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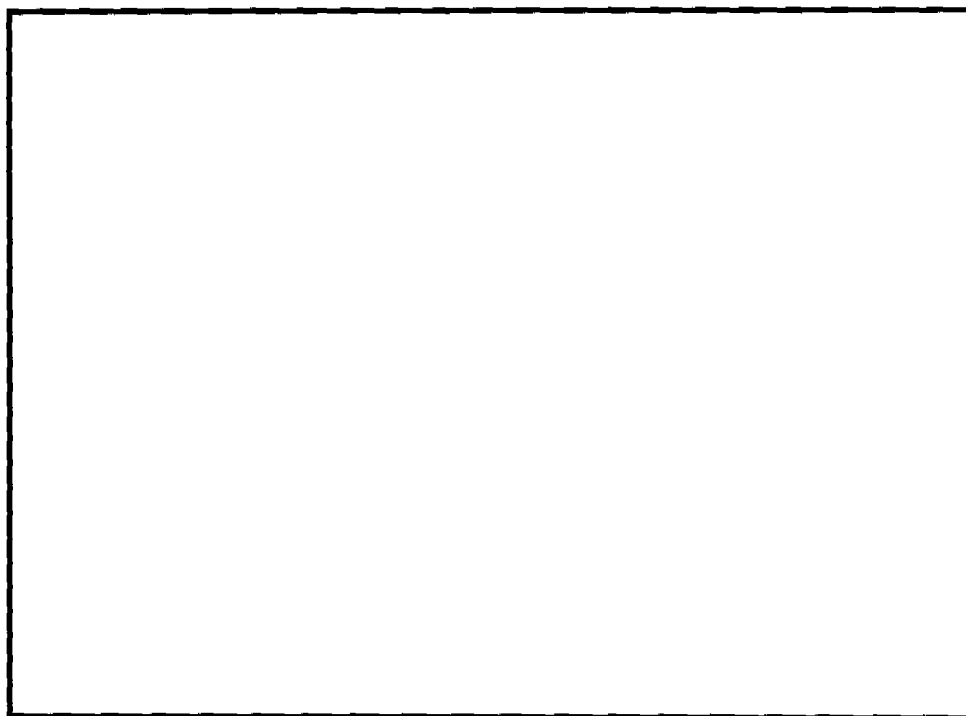
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2 SOLICITANTE (71)	Nombre: COLGATE - PALMOLIVE COMPANY Dirección: 300 Park Avenue, New York, NY 10022, Estados Unidos de América Nacionalidad o Domicilio: Estados Unidos Lugar de Constitución: Estados Unidos Teléfono: Fax: E-mail		IDENTIFICACION C.C. ☐ NIT ☐ C.E. ☐ Otro ☐ Cual _____ Número _____
3 REPRESENTANTE O APODERADO	Nombre: JUAN PABLO CADENA SARMIENTO Dirección: Cra. 7 No. 16-56 Piso 9 Teléfono: 380-2200 Fax: 380-2700 E-mail:		IDENTIFICACION C.C. ☒ NIT ☐ C.E. ☐ Otro ☐ Cual _____ Número <u>80.410.337 TP 57492</u>
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10

ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud. \$463.000
- ☒ Documento que acredita la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☒ Poderes, si fuere el caso. **Fotocopia autenticada**
- ☒ Documento de cesión del inventor al solicitante o a su causante.
- ☐ Declaraciones.
- ☒ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
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- ☐ De ser el caso, copia del contrato de acceso.
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- ☐ Arte final 12x12.
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- ☒ Otros: Extracto para Publicación, Tarjeta de Archivo Temático y Tarjeta de Propietarios

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ning of each regular issue of the PCT Gazette.

(54) Title: HYDROPHOBIC POLYMER CARRIER BASED LIQUID TOOTH WHITENING COMPOSITION

(57) Abstract: A tooth whitening system comprising a tooth whitening composition comprising a whitening agent and a hydropho-
bic polymer carrier. The tooth whitening composition is preferably substantially non-water soluble. The tooth whitening composition
is applied to the surface of a tooth to be whitened in a mammal to effect whitening on the tooth surface. Methods of whitening a
surface of a tooth are also provided.

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HYDROPHOBIC POLYMER CARRIER BASED LIQUID TOOTH WHITENING COMPOSITION**INTRODUCTION**

[0001] The present invention relates to tooth whitening systems employing compositions comprising hydrophobic polymers. Embodiments of the present invention include tooth whitening compositions comprising a hydrophobic polymer carrier and a whitening agent.

[0002] It has become desirable for a person's teeth to appear bright or "white". Society places a high value on the "whiteness" of one's teeth. One whose teeth are white may enjoy more personal confidence and satisfaction and may even enjoy greater social acceptance.

[0003] In a mammal, a tooth is comprised of an inner dentin layer and an outer hard enamel layer that is the protective layer of the tooth. The enamel layer of a tooth is naturally an opaque white or slightly off-white color. It is the enamel layer that can become stained or discolored. The enamel layer of a tooth is composed of hydroxyapatite mineral crystals that create a somewhat porous surface. These hydroxyapatite crystals form microscopic hexagonal rods or prisms that make up the enamel surface. As a result, the surface of the enamel layer presents microscopic spaces or pores between the prisms. It is believed that this porous nature of the enamel layer is what allows staining agents and discoloring substances to permeate the enamel and discolor the tooth. These remaining substances can occupy the microscopic spaces and eventually alter the color of the tooth.

[0004] Many substances that a person confronts or comes in contact with on a daily basis can "stain" or reduce the "whiteness" of one's teeth. In particular, the foods, tobacco products and fluids that one consumes tend to stain one's teeth. These products or substances tend to accumulate on the enamel layer of the tooth and form a pellicle film over the teeth.

These staining and discoloring substances can then permeate the enamel layer. This problem occurs gradually over many years, but imparts a noticeable discoloration of the enamel of one's teeth. So long as the discolored teeth are still healthy and do not pose any health risk or problem, a product or substance that would whiten the discolored teeth would be advantageous.

