of a plasticized proteinaceous material comprising a protein component and plasticizer component wherein a solid state blend of the protein component and the plasticizer component have been heated under controlled shear conditions at a temperature of from about 20°C to about 140°C;

b) in combination with chewing gum base ingredients in an amount sufficient to impart chewing gum characteristics to the chewing gum composition in the absence of an elastomer solvent and a wax.

In a particular aspect of the present invention, the non-stick chewing gum composition contains, in addition to the plasticized proteinaceous material, an elastomeric material and/or polyvinyl acetate as well as a softener/emulsifier which serves as plasticizer for the elastomeric material and/or the polyvinyl acetate.

DETAILED DESCRIPTION OF THE INVENTION

In general, the present invention is directed to non-stick chewing gum compositions containing plasticized proteinaceous materials wherein a plasticizer or mixture thereof (plasticizer component) is dispersed within a matrix of at least one protein (protein component).

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As used herein, the term "gum base" shall include those materials which form the gum composition absent those materials including sugar, flavors and colorants which impart a desirable taste and color to the gum composition. The term "gum composition" shall include the gum base materials in addition to sugar, flavors and colorants.

The successful formation of a plasticized proteinaceous material for use in accordance with the present invention depends first upon the proper selection of one or more blends comprising a protein or mixture thereof and a plasticizer or mixture thereof. Preferred combinations of the protein and plasticizer can be ascertained by variables including the solubility parameter, the free volume of the blend, and the glass transition temperature of the blend as described in detail in U.S. Patent Application Serial No. 08/936,570 filed September 24, 1997, the entire contents of which is incorporated herein by reference.

The resulting blend of the protein component and the plasticizer component is then processed, preferably under heating and under controlled shear conditions, to provide a plasticized proteinaceous material which can replace one or more of the conventional ingredients in chewing gums (e.g. waxes) and when combined with certain combinations of other conventional ingredients imparts non-stick properties to the chewing gum composition while achieving desirable taste and sensory properties.

The preferred process for making the plasticized proteinaceous material denatures the protein component in a melt state, i.e., a protein component in the form of a viscous liquid. More specifically the process comprises heating under controlled shear conditions the blend of the protein component and the plasticizer component preferably in the solid state prior to processing, such that upon cooling, the plasticizer component becomes entrapped within a denatured matrix of the protein component.

Melting, or fusing, is a term generally used to describe the transformation of materials from the solid to liquid phase by the application of heat. Material that melts has flow and processability. As is found with many of the synthetic polymers, proteins generally do not melt or flow upon heating. They usually decompose before the temperatures necessary to melt a protein can be reached. Plasticizers are substances which are usually added to polymeric materials to provide a blended material which will flow upon heating and thereby increase the workability or flexibility of the polymer. The heating of a blend of the plasticizer component with a protein component in the solid state to the melt state occurs without concomitant decomposition of the protein component and with concomitant denaturation of the protein component. It will be understood that a single protein or mixture of proteins may be combined with a single plasticizer or mixture of plasticizers to form a blend.

The selection of a suitable protein or mixture thereof will depend in part on the molecular weight of the protein and its processability within the range of

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temperatures desired for the formation of the non-stick gum. Typical processing temperatures for forming chewing gums are within the range of from about 40° to 120°C. A suitable protein is also amenable to processing using conventional mixing equipment including extruders, blenders and the like.

The molecular weight of the protein must be sufficiently high so that the protein is classified as a polymer. Molecular weights of at least about 5,000, preferably at least about 10,000 are suitable.

The protein selected for the formation of the plasticized proteinaceous material must be matched with a suitable plasticizer. This process which considers the solubility parameter, free volume and glass transition temperature is described in detail in U.S. Patent Application Serial No. 08/936,570 filed September 24, 1997.

The matching of a suitable protein component with a plasticizer component depends first on considering the solubility parameters of the protein component and the plasticizer component which are determined by their relative cohesive properties. The solubility parameter of various materials and methods of calculating the same is known in the art as disclosed, for example, in D.W. Van Krevelen Elsevier "Properties of Polymers" (1990), incorporated herein by reference as well as U.S. Patent Application Serial No. 08/936,570.

The normal effect of increasing the free volume of a polymer is that it is plasticized (i.e. the glass transition temperature is lower, the modulus and tensile strength decreases, and the elongation and impact strength increases). However, the freedom of movement afforded by the plasticizer also permits the polymer molecules, if it is their nature to do so, to associate tightly with each other.

In general, free volume is based on the principle that a suitable plasticizer increases the free volume of the protein. An increase in the free volume of the protein increases the mobility of the protein and therefore the extent of plasticization. Thus, if more plasticization is desired, the amount of the plasticizer can be increased as described in U.S. Patent Application Serial No. 08/936,570.

Once a potential blend of a protein component and a plasticizer component has been identified by comparing the respective solubility parameter values of the protein component and the plasticizer component alone or optionally the free volume of the blend as discussed above, the glass transition temperature of the end product (plasticized proteinaceous material) must be considered. For example, for chewing gums a suitable glass transition temperature for the plasticized proteinaceous material is in the range of, for example, from about 35° to 45°C.

The glass transition temperature of the plasticized proteinaceous material therefore is determined by the ratio of the respective coefficients of thermal expansion, the volume fraction of the plasticizer component and the difference

between the respective glass transition temperatures of the plasticizer component and the protein component. Generally, the glass transition temperature of the plasticized proteinaceous material can be increased by selecting a plasticizer component having a relatively high coefficient of thermal expansion and/or a higher glass transition temperature. If a lower glass transition temperature of the plasticized proteinaceous material is desired, it is appropriate to select a protein having a relatively high coefficient of thermal expansion and/or a lower glass transition temperature.

The proteins suitable for use in the present invention may be any synthetic or natural protein such as any plant or animal protein which is water insoluble. The protein may be enzymatically modified, chemically modified or the product of genetic engineering technology. The protein may be substantially pure or may be a part of a mixture such as in a grain fraction. It will be understood that when grain fractions are employed, the glass transition temperature of one batch may differ from another and this may affect the solubility parameter values and/or the glass transition temperature thereof.

The protein may be selected from but not limited to:

grain proteins such as corn, wheat, barley, rice, oat, soya and sorghum proteins and their fractions including gluten and prolamines such as zein, glutenin and gliadin; and

animal proteins such as collagen, egg and milk proteins including gelatin, egg albumin (ovalbumin), lactalbumin, casein and sodium caseinate, whey, and milk isolates such as blends of caseinate and whey.

Preferred protein components contain at least one protein material selected from wheat, corn, rice, soybean milk and animal proteins.

In addition to insolubility in water other factors may be preferred for the protein including viscoelastic properties. For example, a product having a more viscoelastic character is generally provided by use of a protein component selected from the wheat and corn protein groupings including corn zein and wheat gliadin, or gelatin, and their blends. By contrast a product having less viscoelastic character is generally provided by use of a protein component selected from egg white, whey and sodium caseinate.

The plasticizer, as discussed previously herein, is a material which provides both workability to the plasticized proteinaceous material and contributes to its viscoelastic character. The plasticizer or mixture thereof suitable for use in the present invention may be selected from a variety of materials including organic plasticizers and those like water which do not contain organic compounds.