[0005] It is also essential that a tooth whitening product that is to be used at home or in private by the consumer be safe and easy to use and be stable and retain its whitening efficacy during its storage on retail store shelves as well as over the period of use by the consumer.

[0006] Products and substances that are presently available to whiten teeth include a variety of different ingredients, but the primary active ingredient is a peroxide agent formulated into an aqueous liquid, solution, paste or gel carrier. These products potentially lose their whitening efficacy over time as peroxide compounds in aqueous solutions are relatively unstable. This tendency toward instability of peroxide during storage has limited the utility of aqueous liquid whitening products for whitening teeth. It would be highly desirable, therefore, to provide a stable peroxide whitening liquid to effect substantive whitening.

SUMMARY

[0007] The present invention provides tooth whitening systems for whitening a surface of a tooth. Embodiments include a tooth whitening composition comprising a whitening agent and a hydrophobic polymer carrier, wherein the whitening composition adheres to the tooth surface to effect whitening thereof.

[0008] In another embodiment, the present invention provides a method of whitening a surface of a tooth in a mammal, comprising applying to the tooth a whitening composition comprising a whitening agent and a hydrophobic polymer carrier.

[0009] It has been discovered that compositions and methods of this invention afford advantages over whitening compositions among those known in the art including one or more of: enhanced whitening efficacy, providing a higher available concentration of whitening agent, stability of the whitening agent during storage, adherence of the whitening composition to the tooth surface even in the presence of saliva and sustained and controlled delivery of the whitening agent for a longer duration of time. Further uses, benefits and embodiments of the present invention are apparent from the description set forth herein.

DESCRIPTION

[0010] The following definitions and non-limiting guidelines must be considered in reviewing the description of this invention set forth herein. The headings (such as "Introduction" and "Summary,") and sub-headings (such as "Whitening Compositions" and "Methods", for example) used herein are intended only for general organization of topics within the disclosure of the invention, and are not intended to limit the disclosure of the invention or any aspect thereof. In particular, subject matter disclosed in the "Introduction" may include aspects of technology within the scope of the invention, and may not constitute a recitation of prior art. Subject matter disclosed in the "Summary" is not an exhaustive or complete disclosure of the entire scope of the invention or any embodiments thereof. Classification or discussion of a material within a section of this specification as having a particular utility (e.g., as being an "active" or a "carrier" ingredient) is made for convenience, and no inference should be drawn that the material must necessarily or solely function in accordance with its classification herein when it is used in any given composition.

[0011] The citation of references herein does not constitute an admission that those references are prior art or have any relevance to the patentability of the invention

disclosed herein. Any discussion of the content of references cited in the Introduction is intended merely to provide a general summary of assertions made by the authors of the references, and does not constitute an admission as to the accuracy of the content of such references. All references cited in the Description section of this specification are hereby incorporated by reference in their entirety.

[0012] The description and specific examples, while indicating embodiments of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention. Moreover, recitation of multiple embodiments having stated features is not intended to exclude other embodiments having additional features, or other embodiments incorporating different combinations the stated of features. Specific Examples are provided for illustrative purposes of how to make and use the compositions and methods of this invention and, unless explicitly stated otherwise, are not intended to be a representation that given embodiments of this invention have, or have not, been made or tested.

[0013] As used herein, the words "preferred" and "preferably" refer to embodiments of the invention that afford certain benefits, under certain circumstances. However, other embodiments may also be preferred, under the same or other circumstances. Furthermore, the recitation of one or more preferred embodiments does not imply that other embodiments are not useful, and is not intended to exclude other embodiments from the scope of the invention.

[0014] As used herein, the word "include," and its variants, is intended to be non-limiting, such that recitation of items in a list is not to the exclusion of other like items that may also be useful in the materials, compositions, devices, and methods of this invention.

[0015] As referred to herein, all compositional percentages are by weight of the total composition, unless otherwise specified.

[0016] As referred to herein, "tooth" or "teeth" refers to natural mammalian teeth, dentures, dental plates, fillings, caps, crowns, bridges, dental implants, and the like, and any other hard surfaced dental prosthesis either permanently or temporarily fixed within the oral cavity. As used herein, "whitening" refers to a change in visual appearance of a tooth, preferably such that the tooth has a brighter shade. Increase in whiteness of a dental surface can be observed visually, for example with the aid of color comparison charts or gauges, or measured by colorimetry, using any suitable instrument such as a Minolta Chromameter, e.g., model CR-400 (Minolta Corp., Ramsey, NJ). The instrument can be programmed, for example, to measure Hunter Lab values or L*a*b* values according to the standard established by the International Committee of Illumination (CIE). The L*a*b* system provides a numerical representation of three-dimensional color space where L* represents a lightness axis, a* represents a red-green axis and b* represents a yellow-blue axis. The L* and b* axes are typically of greatest applicability to measurement of tooth whiteness. Increase in whiteness can be computed from differences in L*, a* and b* values before and after treatment, or between untreated and treated surfaces. A useful parameter is ΔE^* , calculated as the square root of the sum of the squares of differences in L*, a* and b* values, using the formula:

$$\Delta E^* = [(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]^{1/2}$$

[0017] A higher value of ΔE^* indicates greater increase in whiteness. In various embodiments, the method of the present invention can effect a ΔE^* of at least about 1, or at least about 3, or at least about 4, or at least about 5.

Tooth Whitening System

[0018] In various embodiments, the present invention provides an improved tooth whitening system that employs a tooth whitening composition that adheres to a surface of a tooth to be whitened. The tooth whitening composition comprises a whitening agent and a

hydrophobic polymer carrier. In various embodiments, the hydrophobic polymer carrier of the whitening composition is preferably anhydrous and provides a stable vehicle or carrier for the whitening agent during storage and before use. The whitening composition will gradually dissolve or disintegrate upon exposure to the saliva in the aqueous oral cavity environment, thus providing delivery of the whitening agent to a tooth surface. In some embodiments, it is preferred that the hydrophobic polymer carrier is non-water soluble and thus is stable for longer durations during exposure to saliva and other aqueous solutions found in an oral cavity, as compared to prior art water-soluble whitening solutions.

[0019] In various embodiments, the whitening composition can be incorporated into a dental strip or film form, or into a liquid product which can be applied to the surface of a tooth by manual application. Upon application to the surface of a tooth, the applied whitening composition forms an adherent layer of whitening agent containing product that has the capacity to release the whitening agent over an extended period of time, e.g., from about 5 to about 45 minutes. The applied layer adheres to the tooth surface and the released whitening agent effects whitening of the tooth surface to which the composition is applied.

[0020] In another embodiment, methods of whitening a surface of a tooth are provided.

Whitening Compositions

[0021] The present invention provides a whitening composition for use in a tooth whitening system. In one embodiment, the whitening composition comprises a whitening agent and a hydrophobic polymer carrier. The whitening composition may further comprise an adhesion enhancing agent. Other additional ingredients that may be added include those known to one of skill in the art, including one or more of the following components: surfactants, flavoring agents, sweeteners, desensitizing agents, antimicrobial agents, anti-caries agents, anti-

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calculus agents, anti-inflammatory agents, vitamins, pigments and coloring agents, and enzymes, as will be discussed in greater detail below.

[0022] Active ingredients useful herein are optionally present in the compositions of the present invention in safe and effective amounts. A "safe and effective" amount of an active is an amount that is sufficient to have the desired therapeutic or prophylactic effect in the human or lower animal subject to whom the active is administered, without undue adverse side effects (such as toxicity, irritation, or allergic response), commensurate with a reasonable benefit/risk ratio when used in the manner of this invention. The specific safe and effective amount of the active will vary with such factors as the particular condition being treated, the physical condition of the subject, the nature of concurrent therapy (if any), the specific active used, the specific dosage form, the carrier employed, and the desired dosage regimen.

Whitening Agents

[0023] In various embodiments, the compositions of the present invention comprise a whitening agent as the main active ingredient. As further discussed below, a "whitening agent" is a material which effects whitening of a tooth surface to which it is applied. In various embodiments, the whitening compositions of this invention comprise a whitening agent selected from the group consisting of peroxides, chlorites, and hypochlorites. Examples of suitable chlorites and hypochlorites include those having alkali or alkaline metal cations and include calcium chlorite, barium chlorite, magnesium chlorite, lithium chlorite, sodium chlorite, potassium chlorite, calcium hypochlorite, barium hypochlorite, magnesium hypochlorite, lithium hypochlorite, lithium hypochlorite, and sodium hypochlorite.

[0024] In one embodiment, the whitening agent comprises a peroxide compound. As referred to herein, a "peroxide compound" is an oxidizing compound

comprising a bivalent oxygen-oxygen group. Peroxide compounds include peroxides and hydroperoxides, such as hydrogen peroxide, peroxides of alkali and alkaline earth metals, organic peroxy compounds, peroxy acids, pharmaceutically-acceptable salts thereof, and mixtures thereof. Peroxides of alkali and alkaline earth metals include lithium peroxide, potassium peroxide, sodium peroxide, magnesium peroxide, calcium peroxide, barium peroxide, and mixtures thereof. Organic peroxy compounds include carbamide peroxide (also known as urea hydrogen peroxide), glyceryl hydrogen peroxide, alkyl hydrogen peroxides, dialkyl peroxides, alkyl peroxy acids, peroxy esters, diacyl peroxides, benzoyl peroxide, and monoperoxyphthalate, and mixtures thereof. Peroxy acids and their salts include organic peroxy acids such as alkyl peroxy acids, and monoperoxyphthalate and mixtures thereof, as well as inorganic peroxy acid salts such as persulfate, dipersulfate, percarbonate, perphosphate, perborate and persilicate salts of alkali and alkaline earth metals such as lithium, potassium, sodium, magnesium, calcium and barium, and mixtures thereof. In various embodiments, the peroxide compound comprises hydrogen peroxide, urea peroxide, sodium percarbonate and mixtures thereof.

[0025] Peroxide releasing compounds particularly useful in the whitening compositions of the present invention include peroxide containing compounds such as urea peroxide, sodium percarbonate, sodium perborate and polyvinylpyrrolidone- H_2O_2 complexes (hereinafter "PVP- H_2O_2 "). Polyvinylpyrrolidone is also known as poly-N-vinyl-poly-2-pyrrolidone and commonly abbreviated to "PVP". PVP generally refers to a polymer containing vinylpyrrolidone (also referred to as N-vinylpyrrolidone, N-vinyl-2-pyrrolidone and N-vinyl-2-pyrrolidinone) as a monomeric unit. The monomeric unit consists of a polar imide group, four non-polar methylene groups and a non-polar methane group.

[0026] Both linear and cross-linked complexes of PVP-H₂O₂ are known in the art and are disclosed in U.S. Patent 3,376,110 and U.S. Patent 3,480,557, which are herein incorporated by reference, and have been used in compositions for treating acne vulgaris (U.S. Patent 5,122,370). PVP-H₂O₂ complexes are also disclosed in U.S. Patent 5,122,370. PVP-H₂O₂ is stable in an anhydrous environment. Upon exposure to highly aqueous environments, such as in the oral cavity, the PVP-H₂O₂ dissociates into individual species (PVP polymer and H₂O₂). In one embodiment, the PVP-H₂O₂ complex is about 80% by weight polyvinylpyrrolidone and 20% by weight H₂O₂.