Organic plasticizers which are the preferred class of plasticizers include, but are not limited to, phthalate derivatives such as dimethyl, diethyl and dibutyl phthalate; polyethylene glycols with molecular weights preferably from about 200 to 6,000; glycerol; glycols such as polypropylene, propylene, polyethylene and

ethylene glycol; citric esters such as tributyl, triethyl and triacetyl citrates; surfactants such as sodium dodecyl sulfate, polyoxymethylene (20) sorbitan and polyoxyethylene (20) sorbitan monooleate, blended with water; alcohols such as ethanol and isopropyl alcohol; organic acids such as acetic and lactic acids and their lower alkyl esters; bulk sweeteners such as sorbitol, mannitol, xylitol and lycasin; fats/oils such as vegetable oil, seed oil and castor oil; acetylated monoglyceride; triacetin; sucrose esters; traditional flavor oils; or mixtures thereof. Preferred organic plasticizers are the polyols such as glycerol and the glycols, especially propylene glycol, polypropylene glycol, ethylene glycol and polyethylene glycol, and organic acids especially lactic and acetic acid, and their corresponding esters.

The amount of the protein component present in the protein/plasticizer blend will vary as discussed above. Consideration must be given to the desired glass transition temperature of the plasticized proteinaceous material. Typically the amount of protein component will be at least 40% by weight and most typically at least 50% by weight. Especially good plasticized proteinaceous materials are generally obtained when the amount of the protein component is from about 60 to 75% by weight.

Preferred amounts of typical plasticizers based on the total weight of the protein/plasticizer blend include, for example, aqueous ethanol (20-40% by weight), propylene glycol (20-40% by weight) ethylene glycol (10-30% by weight), and acetic acid and lactic acid (10-30% by weight). It will be understood that for

applications involving food products (e.g. chewing gum and confectionery compositions) ethanol may not be preferred because of regulatory requirements governing its use.

Preferred blends of proteins and plasticizers for non-stick chewing gums in accordance with the present invention include zein/propylene glycol/glycerol; zein/glycerol/propylene glycol/acetic acid/water; zein/lactic acid/glycerol/propylene glycol/glycol; and zein/lactic acid/propylene glycol/ethyl lactate/butyl lactate/ethyl acetate/glycerol.

The protein component and the plasticizer component are each used in the dry state, i.e., a pre-blend of protein and plasticizer would have the physical properties of a powder with the plasticizer dispersed uniformly with the protein. The protein/plasticizer blend will usually be comprised of a blend of proteins, and/or a blend or plasticizers to take advantage of the property of each component so as to maximize the compatibility of the components of the blend.

The protein and plasticizer are combined into a blend and the blend is treated to form a mixture with the plasticizer dispersed within a matrix of the protein. In a preferred form of the invention, the mixture of the protein and the plasticizer comprises a highly viscous material at the melt stage of the protein (i.e. a plasticized proteinaceous material). Both the melt temperature and the viscosity of the blend at the melt temperature can be affected by the type and the amount of plasticizer present. In general, the greater the amount of plasticizer used in the

practice of the present invention to form the plasticized proteinaceous material, the lower the melt temperature and the lower the viscosity of the blend used to form the plasticized proteinaceous material.

Other materials are blended with the protein component either prior to or after the melt-plasticization. Varying amounts of the protein component and the plasticizer component can be used to provide materials which impart non-stick properties to the chewing gum composition in part because materials such as conventional elastomer solvents (e.g. rosins) and waxes (e.g. paraffin, microcrystalline or natural waxes) are omitted from the chewing gum composition of the present invention. In the production of non-stick chewing gum compositions of the present invention, combinations of gum base materials in desirable amounts provide the non-stick chewing gum composition with excellent taste and sensory properties.

More specifically, the non-stick chewing gum composition of the present invention comprises the combination of a plasticized proteinaceous material as previously defined in combination with a unique combination of gum base materials in effective amounts which provide non-stick properties on a variety of porous and non-porous substrates and desirable taste and sensory characteristics.

The plasticized proteinaceous material is present in the gum base of the chewing gum composition in an amount typically from about 2 to 25% by weight, preferably from about 5 to 15% by weight.

The preferred non-stick gum composition also includes gum base materials including an elastomeric material (i.e. elastomers) and/or polyvinyl acetate, as well as softeners (emulsifier).

The elastomers can include natural and/or synthetic elastomers. Examples of natural elastomers include jelutong, lechi, caspi, perillo, sorva, massaranduba balata, massaranduba chocolate, nispero, rosindinha, chicle, gutta hang kang, smoked or liquid latex, and guayule and combinations thereof.

Examples of synthetic elastomers include polyisobutylene, isobutylene-isoprene copolymer, styrene-butadiene copolymer, vinyl acetate-vinyl laurate copolymer, polyisoprene, polyethylene, and combinations thereof.

The amounts of the elastomer which can be employed in the gum base of non-stick chewing gum composition of the present invention is generally from about 2 to 25% by weight, preferably from about 5 to 15% by weight, based on the total weight of the gum base.

Polyvinyl acetates (PVAc) may be present with or without the presence of an elastomer. PVAc are included in the non-stick chewing gum composition in amounts dependent upon their molecular weight range. It has been determined that a desirable weight average molecular weight range for the polyvinyl acetates is at least about 8,000, preferably from about 8,000 to 100,000. The total amount of

PVAc in the gum base of the non-stick chewing gum composition is typically from about 25% to 75% by weight, preferably from about 40 to 55% by weight based on the total weight of the gum base of the non-stick chewing gum composition.

Typical softeners (i.e. the term "softeners" is used in its customary broad sense and includes emulsifiers) for use in the non-stick chewing gum composition include tallow, hydrogenated tallow, hydrogenated and monostearate, glyceryl monolaurate, glyceryl monooleate, polysorbate 60, polysorbate 65, tween 65, tween 80, glycerol triacetate, lecithin, mono-, di-, and tri-glycerides, acetylated monoglycerides fatty acids and combination thereof. Preferred fatty acids include stearic, palmitic, oleic and linoleic acids. The softener may be generally employed in an amount from about 3 to 35% by weight, preferably from about 10 to 20% by weight based on the total weight of the gum base of the non-stick chewing gum composition.

The gum base may also include effective amounts of fillers. Fillers are used to increase the hardness of the chewing composition while still maintaining appropriate cold flow properties. Useful fillers include organic and inorganic compounds such as calcium carbonate magnesium carbonate, ground limestone, silicates including magnesium silicate, aluminum silicate, clay, alumina, talc, titanium oxide, calcium phosphate, tricalcium phosphate, dicalcium phosphate, cellulose polymers such as wood and the like, and mixtures thereof. Typically, the filler is employed in the gum base of the non-stick chewing gum composition in an amount from about 5% to about 25% by weight preferably from about 5 to 15% by

weight, based on the total weight of the gum base of the non-stick chewing gum composition. It will be understood that the amount of filler will depend in part on the particular filler selected, and the amount of filler needed to obtain a desired hardness and cold flow of the chewing gum composition.

One or more cellulosic materials may be incorporated into the non-stick chewing gum base as an optional ingredient in amounts generally from about 2 to 10% by weight, preferably from about 2 to 5% by weight, based on the total weight of the gum base of the chewing gum composition. The cellulosic materials useful in the non-stick chewing gum composition of the present invention are water soluble and examples include cellulose, methyl cellulose, ethyl cellulose, methylhydroxyethyl cellulose, methylhydroxypropyl cellulose, hydroxypropyl cellulose and sodium carboxymethyl cellulose and mixtures thereof.

The gum base ingredients previously described are combined with sweeteners, flavoring agents, coloring agents and conventional additives such as thickening agents, acidulants and the like.

In commercial practice it is common to premix a portion of at least some of the gum base materials to form a masterbatch. The masterbatch is then combined with the remaining amounts of the gum base materials plus the other materials (e.g. sweeteners) mentioned above to form a gum composition.

In the present invention a masterbatch can be formed, preferably containing the elastomeric material [e.g. poly (isobutylene-isoprene) copolymer], polyvinyl acetate and the softener.