[0027] In alternate embodiments, the whitening agent comprises a liquid peroxide solution. The hydrophobic polymer carrier of the whitening composition provides sufficient stability to permit the use of a liquid hydrogen peroxide. The liquid hydrogen peroxide comprises H₂O₂ generally contained in an aqueous water-based solution. In some embodiments, the liquid hydrogen peroxide has a concentration of peroxide to the total solution of about 0.5 to about 10 %, more preferably 0.5 to 5% by weight). Additionally, a stabilizer may be present. For example, a 3% hydrogen peroxide solution with about 0.1 to about 0.5 % of a stabilizer may be used. Acetanilide or a similar organic material can also be used with a pyrophosphate stabilizer such as sodium acid pyrophosphate (about 0.1 to about 1.0%) with a preferred amount of about 0.5%.

[0028] In certain embodiments, an agent to enhance release of the peroxide in the oral cavity is present as a part of the peroxide component whitening agent. P olypore® which is an allyl methacrylate crosspolymer available from Amcol health & Beauty Solutions, Inc. is such an enhancing agent.

[0029] In various embodiments, the whitening agent of the whitening composition comprises from about 0.1% to about 50%, optionally from about 0.5% to about 50%, and optionally from about 10% to about 40% of the oral care composition.

Hydrophobic Polymer Carrier

[0030] The present invention preferably comprises a carrier that comprises a hydrophobic polymer. The term "hydrophobic" or "water-insoluble" as applied to polymers and as employed herein refers to an organic polymer which is substantially non-aqueous having a water solubility of less than one gram per 100 grams of water at 25°C. In various embodiments, a hydrophobic polymer is compatible with the whitening agents previously described above. In certain embodiments, a hydrophobic polymer is selected for the carrier to produce a tooth whitening composition having a viscosity of greater than about 1,000 centipoise (cP) and less than about 900,000 cP, preferably greater than about 10,000 cP and less than about 100,000 cP.

[0031] One preferred class of hydrophobic polymers comprise siloxane polymers, which are also generally known in the art as "silicone" polymers. In certain embodiments of the present invention, the hydrophobic polymers in the carrier are those in which a whitening agent can be dispersed and are well known in the art. Many such silicone polymers are commercially available. In various embodiments, a preferred silicone-based hydrophobic polymer is a polyorganosiloxane. One such polyorganosiloxane is produced by condensing a silicone resin and an organosiloxane such as a polydiorganosiloxane. Such hydrophobic polymers are an elastomeric, tacky material, adhesion of which to dental enamel surfaces can be varied by altering the ratio of silicone resin to polydiorganosiloxane in the copolymer molecule. Preferably, the polymers are pressure sensitive hydrophobic polymers specifically designed for pharmaceutical use and are permeable to many drug compounds and

find application for the transdermal application of various compounds. In one such embodiment, the silicone polymers are the copolymer product of mixing a silanol terminated polydiorganosiloxane such as polydimethyl siloxane with a silanol-containing silicone resin whereby the silanol groups of the polydiorganosiloxane undergo a condensation reaction with the silanol groups of the silicone resin so that the polydiorganosiloxane is lightly crosslinked by the silicone resin (that is, the polydiorganosiloxane chains are bonded together through the resin molecules to give chain branching and entanglement and/or a small amount of network character) to form the silicone hydrophobic polymers. A catalyst, for example, an alkaline material, such as ammonia, ammonium hydroxide or ammonium carbonate, can be mixed with the silanol-terminated polydiorganosiloxane and the silicone resin to promote this crosslinking reaction. By copolymerizing the silicone resin with the silanol terminated polydiorganosiloxane, there results a polymer with self adhering properties and the cohesive properties of a soft elastomer matrix characteristic of pressure sensitive polymers being distinguished from the hard, non-elastomeric properties of other silicone resins. In one embodiment, hydrophobic polymers used in the carrier are available from the Dow-Corning Company under the brand name BIO-PSA.

[0032] The modification of a ratio of silicone resin to polydiorganosiloxane modifies the tackiness of the hydrophilic polymer. This ratio can be in the range of about 70:30 to about 50:50. For example, the BIO-PSA silicone sold by Dow-Corning is available in three silicone resin to silicone polymer ratios namely, 65/35 (low tack), 60/40 (medium tack), 55/45 (high tack). Such a polyorganosiloxane pressure sensitive adhesive is available dissolved in either ethyl acetate solvent or dimethicone.

[0033] In various embodiments, the hydrophobic polymer carrier is preferably present in the liquid whitening compositions of the present invention at a concentration of from

about 1 to about 80% (by weight), optionally from about 15% to about 80%, optionally from about 15% to about 80%. In one embodiment, the hydrophobic polymer carrier is present at a level of from about 15% to about 40%. In one embodiment, the hydrophobic carrier is present at a level of from about 40% to about 80 %.

Adhesion Enhancing Agents

[0034] In one embodiment of the present invention, the whitening composition further comprises an adhesion enhancing agent, that augments adhesion of the anhydrous whitening composition to the surface of the tooth, i.e., adhesion to the enamel. Adhesion enhancing agents useful with the present invention include inorganic materials as well as organic natural and synthetic polymers. Inorganic materials include amorphous silica compounds which function as thickening agents, and include colloidal silica compounds available under trademarks such as Cab-o-sil fumed silica manufactured by Cabot Corporation and distributed by Lenape Chemical, bound Brook, NJ; Zeodent 165 from J.M. Huber Chemicals Division, Havre de Grace, MD 21078; and Sylox 15 also known as Sylodent 15, available from Davison Chemical Division of W.R. Grace Corporation, Baltimore, MD 21203. In certain embodiments, the inorganic adhesion enhancing material, such as silica, is surface treated to compatibilize the adhesion enhancing agent with the hydrophobic components in the whitening composition.

[0035] Organic materials which may be included in the compositions of the present invention to enhance the properties of the hydrophobic polymers of the present invention include adhesion enhancing agents such as waxes, inclusive of bees' wax, mineral oil, plastigel, (a blend of mineral oil and polyethylene), petrolatum, white petrolatum, shellac, versagel (blend of liquid paraffin, butene/ethylene/styrene hydrogenated copolymer)

polyethylene waxes, microcrystalline waxes, polyisobutene, polyvinyl pyrrolidone/vinyl acetate copolymers, and insoluble polyacrylate copolymers.

[0036] Also effective as adhesion enhancing agents are liquid hydrophilic polymers including polyethylene glycols, nonionic polymers of ethylene oxide having the general formula:



wherein n represents the average number of oxyethylene groups. Polyethylene glycols available from Dow Chemical are designated by a number such as 200, 300, 400, 600, 2000 which represents the approximate average molecular weight of the polymer, as well as nonionic block copolymer of ethylene oxide and propylene oxide of the formula:



The block copolymer is preferably chosen (with respect to a, b and c) such that the ethylene oxide constituent comprises from about 65 to about 75% by weight, of the copolymer molecule and the copolymer has an average molecular weight of from about 2,000 to about 15,000 with the copolymer being present in the liquid tooth whitening composition in such concentration that the composition is liquid at room temperatures (23°C).

[0037] A particularly desirable block copolymer for use in the practice of the present invention is available commercially from BASF and designated Pluraflo L1220 which has an average molecular weight of about 9,800. The hydrophilic poly(ethylene oxide) block averages about 65% by weight of the polymer.

[0038] Adhesion enhancing agents employed in compositions of various embodiments of the invention are present in an amount of from about 0 to about 20% by weight. Preferably, the adhesion enhancing agents are present in an amount of from about 2 to about 15% by weight.

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Additional Ingredients

[0039] As previously described, many other components may further be included in the whitening compositions of the present invention, and include flavors, sweetening agents, surfactants, anti-microbial agents, anti-inflammatory agents, plaque buffers, vitamins, anti-caries agents, anti-plaque agents, desensitizing agents, coloring agents, pigments and opacifying agents, for example.

[0040] In certain embodiments, nonionic surfactants are present in the whitening composition. These surfactants are preferably compatible with the whitening agents and serve as solubilizing, dispersing, emulsifying and wetting agents. In one aspect, surfactants are especially effective to solubilize a flavoring agent, if flavor is desired for the liquid whitening composition. A particularly useful nonionic surfactant is a water soluble polyoxyethylene monoester of sorbitol with a C10 to C18 fatty acid, marketed commercially under the Tween trademark. The Tween surfactants are mixtures of C10 to C18 fatty acid esters of sorbitol (and sorbitol anhydrides), consisting predominately of the monoester, condensed with about 10-30, preferably about 20, moles of ethylene oxide. The fatty acid (aliphatic hydrocarbonyl monocarboxylic acid) may be saturated or unsaturated, e.g., lauric, palmitic, stearic, oleic acids. Polysorbate 20 (e.g., Tween 20) is especially preferred and is commonly referred to as polyoxyethylene (20) sorbitan monolaurate. The nonionic surfactant constitutes about 0 to 50% by weight and preferably 0.5 to 40% by weight of the liquid composition.

[0041] In an embodiment where the whitening composition has a flavoring agent, the flavoring agent is selected from essential oils, as well as various flavoring aldehydes, esters, alcohols, and similar materials. Examples of the essential oils include oils of spearmint, peppermint, wintergreen, sassafras, clove, sage, eucalyptus, marjoram, cinnamon, lemon, lime, grapefruit, and orange. Also useful are such chemicals as menthol, carvone, and anethole. Of

these, the most commonly employed are the oils of p eppermint, spearmint and w intergreen. The flavoring agent is preferably incorporated in the whitening composition of the present embodiment at a concentration of about 0 to about 2% by weight and more preferably about 0.1 to about 0.5% by weight.

[0042] In embodiments where the whitening composition is sweetened, a sweetening material is used as an alternative or complement to the flavoring agent. Suitable sweetening agents are water-soluble and include sodium saccharin, sodium cyclamate, xylitol, perillartien, D-tryptophan, aspartame, dihydrochalcones and the like, in concentrations of about 0.01 to about 1% by weight. Sodium saccharin is preferred.

[0043] Other ingredients which are included in various embodiments of the liquid whitening composition comprise materials commonly used in the oral care formulations. These include: antimicrobial agents, e.g., Triclosan, chlorhexidine, copper-, zinc- and stannous salts such as zinc citrate, zinc sulfate, zinc glycinate, sodium zinc citrate and stannous pyrophosphate, sanguinarine extract, metronidazole, quaternary ammonium compounds, such as cetylpyridinium chloride; bis-guanides, such as chlorhexidine digluconate, hexetidine, octenidine, alexidine; and halogenated bisphenolic compounds, such as 2,2' methylenebis-(4-chloro-6-bromophenol); anti-inflammatory agents such as ibuprofen, flurbiprofen, aspirin, indomethacine; anti-caries agents such as sodium-, calcium-, magnesium- and stannous fluoride, aminefluorides, disodium monofluorophosphate and sodium trimetaphosphate; plaque buffers such as urea, calcium lactate, calcium glycerophosphate and strontium polyacrylates; vitamins such as Vitamin C; plant extracts; desensitizing agents, e.g., potassium citrate, potassium chloride, potassium tartrate, potassium bicarbonate, potassium oxalate, potassium nitrate and strontium salts; agents effective against dental calculus such as pyrophosphate salts including the mono, di, tri and tetra alkali metal and ammonium pyrophosphate and

tripolyphosphate salts; biomolecules, e.g., bacteriocins, antibodies, enzymes such as papain, glucoamylase; opacifying agents, pigments, coloring agents and fluoride ion providing salts having anti-caries efficacy such as sodium fluoride, potassium fluoride, a tin fluoride such as stannous fluoride. In another embodiment, the whitening composition comprises one or more desensitizing agents, such as potassium nitrate, citric acid, citric acid salts, strontium chloride and the like.