The non-stick chewing gum composition of the present invention may also contain bulk sweeteners. Suitable sugars include monosaccharides, disaccharides and polysaccharides such as xylose, ribulose, glucose (dextrose), mannose, galactose, fructose (levulose) sucrose (sugar), maltose, invert sugar, partially hydrolyzed starch and corn syrup solids, and mixtures thereof. Suitable non-sugar bulking agents include sugar alcohol bulking agents such as sorbitol, xylitiol, mannitol, galactitol, maltitol, and mixtures thereof, isomalt, maltodextrins; hydrogenated starch hydrolysates; hydrogenated hexoses; hydrogenated disaccharides; and the like, and mixtures thereof. Bulking agents or sweeteners described above, may be used in a wide range of amounts, typically from about 30% to 75% by weight, preferably from about 45 to 60% by weight based on the total weight of the non-stick chewing gum composition.

The non-stick chewing gum compositions may also include high intensity sweeteners. Examples of suitable intense sweeteners include (A) water-soluble naturally-occurring intense sweeteners such as dihydrochalcones, monellin, steviosides, glycyrrhizin, dihydroflavenol, and L-aminodicarboxylic acid aminoalkanoic acid ester amides, such as those disclosed in U.S. Patent No. 4,619,834, and mixtures thereof; (B) water-soluble artificial sweeteners including the soluble saccharin salts such as sodium or calcium saccharin salts, cyclamate

salts, the sodium, ammonium or calcium salts of 3,4-dihydro-6-methyl-1,2,3-oxathiazine-4-one-2, 2-dioxide, the potassium salt of 3,4-dihydro-6-methyl-1,2,3-oxathiazine-4-one-2,2-dioxide (Acesulfam-K), the free acid form of saccharin, and the like, and mixtures thereof; (C) dipeptide based sweeteners including L-aspartic acid derived sweeteners, such as l-aspartyl-L-phenylalanine methyl ester (Aspartame) and materials described in U.S. Patent No. 3,492,131, L-alphaaspartyl-N-(2,2,4,4-tetramethyl-3-thietanyl)-D-alaninamide hydrate (Alitame), methyl esters of L-aspartyl-L-phenyl-glycerine and L-aspartyl-L-2,5-dihydrophenyl-glycine, L-aspartyl-2,5-dihydro-L-phenylalanine, L-aspartyl-L-(1-cyclohexene)-alanine, and the like, and mixtures thereof; (D) water-soluble intense sweeteners derived from naturally-occurring water-soluble sweeteners, such as chlorinated derivatives of ordinary sugar (sucrose), e.g., chlorodeoxysugar derivatives such as derivatives of chlorodeoxysucrose or chlorodeoxygalactosucrose, known, for example, under the product designation of Sucralose®; examples of chlorodeoxysucrose and chlorodeoxygalactosucrose derivatives include but are not limited to: 1-chloro-1'-deoxysucrose; 4-chloro-4-deoxy-alpha-D-galactopyranosyl-alpha-D-fructofuranoside, or 4-chloro-4-deoxygalactosucrose; 4-chloro-4-deoxy-alpha-D-galactopyranosyl-1-chloro-1-deoxy-beta-D-fructo-furanoside, or 4,1'-dichloro-4,1'-dideoxygalactosucrose; 1', 6'-dichloro-1',6'-dideoxysucrose; 4-chloro-4-deoxy-alpha-D-galactopyranosyl-1,6-dichloro-1,6-dideoxy-beta-D-fructofuranoside, or 4,1',6'-trichloro-4,1',6'-trideoxygalactosucrose; 4,6-dichloro-4,6-dideoxy-alpha-D-galactopyranosyl-6-chloro-6-deoxy-beta-D-fructofuranoside, or 4,6,6'-trichloro-4,6,6'-trideoxygalactosucrose; 6,1',6'-trichloro-6,1',6'-trideoxysucrose; 4,6-dichloro-4,6-dideoxy-alpha-D-galacto-pyranosyl-1,6-dichloro-

1,6-dideoxy-beta-D-fructofuranoside, or 4,6,1',6'-tetrachloro-4,6,1',6'-tetradeoxygalacto-sucrose; and 4,6,1',6'-tetradeoxy-sucrose, and mixtures thereof; and (E) protein based intense sweeteners such as thaumaoccous danielli (Thaumatin I and II). The intense sweeteners are usually used in an amount of up to about 1% by weight based on the total weight of the chewing gum composition.

The non-stick chewing gum composition may also contain a flavoring agent selected from those flavors known to the skilled artisan, and include natural and artificial flavors. Non-limiting representative flavoring agents include (A) flavor oils such as spearmint, cinnamon, oil of wintergreen (methyl salicylate), peppermint (menthol), clove, bay, anise, eucalyptus, thyme, cedar leaf, oil of nutmeg, allspice, oil of sage, mace, oil of bitter almonds, and cassia oil; (B) artificial, natural and synthetic fruit flavors such as vanilla, and citrus oils including lemon, orange, lime, grapefruit, and fruit essences including apple, pear, peach, grape, strawberry, raspberry, cherry, plum, pineapple, apricot and so forth; (C) aldehydes and esters such as acetaldehyde, benzaldehyde, anisic aldehyde, cinnamic aldehyde, citral, neral, decanal, ethyl vanillin, heliotrope, piperonal, vanillin, alpha-amyl cinnamaldehyde, butyraldehyde, valeraldehyde, citronellal, decanal, dihydrocarvyl acetate, eugenyl formate, aldehyde C-8, aldehyde C-9, aldehyde C-12, 2-ethyl butyraldehyde, hexenal, tolyl aldehyde, veratraldehyde, 2,6-dimethyl-5-heptenal, 2,6-dimethyloctanal, 2-dodecenal, p-methylanisol, and so forth. Generally any flavoring or food additive such as those described in Chemicals Used in Food Processing, publication 1274, pages 63-258, by the National Academy of Sciences, Incorporated herein by reference, may be used. Other ingredients which may be

used in the flavor component include acids such as citric, tartaric, malic and the like acidulants. In the non-stick chewing gum compositions of the present invention, the flavoring agent is generally present in amounts from about 0.5% to 4.0% by weight based on the total weight of the chewing gum composition.

The chewing gum composition may also contain a coloring agent selected from but not limited to pigments such as titanium dioxide, which may be incorporated in amounts up to about 0.3% by weight based on the total weight of the non-stick chewing gum composition, natural food colors and dyes suitable for food, drug and cosmetic applications, known as F.D.&C. dyes and lakes. A recitation of all F.D.&C. colorants and their corresponding chemical structures may be found in the Kirk-Othmer Encyclopedia of Chemical Technology, 3rd Edition, In Volume 5 at page 857-884, incorporated herein by reference.

Other conventional additives may be used in chewing gum compositions. Example of other conventional additives which may be used include thickening agents such as methyl cellulose, alginates, carrageenan, xanthan gum, gelatin, carob, tragacanth, and locust bean, acidulants such as malic acid, adipic acid, citric acid, tartaric acid, fumaric acid, and mixtures thereof.

The non-stick chewing gum composition of the present invention possesses broad reaching non-stick properties. Not only does the chewing gum composition not stick to non-porous materials such as denture material including but not limited to natural teeth, fillings, removable and fixed oral prosthetic devices, dentures and

the like, but the gum composition also does not stick to a variety of common surfaces including porous surfaces even at temperatures up to about 40°C.

More specifically, the non-stick chewing gum composition does not stick to common indoor surfaces such as, for example, carpets, rugs, linoleum, tiles, mosaic floors and the like. The gum composition also does not stick to common outdoor surfaces such as concrete based materials, asphalt, marble, stone, brick, deck wood and the like.

Other surfaces to which the gum composition does not stick include, leather soles, rubber soles, woolen fabrics, cotton fabrics and the like.

The term non-stick as used herein shall mean a chewing gum composition in which the composition can be removed from a surface by pulling alone (i.e. without the aid of devices e.g. scrapers, knives and the like, and/or solvents e.g. acetone, toluene and the like and terpene based on commercially available solvent blends).

EXAMPLE 1

FORMING PLASTICIZED PROTEINACEOUS MATERIAL

I. Batch Mixing

This example illustrates that a selection of proteins and plasticizers or mixtures of plasticizers can be successfully treated to provide a plasticized proteinaceous material for use as a gum base material in the making of a non-stick

chewing gum composition of the present invention. This example further illustrates the use of a high shear batch-type mixing apparatus.

The denaturation of the proteins is indicated by a peak in the processing torque values (fusion torque values) due to the phase transition from the powder to a viscous paste. Measurements of the torque values (a measurement of viscosity), glass transition temperatures and the mechanical properties of plasticized proteinaceous materials are made in a conventional manner.

The zein, egg white, milk (whey concentrate, sodium caseinate, milk isolates (blend of 80% caseinate and 20% whey)), and gelatin (GP-8, 250 Bloom) are obtained from Freeman Industries, Clofine Dairy and Food Products, New Zealand Milk Products and Hormel Foods Corporation, respectively. These commercial proteins are used as received.

The propylene glycol and glycerol are from Sigma and the triethyl citrate, polyethylene glycol and sorbitol are from Morflex, Aldrich and SPI Polyols respectively.

In these examples the proteins are plasticized using a C.W. Brabender Torque Rheometer (PL 2,000) with a prep mixer equipped with roller blades. The Brabender Rheometer is a heated chamber which fits over two irregularly shaped rollers. A quantity of material is added to the chamber to 70% capacity by using the following expression: Sample charge = 70% x mixer volume x specific gravity of

sample. The sample is melted, and the total torque required to turn the rollers in the melt at a given rotational speed, which can be varied continuously, is measured with a dynamometer which includes a movable gear box coupled to a load cell by means of a torque arm. The unit is pre-calibrated but may be recalibrated. The polymer temperature is determined using a thermocouple which protrudes into the sample chamber. The total amount of material used in the mixer is 250 g. The torque values are measured as a function of time at half minute intervals at different temperatures considered significant to the point being illustrated.

Torque is expressed as "meter-gms" or as "newton-meters". These can be easily converted to other units such as poise or pascal-sec. The unit derives from the use of the Brabender Torque Rheometer. Because the torque developed is related to the shear stress applied to the sample, the Rheometer can be used as a Melt Viscometer. The rotational speed of the mixing blades of the Brabender determines the maximum rate of shear to which the sample is subjected. Therefore apparent viscosity = K_1 (Torque/RPM) and Shear rate at the Wall = K_2 x RPM. K_1 and K_2 are constants determined by Brabender for different types of bowl and blade. The values for the mixing bowl (Prep Mixer) used in the present invention are K_1 = 10,760 and K_2 = 2.47. Based on these equations, at 30 RPM, the shear rate is approximately 75 sec^{-1} and 1 meter-gms (Torque) is approximately 360 poise or 36 Pa-sec (Apparent Viscosity).

The glass transition temperatures (Tg) of the plasticized proteinaceous materials from the torque Rheometer are determined using a Perkin Elmer Differential Scanning Calorimeter (DSC) 7 Instrument at a heating rate of 20°C/min.

II. Extruder Preparation:

This example illustrates the use of protein mixtures with plasticizers to prepare plasticized proteinaceous materials. An extruder is used as the processing apparatus.

Protein-plasticizer blends are melt processed using a counter-rotating conical twin-screw extruder (C.W. Brabender) with metering screw equipped with a rod or a ribbon die. The extruder has three barrel heater/cooling temperature and 1 or 2 die zones. A pressure transducer and a thermocouple are attached at the end of the third zone and the die, respectively, in order to monitor the pressure and the melt temperature during the extrusion process. All of the processing parameters, including the torque and the rpm, are controlled by a computer and are directly printed during the extrusion of the plasticized proteinaceous material. Typical processing conditions are as follows:

Processing Temperature (Zones 1 to 4):	70 - 100°C
Processing torque:	500 - 3000 mg
Head pressure:	80 - 600 psi
RPM:	20 - 40

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The proteins are pre-mixed in different ratios, and are then vigorously mixed with different amounts of plasticizers. The mixtures are then extruded by feeding them through the hopper. The extrudates are collected in the strand form and analyzed.

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EXAMPLE 2

GUM BASE PREPARATION

This example illustrates the preparation of a non-stick chewing gum base using plasticized proteinaceous materials of the type prepared in accordance with Example 1. Both the use of a mixing bowl (batch operation) and extruder (continuous operation) are illustrated.

A masterbatch of a portion of the gum base materials was prepared in the following manner. 8.0 parts by weight of an elastomeric material poly (isobutylene-isoprene) copolymer (Butyl 077 Mol. Wt. = 400,000 obtained from Exxon Chemical Co.), 8 parts by weight of polyvinyl acetate (AYAC, Mol. Wt. = 12,800) obtained from Union Carbide Corporation and 8 parts by weight of a softener for the elastomeric material (DURKEE 17 obtained from Van Den Bergh Foods Company) were combined and mixed until a homogenous mixture was obtained.

The masterbatch was combined with 11 parts by weight of a proteinaceous material obtained from the melt plasticization of zein and glycol 60% and 40% by weight respectively, 39.5 parts by weight of polyvinyl acetate, 6 parts by weight of an emulsifier (NM obtained from Lonza, Inc.) 5 parts by weight of the elastomeric material/softener, 7.5 parts by weight of a filler (ATOMITE obtained from Webber) and 7 parts by weight of a plasticizer (triacetin obtained from Eastman Chemicals) and the mixture was blended in the following manner to form a non-stick chewing gum base.

A 5 kg kettle equipped with Sigma blades was heated through a steam jacket to 110°C. The masterbatch was placed into the kettle and melted. Mixing was commenced as the plasticized zein was added. The masterbatch and zein was mixed under heating until a homogenous mixture was formed at which time the polyvinyl acetate was added.

When the polyvinyl acetate was melted and mixed well with the homogenous mixture of the masterbatch and zein, the temperature was reduced to room temperature and then the softener (Durkee 17) was added until a homogenous mixture was formed. Thereafter, the emulsifier (NM) and triacetin were added and mixed until a homogenous mixture was obtained.

35.00 parts by weight of the gum base prepared as described above was combined with 7.50 parts by weight of corn syrup, 54.96 parts by weight of pulverized sugar, 0.44 parts by weight of each of natural and synthetic peppermint oil, 0.66 part by weight of menthol crystals and 1.0 part by weight of peppermint to form a non-stick gum composition.

The chewing gum composition was divided into a series of multiple groups of samples and chewed for 5 minutes. All of the samples were subjected to an Instron Compression Cycle Test. The Instron Compression Cycle Test is used to apply a cyclic force on a chewed gum composition after it is placed on a substrate (e.g. carpet, leather, concrete, and the like). The force was cycled 20 times to simulate 20 people stepping on the chewing gum after it was placed on the

substrate. After the cyclic procedure, each of these groups of samples was divided into five subgroups held for different lengths of time (0, 0.5, 1.0, 24 and 48 hours) at room temperature prior to a subsequent Instron 180° peel test.

In the Instron 180° peel test the substrate was clamped to the lower jaw of the Instron device. The chewing gum that was smeared on the substrate was peeled away from the substrate at an angle of 180° to the substrate surface, until the gum separated from the substrate surface. If any part of the gum composition remained stuck to the substrate surface, it was identified by the letter "S" meaning "stick". If the sample did not stick, it was identified by the letters "NS" mean "non-stick".