[0044] In one embodiment, the tooth whitening composition has the following general formula:

Component	Content
Hydrophobic Polymer Carrier	1 to 80 wt %
Adhesive Enhancing Agent	0 to 20 wt %
Whitening Agent (Peroxide)	0.5 to 50 wt %
Surfactant	0 to 50 wt %
Flavor	0.1 to 1 wt %
Other Components (can be HOH)	0 to 10 wt %

Strip

[0045] The whitening composition of the present invention may be in the form of a layer of a strip prepared using a conventional solvent casting process. Strips among those useful herein comprise polymers, natural and synthetic woven materials, non-woven material, foil, paper, rubber and combinations thereof. Preferably the strip of material is substantially water insoluble. Suitable polymers include polyethylene, ethylvinylacetate, polyesters, ethylvinyl alcohol, fluoroplastics, and combinations thereof. In various embodiments, the strip of material is generally less than about 1 mm (millimeter) thick, optionally less than about 0.05 mm thick, optionally about 0.001 to about 0.03 mm thick. The shape of the strip is any shape and size that covers the desired oral surface. In one embodiment, the length of the strip material is from about 2 cm (centimeter) to about 12 cm, in another embodiment from about 4

cm to about 9 cm. The width of the strip material will also depend on the oral surface area to be covered. The width of the strip is generally from about 0.5 cm to about 4 cm, in one embodiment from about 1 cm to about 2 cm. The strip material may comprise shallow pockets, optionally filled by a composition of this invention. Strips among those useful herein are disclosed in U.S. Patent 6,514,484, Rajaiah et al. issued February 4, 2003.

[0046] For example, in some embodiments, a strip is prepared by solvent casting, an adhesive polymer or resin such as colophonium and/or polyvinylpyrrolidone is dissolved in a sufficient amount of a compatible solvent such as ethanol. After a solution has been formed, the addition of the base whitening composition follows and any other ingredients such as sweeteners or flavors. The solution is coated onto a suitable casting carrier material from which the formed strip can be easily released from without damage. The carrier material must have a surface tension which allows the solution to spread evenly across the intended carrier width without soaking in to form a destructive bond between the two substrates. Examples of suitable carrier materials include glass, stainless steel, teflon, polyethylene impregnated kraft paper. The strip may be dried to a solid usable form in a high temperature air bath using a drying oven, drying tunnel, vacuum drier, or any other suitable drying equipment at a temperature. Thereafter the strip formed on the carrier is peeled off the carrier surface and cut into pieces of suitable size and shape for consumer use and packed into a suitable container.

[0047] To use the whitening strip for the present invention, the strip when applied to the teeth surface will adhere to the teeth in an appropriate manner and within 1 to 60 minutes, the teeth surfaces will whiten to a natural appearance as the whitening agent(s) present in the strip matrix migrate to the tooth surfaces. The composition can be applied to the tooth surface to be whitened for a plurality of minutes per day. The application of the composition can be repeated for multiple days to thereby whiten the teeth.

[0048] In this regard, the whitening strip is formed to have a width dimension suitable to cover one or more teeth in a row (upper or lower). Therefore, the whitening strip may be applied to one or more of the upper set of teeth, or to one or more of the lower set of teeth either separately or simultaneously. The length dimension of the whitening strip is determined by the amount of coverage desired. In this regard, the number of teeth which it is desired to whiten will determine the dimensions for the whitening strip. For instance, it may be desired to only whiten the front teeth, which are most easily seen by others. Accordingly, the length of whitening strip can be reduced in this case, as compared to the case where it is desired to whiten all of the teeth. The duration of application of whitening strip to the teeth will depend upon the type and concentration of the whitening agent(s), as well as the type and intensity of stain. After the teeth are whitened to the satisfaction of the user, the portions of the strip can be easily removed by rinsing the mouth with water and brushing.

Paint-On Tooth Whitener

[0049] In one preferred embodiment, the whitening composition is applied using a "paint-on" technique. A small application device, such as a brush or spatula is coated with a composition of this invention and the composition is then placed on a tooth surface. Preferably, the composition is spread evenly on such surfaces, in sufficient quantity to deliver whitening agent(s) to the stained surfaces.

[0050] The paint-on whitening composition of the present invention is prepared in the form of a flowable viscous liquid suspension containing the whitening agent and is applied as such to the subject's teeth, by manual application, such as by painting the teeth with a soft applicator brush in the same manner as application of nail polish to a finger nail and without the intervention of a dentist or technological operations. Application by the user and evaporation or dissolution of the solvent leaves an adherent natural appearing white coating on the teeth.

[0051] In various embodiments, the layer of tooth whitening composition applied to tooth enamel contains no ingredients imparting thereto an unacceptable taste or texture, rendering it unpleasant to the user while adhering strongly to tooth enamel. The composition is sufficiently adherent to tooth enamel to remain on the teeth for the applied whitening composition enabling the applied coating to resist the forces commonly applied by the lips and tongue as well as those forces encountered during normal mastication, as upon the evaporation or dissolution of the solvent in mouth after application a hard coating of whitening composition forms in about 1 minute which coating is bonded securely to the tooth enamel to which it is applied. While the layer of applied paint-on whitening composition is in place, the user is to refrain from mastication. The whitening composition can be removed as and when required, at will, by an employment of standard oral hygiene procedures such as brushing or by rinsing with an alcoholic mouthwash.

Methods

[0052] In one embodiment, the present invention provides a method of whitening the surface of a tooth in the oral cavity of a human or other animal subject using a tooth whitening composition comprising a whitening agent and a hydrophobic polymer carrier. The method comprises contacting the composition with the surface of the tooth. The contacting occurs for a duration of time sufficient to satisfactorily effect whitening of the teeth. Thus, the contacting occurs for a sufficient period of time to at least partially whiten teeth. This can be a period of time from about 1 minute to 2 hours or longer. In certain embodiments, the contacting is for a period of time from about 1 minute to about 5 minutes to about 45 minutes. The substantially non-aqueous tooth whitening composition is effective over a longer period of time, since it is not significantly diluted washed away in the oral cavity during the treatment time.

[0053] In another embodiment of the present invention, a method is provide for whitening a surface of a tooth in an oral cavity of a human or other animal subject which comprises preparing a liquid tooth whitening composition as previously described. The composition is applied to the tooth surface to be whitened for a plurality of minutes per day. The application is then repeated for multiple days to expose the teeth to multiple doses of whitening agent, and thus, thereby whitens the surface of the tooth.

[0054] The liquid whitening compositions of the present invention are prepared by adding and mixing the ingredients of the composition in a suitable vessel such as a stainless steel tank provided with a mixer. In the preparation of the liquid whitening composition, the ingredients are advantageously added to the mixer in the following order: liquid anhydrous silicone based pressure sensitive polymer (hydrophobic polymer carrier), peroxide whitening agent, adhesion enhancing agent and any desired flavoring or sweetener. The ingredients are then mixed to form a homogeneous dispersion/solution.

[0055] The present invention is illustrated by the following examples but is not to be limited thereby.

Example I

[0056] A series of liquid whitening paint-on composition are prepared using the ingredients listed in Table I below.

TABLE I		
Composition Ingredients	A	B
BIO PSA (medium/high tack)*	30.0	30.0
Plastigel	44.2	44.0
Sodium percarbonate	25	--
PVP H ₂ O ₂ cx**	--	25.0
Saccharin	0.8	0.50
Flavor	--	0.50
PEG 400	--	--
Polyisobutene	--	--
*Dissolved in 60% by weight dimethicone		
**cx=cross-linked		

[0057] The whitening compositions A and B are prepared by mixing the sodium percarbonate or PVP·H₂O₂ with the Plastigel followed by the pressure sensitive adhesive BIO PSA, saccharin, flavor, PEG 400 or polyisobutene. The liquid whitening composition of Table I can be packaged in sealed polypropylene bottles.

Example II

[0058] A second series of silicone polymer based pressure sensitive whitening compositions are prepared with the ingredients listed in Table II below, with the methods as described above.

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TABLE II		
Composition		
Ingredient	C	D
Ethyl acetate	13.50	13.50
Bio PSA (medium/high tack)	35.00	35.0
Pluracare L1220	5.00	5.0
Sodium saccharin	1.00	1.0
Snow white petrolatum	5.00	12.0
Zinc oxide	7.00	--
Sodium percarbonate	33.00	33.0
Flavor	0.50	0.50
Total	100.00	100.00

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28CLAIMS

What is claimed is:

1. A tooth whitening composition for whitening a surface of a tooth comprising a whitening agent and a hydrophobic polymer carrier, wherein said whitening composition adheres to the tooth surface to effect whitening thereof.
2. A composition according to Claim 1, wherein said hydrophobic carrier of said whitening composition is substantially non-water soluble.
3. A composition according to Claim 1, wherein said whitening composition comprises from between about 1 to about 80 weight % of said hydrophobic polymer carrier.
4. A composition according to Claim 1, wherein said whitening composition comprises from between about 40 to about 80 weight % of said hydrophobic polymer carrier.
5. A composition according to Claim 1, wherein said hydrophobic polymer of said carrier comprises a siloxane.
6. A composition according to Claim 1, wherein said hydrophobic polymer of said carrier comprises a silicone resin.
7. A composition according to Claim 1, wherein said hydrophobic polymer of said carrier comprises a polyorganosiloxane.
8. A composition according to Claim 1, wherein said hydrophobic polymer of said carrier is a pressure sensitive adhesive.
9. A composition according to Claim 1, wherein said whitening composition comprises from between about 0.5 to about 50 weight % of said whitening agent.
10. A composition according to Claim 1, wherein the whitening agent is selected from the group consisting of peroxides, chlorites and hypochlorites.

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11. A composition according to Claim 1, wherein the whitening agent is selected from the group consisting of polyvinylpyrrolidone/hydrogen peroxide, liquid hydrogen peroxide, urea peroxide, sodium percarbonate, sodium perborate, and mixtures thereof.
12. A composition according to Claim 1, wherein said whitening composition further comprises an adhesion enhancing agent from about 0.1 to about 20 weight % of the whitening composition.
13. A composition according to Claim 12, wherein said adhesion enhancing agent comprises one or more components selected from the group consisting of: waxes, nonionic polymers comprising ethylene oxide, nonionic copolymers comprising ethylene oxide and propylene oxide, polyethylene gelled mineral oil, petrolatum, hydrophobic silica containing compounds, and mixtures thereof.
14. A composition according to Claim 1, wherein said whitening composition further comprises one or more of the following components: a surfactant, a flavoring agent, a desensitizing agent, an antimicrobial agent, an anti-caries agent, and an anti-calculus agent.
15. A composition according to Claim 1, wherein said whitening composition comprises between about 1 to about 80 weight % of said hydrophobic carrier, between about 0.5 to about 50 weight % of said whitening agent, between about 0 to about 20 weight % of an adhesive enhancing agent; between about 0 to about 50 weight % of a non-ionic surfactant; between about 0 to about 1 weight % of a flavoring agent; and between about 0 to about 10 weight % of other components.
16. A method for whitening a surface of a tooth in an oral cavity of a human or other animal subject which comprises
- (a) applying a liquid tooth whitening composition of Claim 1 to the tooth surface to be whitened for a plurality of minutes per day; and

(b) repeating b for multiple days to thereby whiten the teeth.

17. A method of whitening a tooth in a mammal, the method comprising applying to the tooth a composition comprising a hydrophobic polymer carrier and a whitening agent.

18. A method according to Claim 20, wherein said applying is achieved by contacting a film comprising said tooth whitening composition with a surface of a the tooth.

19. A method according to Claim 20, wherein said applying is achieved by contacting a liquid form of said tooth whitening composition with a surface of the tooth.