The gum composition of the present invention (shown by "S-1") was compared to commercial products on the market advertising non-stick properties. The results are shown in Table 1.

Table 1

	FORCE = 20 kg					FORCE = 60 kg				
TIME (hours)	0	0.5	1	24	36	0	0.5	1	24	36
GUMS										
FREEDENT[1] SPM	S	S	S	S	S	S	S	S	S	S
FREEDENT[1] PPM	S	S	S	S	S	S	S	S	S	S
STICKFREE[2] SPM	S	S	S	S	S	S	S	S	S	S
STICKFREE[2] PPM	S	S	S	S	S	S	S	S	S	S
FREEZONE[3]	S	S	S	S	S	S	S	S	S	S
TRIDENT ORIG.[4]	S	S	S	S	S	S	S	S	S	S
CLORETS[4]	S	S	S	S	S	S	S	S	S	S
S-1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

[1] Freedent is a trademark of the Wrigley Co.
[2] Stickfree is a trademark of Nabisco, Inc.
[3] Freezone is a trademark of Lotte, Inc.
[4] Trident and Clorets are trademarks of Warner-Lambert Co.

As shown in Table 1, the gum composition of the present invention exhibited non-stick properties even if after thirty-six hours of contact with the carpet surface while the commercial products stuck to the carpet surface from the moment of contact. It should also be noted that commercial products which are known not to stick to dentures (e.g. Freedent) stick to carpet and other similar surfaces as will be shown in the following examples.

EXAMPLE 3

The test procedure of Example 2 was repeated on a surface of leather/rubber sole shoes except that the force applied to the samples to test non-stick properties was 20 kg and 100 kg, respectively. The results are shown in Table 2.

Table 2

GUMS	FORCE = 20 kg	FORCE = 100 kg
FREEDENT[1] SPM	S	S
FREEDENT[1] PPM	S	S
STICKFREE[2] SPM	S	S
STICKFREE[2] PPM	S	S
FREEZONE[3]	S	S
TRIDENT ORIG.[4]	S	S
CLORETS[4]	S	S
S-1	NS	NS

[1] Freedent is a trademark of the Wrigley Co.
[2] Stickfree is a trademark of Nabisco, Inc.
[3] Freezone is a trademark of Lotte, Inc.
[4] Trident and Clorets are trademarks of Warner-Lambert Co.

As shown in Table 2, the gum composition of the present invention exhibited non-stick properties even after 36 hours of contact with the leather/rubber sole surface while the commercial products stick to the surface of the leather/rubber soles from the moment of contact. It should also be noted that commercial products which are known not to stick to dentures (e.g. Freedent) stick to leather and rubber sole surfaces.

EXAMPLE 4

Nine chewing gum bases having non-stick properties in accordance with the present invention were employed in a chewing gum composition in the same manner as Example 1. The gum bases are shown in Table 3.

Table 3

INGREDIENTS	COMPOSITION NO. (Parts by weight)								
	1	2	3	4	5	6	7	8	9
Zein (40% glycol)	5.5	–	–	–	–	–	–	11.0	11.0
Zein (25% glycol)	–	6.0	6.0	6.0	6.0	7.0	7.5	–	–
Poly (isobutylene-isoprene)	9.0	9.0	9.0	9.0	9.0	7.5	7.0	8.0	8.0
Polyvinyl acetate	50.0	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5
Emulsifier	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Cellulose	–	4.0	7.0	7.0	10.0	2.0	2.0	–	–
Elastomer/softener	15.0	13.0	10.0	10.0	7.0	15.5	15.5	13.0	13.0
Filler	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	8.5
Plasticizer	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0

Each of the compositions 1-9 prepared above exhibited similar non-stick properties to the compositions prepared and tested in accordance with Examples 1-3.

What is Claimed is:

1. A non-stick chewing gum composition comprising

a) from about 2 to 25% by weight of a plasticized proteinaceous material comprising a protein component and a plasticizer component wherein a solid state blend of the protein component and the plasticizer component have been heated under controlled shear conditions at a temperature of from about 20°C to about 140°C;

b) in combination with chewing gum base ingredients in an amount sufficient to impart non-stick characteristics to the chewing gum composition on both porous and non-porous surfaces in the absence of an elastomer solvent and a wax.

2. The non-stick chewing gum composition of claim 1 wherein the chewing gum base ingredients include at least one ingredient selected from an elastomeric material, polyvinyl acetate and combinations thereof and a compound which serves as a plasticizer for said ingredients.

3. The non-stick chewing gum composition of claim 2 wherein the elastomeric material is present in an amount from about 2 to 25% by weight based on the weight of the chewing gum composition.

4. The non-stick chewing gum composition of claim 2 wherein the polyvinyl acetate has a molecular weight of at least 8,000.

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5. The non-stick chewing gum composition of claim 2 wherein the amount of the polyvinyl acetate is from about 25 to 75% by weight based on the weight of the chewing gum composition.

6. The non-stick chewing gum composition of claim 2 wherein the amount of the plasticizer is from about 3 to 35% by weight based on the weight of the chewing gum composition.

7. The non-stick chewing gum composition of claim 2 further comprising at least one ingredient selected from fillers and a cellulose material.

8. The non-stick chewing gum composition of claim 7 wherein the amount of fillers is from about 5 to 25% by weight based on the total weight of the chewing gum composition.

9. The non-stick chewing gum composition of claim 7 wherein the amount of the cellulosic material is from about 2 to 10% by weight based on the total weight of the chewing gum composition.

10. The non-stick chewing gum composition of claim 2 wherein the elastomeric material is a natural elastomer or a synthetic elastomer.

11. The non-stick chewing gum composition of claim 10 wherein the natural elastomers are selected from the group consisting of jelutong, lechi, caspi,

perillo, sorva, massaranduba balata, massaranduba chocolate, nispero, nispero rosindinha, chicle, gutta hang kang, smoked or liquid latex, and guayule and combinations thereof.

12. The non-stick chewing gum composition of claim 10 wherein the synthetic elastomers are selected from the group consisting of polyisobutylene, isobutylene-isoprene copolymer, styrene-butadiene copolymer, vinyl acetate-vinyl laurate copolymer, polyisoprene, polyethylene, and combinations thereof.

13. The non-stick chewing gum composition of claim 4 wherein the polyvinylacetate has an weight average molecular weight of from about 8,000 to 100,000.

14. The non-stick chewing gum composition of claim 2 wherein the plasticizer is selected from the group consisting of tallow, hydrogenated tallow, hydrogenated and partially hydrogenated vegetable oils, cocoa butter, glyceryl monostearate, glyceryl monolaurate, glyceryl monooleate, polysorbate 60, polysorbate 65, tween 65, tween 80, glycerol triacetate, lecithin, mono-, di-, and tri-glycerides, acetylated monoglycerides and fatty acids.

15. The non-stick chewing gum composition of claim 7 wherein the filler is selected from the group consisting of magnesium carbonate, calcium carbonate, ground limestone, silicates, clay, alumina, talc, titanium oxide, mono-, di-, and tri-calcium phosphate and cellulose polymers.

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16. The non-stick chewing gum composition of claim 7 wherein the cellulosic material is selected from the group consisting of cellulose, methyl cellulose, ethyl cellulose, methylhydroxyethyl cellulose, methylhydroxypropyl cellulose, hydroxypropyl cellulose and sodium carboxymethyl cellulose.

17. The non-stick chewing gum composition of claim 1 wherein the protein component includes at least one of wheat, corn, rice, soybean, milk or animal protein.

18. The non-stick chewing gum composition of claim 17 wherein the protein component includes zein, glutenin, gliadin or mixtures thereof.

19. The non-stick chewing gum composition of claim 1 wherein the plasticizer component is at least one organic plasticizer.

20. The non-stick chewing gum composition of claim 19 wherein the organic plasticizers are selected from the group consisting of propylene glycol, ethylene glycol, acetic acid, lactic acid, polypropylene glycol, polyethylene glycol, glycerol and ethanol.

BNSDOCID: <WO_____0008944A2_L>

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

104

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 February 2000 (24.02.2000)

PCT

(10) International Publication Number
WO 00/08944 A3

(51) International Patent Classification[7]: A23G 3/30

(21) International Application Number: PCT/US99/15388

(22) International Filing Date: 8 July 1999 (08.07.1999)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/131,771 11 August 1998 (11.08.1998) US

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(81) Designated States *(national)*: AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, UZ, VN, YU, ZA.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(88) Date of publication of the international search report:
20 December 2001

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 00/08944 A3

(54) Title: NON-STICK CHEWING GUM MADE FROM PLASTICIZED PROTEINACEOUS MATERIALS AND COMPOSITIONS CONTAINING THE SAME

(57) Abstract: A non-stick chewing gum composition containing from about 2 to 25 % of a plasticized proteinaceous material and a combination of gum base materials, absent elastomer solvent and wax, which render the composition non-stick with respect to non-porous surfaces such as denture materials as well as common surfaces such as floors and including porous surfaces such as carpets.

INTERNATIONAL SEARCH REPORT

Inter onal App
PCT/US 99/15388

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A23G3/30

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A23G

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

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

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
26 October 1999	11/11/1999

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Weber, G

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

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FR 2770375 A	07-05-1999	NONE	

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ _____

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CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty.

For International Preliminary Examining Authority use only

Identification of IPEA	Date of receipt of DEMAND

Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION

Applicant's or agent's file reference: 04 LG 30 E

International application No.	International filing date *(day/month/year)*	(Earliest) Priority date *(day/month/year)*
PCT/EP2004/007569	6/07/2004	8/7/2003

Title of invention: Non sticky gum base for chewing gum

Box No. II APPLICANT(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

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Telephone No.

Facsimile No.

Teleprinter No.

Applicant's registration No. with the Office

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State *(that is, country)* of residence: IT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

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State *(that is, country)* of nationality: IT

State *(that is, country)* of residence: IT

☐ Further applicants are indicated on a continuation sheet.

International application No.
PCT/EP2004/007569

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and [X] has been appointed earlier and represents the applicant(s) also for international preliminary examination.

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[ ] is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

PISTOLESI ROBERTO
DRAGOTTI & ASSOCIATI SRL
Via Turati 32
20121 MILANO ITALY

Telephone No.
02-29014418

Facsimile No.
02-29003139

Teleprinter No.

Agent's registration No. with the Office

[ ] **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination to start on the basis of:

   [ ] the international application as originally filed

   the description [X] as originally filed
   [ ] as amended under Article 34

   the claims [ ] as originally filed
   [X] as amended under Article 19 (together with any accompanying statement)
   [ ] as amended under Article 34

   the drawings [X] as originally filed
   [ ] as amended under Article 34

2. [ ] The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. [ ] The applicant wishes the start of the international preliminary examination to be postponed until the expiration of the applicable time limit under Rule 69.1(*d*).

4. [ ] The applicant expressly wishes the international preliminary examination to start earlier than at the expiration of the applicable time limit under Rule 54*bis*.1(a).

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: ENGLISH

[X] which is the language in which the international application was filed.
[ ] which is the language of a translation furnished for the purposes of international search.
[ ] which is the language of publication of the international application.
[ ] which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The filing of this demand constitutes the election of all Contracting States which are designated and are bound by Chapter II of the PCT.

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Sheet No. 3

International application No.
PCT/EP2004/007569

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:				For International Preliminary Examining Authority use only: received	not received
1. translation of international application	:		sheets	☐	☐
2. amendments under Article 34	:		sheets	☐	☐
3. copy (or, where required, translation) of amendments under Article 19	:	2	sheets	☐	☐
4. copy (or, where required, translation) of statement under Article 19	:		sheets	☐	☐
5. letter	:		sheets	☐	☐
6. other *(specify)*	:		sheets	☐	☐

The demand is also accompanied by the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ original separate power of attorney
3. ☐ original general power of attorney
4. ☐ copy of general power of attorney; reference number, if any:
5. ☐ statement explaining lack of signature
6. ☐ sequence listing in computer readable form
7. ☐ tables in computer readable form related to a sequence listing
8. ☐ other *(specify)*:

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

Milano, February 1, 2005

Dr. Roberto Pistolesi

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and *item 4 or 5, below, does not* apply.
   ☐ The applicant has been informed accordingly.
4. ☐ The date of receipt of the demand is WITHIN the time limit of 19 months from the priority date as extended by virtue of Rule 80.5.
5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.
6. ☐ The date of receipt of the demand is AFTER the expiration of the time limit under Rule 54*bis*.1(a) and item 7 or 8, below, does not apply.
7. ☐ The date of receipt of the demand is WITHIN the time limit under Rule 54*bis*.1(a) as extended by virtue of Rule 80.5.
8. ☐ Although the date of receipt of the demand is after the expiration of the time limit under Rule 54*bis*.1(a), the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

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CLAIMS

1. A gum base formulation as claimed in claim 1, having the following percentage composition by weight:

Elastomers	9-16%
Emulsifiers and/or technological auxiliaries	25-30%
Adjuvants	15-22%
Terpene resins	24-28%
Rosin esters	9-13%
Antioxidants	0-2%

and not containing polyvinyl acetate.

2. A gum base formulation as claimed in claim 1, having the following percentage composition by weight:

Elastomers	8-14%
Emulsifiers and/or technological auxiliaries	18-25%
Adjuvants	32-40%
Terpene resins	18-24%
Rosin esters	8-12%
Antioxidants	0-2%.

3. A gum base formulation as claimed in one of the preceding claims, characterised in that the elastomers are chosen from polyisobutylene, isobutylene-isoprene copolymer, styrene-butadiene copolymer, chicle, jelutong, balata, guttapercha, lechi caspi, sorva or a combination thereof.

4. A gum base formulation as claimed in one of the preceding claims, characterised in that the emulsifiers and/or technological auxiliaries are selected from glyceryl monostearate, acetylated monoglycerides, hydrogenated vegetable oils, lecithin, triacetin, or a combination thereof.

5. A gum base formulation as claimed in claim 4, characterised in that the hydrogenated vegetable oils are selected from coconut, soybean, palm and/or cottonseed oil.

6. A gum base formulation as claimed in one of the preceding claims, characterised in that the adjuvant agents are selected from calcium carbonate, talc or magnesium carbonate, tricalcium phosphate, or a combination thereof.

7. A gum base formulation as claimed in one of the preceding claims, characterised in that the terpene resins are selected from polymers of α-pinene, β-pinene and/or d-limonene.

8. A gum base formulation as claimed in one of the preceding claims, characterised in that the rosin derivatives are selected from hydrogenated or partially hydrogenated resins, glycerol esters of natural resin, pentaerythritol esters with natural resin, glycerol esters with partially hydrogenated natural rosin, pentaerythritol esters with partially hydrogenated natural rosin, methyl esters of hydrogenated rosin, esters of hydrogenated rosin and glycerol, esters of partially dimerised rosin and glycerol, esters of polymerised rosin and glycerol esters of tall oil resin acids, or combinations thereof.

9. A gum base formulation as claimed in one of the preceding claims, characterised in that the antioxidants are selected from butylated hydroxyanisole, butylated hydroxytoluene, tocopherol, propyl gallate and mixtures thereof.

10. A chewing gum containing a gum base formulation as claimed in one of the preceding claims.

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

PCT/EP2004/007569
International Application No.

06 JUL 2004 (06.07.04)
International Filing Date

EUROPEAN PATENT OFFICE
PCT INTERNATIONAL APPLICATION
Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference (if desired) (12 characters maximum) 04 LG 30 E

Box No. I TITLE OF INVENTION

Non sticky gum base for chewing gum

Box No. II APPLICANT ☐ This person is also inventor

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

GUM BASE CO. S.p.A.
Via Nerviano, 25
20020 Lainate (MI)
ITALY

Telephone No.

Facsimile No.

Teleprinter No.

Applicant's registration No. with the Office

State *(that is, country)* of nationality: IT

State *(that is, country)* of residence: IT

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

SOZZI Giuseppe
Via Re Umberto 45
20020 Lainate (MI)
ITALY

This person is:
☐ applicant only
☒ applicant and inventor
☐ inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality: IT

State *(that is, country)* of residence: IT

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

PISTOLESI Roberto
Dragotti & Associati Srl
Galleria San Babila 4/C
20122 Milano
ITALY

Telephone No.
0039 0276022077

Facsimile No.
0039 02784427

Teleprinter No.

Agent's registration No. with the Office

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

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Sheet No. ...2...

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

DEL VISCIO Giovanna
Viale Campania 26/A
20133 Milano
ITALY

This person is:
- [ ] applicant only
- [x] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality: IT

State *(that is, country)* of residence: IT

This person is applicant for the purposes of: [ ] all designated States [ ] all designated States except the United States of America [x] the United States of America only [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of: [ ] all designated States [ ] all designated States except the United States of America [ ] the United States of America only [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of: [ ] all designated States [ ] all designated States except the United States of America [ ] the United States of America only [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of: [ ] all designated States [ ] all designated States except the United States of America [ ] the United States of America only [ ] the States indicated in the Supplemental Box

[ ] Further applicants and/or (further) inventors are indicated on another continuation sheet.

Supplemental Box *If the Supplemental Box is not used, this sheet should not be included in the request.*

1. If, in any of the Boxes, except Boxes Nos. VIII(i) to (v) for which a special continuation box is provided, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No...." (Indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:

(i) if more than two persons are to be indicated as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;

(ii) if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;

(iii) if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;

(iv) if, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;

(v) if, in Box No. VI, there are more than three earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI.

2. If the applicant intends to make an indication of the wish that the international application be treated, in certain designated States, as an application for a patent of addition, certificate of addition, inventor's certificate of addition or utility certificate of addition: in such a case, write the name or two-letter code of each designated State concerned and the indication "patent of addition," "certificate of addition," "inventor's certificate of addition" or "utility certificate of addition," the number of the parent application or parent patent or other parent grant and the date of grant of the parent patent or other patent grant or the date of filing of the parent application (Rules 4.11(a)(iii) and 49bis.1(a) or (b)).

3. If the applicant intends to make an indication of the wish that the international application be treated, in the United States of America, as a continuation or continuation-in-part of an earlier application: in such a case, write "United States of America" or "US" and the indication "continuation" or "continuation-in-part" and the number and the filing date of the parent application (Rules 4.11(a)(iv) and 49bis.1(d)).

Continuation of box IV:

DRAGOTTI GIANFRANCO
MICHELOTTI GIULIANO
FERRONI FILIPPO
AGOSTINI AGOSTINO

All of

Dragotti & Associati Srl
Galleria San Babila 4/C
20122 Milano
ITALY

Box No. V DESIGNATIONS

The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.

However,

☐ DE Germany is not designated for any kind of national protection

☐ KR Republic of Korea is not designated for any kind of national protection

☐ RU Russian Federation is not designated for any kind of national protection

(The check-boxes above may be used to exclude (irrevocably) the designations concerned in order to avoid the ceasing of the effect, under the national law, of an earlier national application from which priority is claimed. See the Notes to Box No. V as to the consequences of such national law provisions in these and certain other States.)

Box No. VI PRIORITY CLAIM

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application *(day/month/year)*	Number of earlier application	Where earlier application is:		
		national application: country or Member of WTO	regional application:* regional Office	international application: receiving Office
item (1) 08/07/2003	03425448.2		EP	
item (2)				
item (3)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office)* identified above as:

☐ all items ☒ item (1) ☐ item (2) ☐ item (3) ☐ other, see Supplemental Box

** Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):* ....

.....

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the International search, indicate the Authority chosen; the two-letter code may be used)*:

ISA / EP .....

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority)*:

Date *(day/month/year)* 22/12/2003 Number EP03425448 Country *(or regional Office)* MUNICH

Box No. VIII DECLARATIONS

The following declarations are contained in Boxes Nos. VIII (i) to (v) *(mark the applicable check-boxes below and indicate in the right column the number of each type of declaration)*:			Number of declarations
☐ Box No. VIII (i)	Declaration as to the identity of the inventor	:	
☐ Box No. VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	:	
☐ Box No. VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	:	
☒ Box No. VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America)	:	1
☐ Box No. VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	:	

Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)

The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

Declaration of Inventorship (Rules 4.17(iv) and 51*bis*.1(a)(iv)) for the purposes of the designation of the United States of America:

I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/..... (if furnishing declaration pursuant to Rule 26*ter*).

I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.

I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority, and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America, including any PCT international application designating at least one country other than the United States of America, having a filing date before that of the application on which foreign priority is claimed.

Prior Applications: No. 03425448.2, EP, 8 July 2003

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.

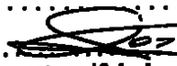
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name: SOZZI Giuseppe

Residence: Lainate, Milano, Italy
(city and either US state, if applicable, or country)

Mailing Address: Via Re Umberto 45
20020 Lainate, Milano

Citizenship: Italy

Inventor's Signature: 
(if not contained in the request, or if declaration is corrected or added under Rule 26*ter* after the filing of the international application. The signature must be that of the inventor, not that of the agent)

Date: July 2, 2004
(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26*ter* after the filing of the international application)

Name: DEL VISCIO Giovanna

Residence: Milano, Italy
(city and either US state, if applicable, or country)

Mailing Address: Viale Campania 26/A
20133 Milano

Citizenship: Italy

Inventor's Signature: Giovanna Del Visc
(if not contained in the request, or if declaration is corrected or added under Rule 26*ter* after the filing of the international application. The signature must be that of the inventor, not that of the agent)

Date: July 2, 2004
(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26*ter* after the filing of the international application)

☐ This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

Box No. IX CHECK LIST; LANGUAGE OF FILING

This international application contains:		
(a) In paper form, the following number of sheets:		
request (including declaration sheets)	:	6
description (excluding sequence listing and/or tables related thereto)	:	10
claims	:	2
abstract	:	1
drawings	:	
Sub-total number of sheets	:	19
sequence listing	:	
tables related thereto	:	
(for both, actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (c) below)		
Total number of sheets	:	19
(b) ☐ only in computer readable form (Section 801(a)(i))		
(i) ☐ sequence listing		
(ii) ☐ tables related thereto		
(c) ☐ also in computer readable form (Section 801(a)(ii))		
(i) ☐ sequence listing		
(ii) ☐ tables related thereto		
Type and number of carriers (diskette, CD-ROM, CD-R or other) on which are contained the		
☐ sequence listing:		
☐ tables related thereto:		
(additional copies to be indicated under items 9(ii) and/or 10(ii), in right column)		

This international application is accompanied by the following item(s) *(mark the applicable check-boxes below and indicate in right column the number of each item)*:		Number of items
1. ☒ fee calculation sheet	:	1
2. ☒ original separate power of attorney	:	2
3. ☐ original general power of attorney	:	
4. ☐ copy of general power of attorney; reference number, if any:	:	
5. ☐ statement explaining lack of signature	:	
6. ☐ priority document(s) identified in Box No. VI as item(s):	:	
7. ☐ translation of international application into *(language)*:	:	
8. ☐ separate indications concerning deposited microorganism or other biological material	:	
9. ☐ sequence listing in computer readable form *(indicate type and number of carriers)*		
(i) ☐ copy submitted for the purposes of international search under Rule 13*ter* only (and not as part of the international application)	:	
(ii) ☐ *(only where check-box (b)(i) or (c)(i) is marked in left column)* additional copies including, where applicable, the copy for the purposes of international search under Rule 13*ter*	:	
(iii) ☐ together with relevant statement as to the identity of the copy or copies with the sequence listing mentioned in left column	:	
10. ☐ tables in computer readable form related to sequence listing *(indicate type and number of carriers)*		
(i) ☐ copy submitted for the purposes of international search under Section 802(b-*quater*) only (and not as part of the international application)	:	
(ii) ☐ *(only where check-box (b)(ii) or (c)(ii) is marked in left column)* additional copies including, where applicable, the copy for the purposes of international search under Section 802(b-*quater*)	:	
(iii) ☐ together with relevant statement as to the identity of the copy or copies with the tables mentioned in left column	:	
11. ☐ other *(specify)*:	:	

Figure of the drawings which should accompany the abstract:	Language of filing of the international application: English

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Milan, 2nd July, 2004

Roberto Fiammenghi

For receiving Office use only

1. Date of actual receipt of the purported international application: (06.07.04) 06 JUL 2004	2. Drawings: ☐ received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	☐ not received:
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority (if two or more are competent): ISA /	6. ☐ Transmittal of search copy delayed until search fee is paid

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

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Industria y Comercio
SUPERINTENDENCIA

[redacted] SUPERINTENDENCIA Y. COMERCIO
Radicación : 06611163 00000000 Folios: 117
Fecha (AMD): 2006-02-06 16:52:42
Tramite : 011 PCT-PATENT 379-FASE NACI 411 PRELIMINAR
Dependencia: 0000 DIVISION DE NUEVAS CREACIONES

FORMULARIO ÚNICO DE SOLICITUD DE PATENTE PCT ENTRADA EN FASE NACIONAL

1) SOLICITUD DE:

☒ Patente de invención ☐ Patente de Modelo de Utilidad

☐ Capitulo I. ☒ Capitulo II.

2) SOLICITANTE (71)	**Nombre: GUM BASE CO. S.P.A.** **Dirección: Via Nerviano, 25 I-20020, Lainate, Italia** **Nacionalidad o domicilio: Lainate, Italia** **Lugar de constitución: Italia**	**IDENTIFICACIÓN** **C.C.** ☐ **NIT:** ☒ **C.E.** ☐ **OTRO** ☐ **Cual** _____ **NÚMERO** _____
	Teléfono: Fax: **E. Mail:**	
3) REPRESENTANTE O APODERADO	Nombre: DILIA MARÍA RODRÍGUEZ D'ALEMAN Dirección: Carrera 11 N°. 86-53 Piso 6 Bogotá D.C. Teléfono: 6181088 Fax: 6350824 E. Mail: info@clarkemodet.com.co	**IDENTIFICACIÓN** **C.C.** ☒ **NIT:** ☐ **C.E.** ☐ **OTRO** ☐ **NÚMERO:** 41.654.882 **TP:** 20824 CSJ
4) INVENTOR (ES) (72)	**Nombre: 1. SOZZI, Giuseppe; 2. DEL VISCIO, Giovanna** **Dirección: 1. Via Re Umbreto, 45, I-20020 Lainate, Italia; 2. Viale Campania 26/A, I-20133 Milano, Italia** **Nacionalidad o Domicilio: Todos los anteriores, Italianos**	

5) PCT (86)
Solicitud Internacional No. PCT/EP2004/007569 Fecha: Julio 6, 2004

Publicación Internacional No. WO 2005/004621 A1 Fecha: Enero 20, 2005

6)Título (54) BASE DE GOMA NO PEGAJOSA PARA CHICLE

7) Clasificación Internacional: A23G 3/00

8) PRIORIDAD	**33) País de Origen**	**(32) Fecha**	**(31) Número de Solicitud**
SI ☒ **NO** ☐	**EUROPEA**	**JULIO 8, 2003**	**03425448.2**

9) Comprobante de pago N°. 06-6,527 Fecha: Enero 25, 2006

Instrucciones para el diligenciamiento del presente formulario. Ver reverso de esta pagina

REIVINDICACIONES

1. Una formulación a base de goma que tiene la siguiente composición en peso:

(a)	Elastómeros	8-16%
(b)	emulsificadores y/o auxiliares tecnológicos	18-30%
(c)	Adyuvantes	15-40%
(d)	Resinas vegetales y/o ésteres de resinas vegetales	26-45%
(e)	Antioxidantes	0-2%

y por no contener polivinil acetato.

2. Una formulación a base de goma como se reivindicó en la reivindicación 1, caracterizada por que el componente (d) es una mezcla de resinas de terpeno y ésteres de colofonia.

3. Una formulación a base de goma como se reivindicó en la reivindicación 1 o 2, caracterizada por que el porcentaje de componente (d) está entre 26 y 41%.

Industria y Comercio

SUPERINTENDENCIA

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Delegatura de Propiedad Industrial
División de Nuevas Creaciones

REQUISITOS NECESARIOS PARA PRESENTACIÓN Y AGILIZACIÓN DEL TRAMITE

PCT

	USUARIO	RADICADOR
PATENTE DE INVENCIÓN (X) MODELO DE UTILIDAD ( )	( )	( )
-Indicación de que se solicita la concesión de una patente.	( )	(X)
-Datos de identificación del solicitante o de la persona que se presenta la solicitud.	( )	X
-Descripción de la invención.	( )	X
-Dibujos de ser estos pertinentes.	( )	X
-Comprobante de Pago de las tasas establecidas.	( )	X
COMPLETA (X) INCOMPLETA ( )	( )	( )
DISEÑO INDUSTRIAL ( )		
-Indicación de que se solicita el registro de Diseño Industrial.	( )	( )
-Datos de identificación del solicitante o de la persona que se presenta la solicitud.	( )	( )
-Representación gráfica y fotográfica del Diseño Industrial o muestra del Material que incorpora el diseño.	( )	( )
-Comprobante de Pago de las tasas establecidas.	( )	( )
COMPLETA ( ) INCOMPLETA ( )	( )	( )
ESQUEMA DE TRAZADO ( )		
-Indicación de que se solicita el registro de Diseño Industrial.	( )	( )
-Datos de identificación del solicitante o de la persona que se presenta la solicitud.	( )	( )
-Representación gráfica del Esquema Trazado.	( )	( )
-Comprobante de Pago de las tasas establecidas.	( )	( )
COMPLETA ( ) INCOMPLETA ( )	( )	( )

Firma Responsable: _____

Fecha: _____

REPUBLICA DE COLOMBIA

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

121

Bogotá,
2020

Doctor(a)
RODRIGUEZ DILIA MARIA

REFERENCIA	Radicación No.	6 11103
	Solicitud internacional	EP2004/007569
	Fecha inicio fase nacional	08/02/2006
	Trámite	11
	Evento	379
	Actuación	430
	Oficio No.	3831

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

1. En la documentación allegada el solicitante deberá aclarar la existencia y representación de la sociedad solicitante, ya que la presentada se encuentra restringida a determinados paises.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

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

ALIX CARMENZA CESPEDES DE VERGEL
Jefe de la división de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista de fecha 31 MAR. 2006
adpa11