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(54) Título: COMPOSICION LIQUIDA BLANQUEADORA DE DIENTES A BASE DE PORTADOR DE POLÍMERO HIDROFOBICO

(57) Resumen: Un sistema blanqueador de dientes que comprende una composición blanqueadora de dientes que comprende un agente blanqueador y un portador de polímero hidrofóbico. La composición blanqueadora de dientes es preferiblemente sustancialmente insoluble en agua. La composición blanqueadora de dientes se aplica a la superficie de los dientes a blanquear en un mamífero para efectuar el blanqueado en la superficie del diente. También se proporcionan métodos de blanquear la superficie de un diente.

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**COMPOSICIÓN LÍQUIDA PARA BLANQUEAR LOS DIENTES,
A BASE DE PORTADOR DE POLÍMERO HIDRÓFOTO**

INTRODUCCIÓN

La presente invención se refiere a unos sistemas para blanquear los dientes que emplean composiciones que comprenden polímeros hidrófobos. Unas realizaciones de la presente invención incluyen unas composiciones para blanquear los dientes que comprenden un portador de polímero hidrófobo y un agente blanqueador.

Se ha hecho deseable que los dientes de una persona luzcan brillantes o "blancos". La sociedad le da un alto valor a la "blancura" de los dientes. Las personas cuyos dientes son blancos pueden disfrutar de mayor confianza y satisfacción personal e incluso pueden disfrutar de mayor aceptación social.

En un mamífero, un diente está compuesto por una capa interna de dentina y una capa externa de esmalte duro que es la capa protectora del diente. La capa de esmalte de un diente es naturalmente opaca y blanca o de un color ligeramente blanquecino. La capa de esmalte puede mancharse o decolorarse. La capa de esmalte de un diente está compuesta por cristales de mineral de hidroxiapatita que crean una superficie algo porosa. Estos cristales de hidroxiapatita forman prismas o varas hexagonales microscópicas que componen la superficie del esmalte. Como resultado, la superficie de la capa de esmalte presenta unos espacios microscópicos o poros entre los prismas. Se cree esta naturaleza porosa de la capa de esmalte es lo que permite que los agentes manchadores y las sustancias decolorantes penetren el esmalte y decoloren los dientes. Estas sustancias remanentes pueden ocupar los espacios microscópicos y eventualmente alterar el color de los dientes.

Muchas sustancias con las cuales una persona se pone en contacto diariamente pueden "manchar" o reducir la "blancura" de los dientes. En particular, los alimentos, los productos de tabaco y los fluidos que se consumen tienden a manchar los dientes. Estos productos o sustancias tienden a acumularse sobre la capa de esmalte del diente y forman una película fina sobre los dientes. Estas sustancias que manchan y decoloran pueden entonces penetrar la capa de esmalte. Este problema ocurre gradualmente por muchos años, pero imparte una decoloración notable del esmalte de los dientes. Siempre que los dientes decolorados estén aún saludables y no planteen riesgo o problema alguno de salud, un producto o sustancia que blanqueara los dientes decolorados sería ventajoso.

También es esencial que un producto para blanquear los dientes que deba ser

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usado en el hogar o en privado por el consumidor sea seguro y fácil de usar y sea estable y retenga su eficacia de blanqueo durante su almacenaje en los anaqueles de las tiendas así como durante el período de uso por el consumidor.

Los productos y sustancias que están actualmente disponibles para blanquear los dientes incluyen una variedad de diferentes ingredientes, pero el ingrediente activo primario es un agente de peróxido formulado en un portador acuoso líquido, en solución, en pasta o en gel. Estos productos pierden potencialmente su eficacia de blanqueo con el tiempo, ya que los compuestos de peróxido en soluciones acuosas son relativamente inestables. Esta tendencia hacia la inestabilidad del peróxido durante el almacenaje ha limitado la utilidad de los productos blanqueadores líquidos acuosos para blanquear los dientes. Sería sumamente conveniente, por lo tanto, proporcionar un líquido blanqueador de peróxido estable para efectuar un blanqueo sustancial.

SUMARIO

La presente invención proporciona unos sistemas para blanquear los dientes, para blanquear una superficie de un diente. Las realizaciones incluyen una composición para blanquear los dientes, que comprende un agente blanqueador y un portador de polímero hidrófobo, en donde la composición blanqueadora se adhiere a la superficie del diente para efectuar el blanqueo de la misma.

En otra realización, la presente invención proporciona un método para blanquear una superficie de un diente en un mamífero, que comprende aplicar al diente una composición blanqueadora que comprende un agente blanqueador y un portador de polímero hidrófobo.

Se ha descubierto que las composiciones y los métodos de esta invención ofrecen ventajas sobre las composiciones blanqueadoras entre aquellas conocidas en el arte, incluyendo una o más de: eficacia mejorada de blanqueo, provisión de una concentración disponible superior de agente blanqueador, estabilidad del agente blanqueador durante el almacenaje, adherencia de la composición blanqueadora a la superficie del diente incluso en la presencia de saliva, y entrega sostenida y controlada del agente blanqueador por una duración mayor de tiempo. Unos usos, beneficios y realizaciones adicionales de la presente invención son evidentes a partir de la descripción expuesta en la presente.

DESCRIPCIÓN

Las siguientes definiciones y pautas no limitativas deben ser consideradas en la revisión de la descripción de esta invención expuesta en la presente. Los

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encabezados (tales como "Introducción" y "Sumario") y los sub-encabezados (tales como "Composiciones Blanqueadoras" y "Métodos", por ejemplo) usados en la presente son propuestos solamente para la organización general de los tópicos dentro de la descripción de la invención, y no tienen la intención de limitar la descripción de la invención o cualquier aspecto de la misma. En particular, la materia descrita en la "Introducción" puede incluir aspectos de tecnología dentro del alcance de la invención, y puede no constituir una narración del arte previo. La materia descrita en el "Sumario" no es una descripción exhaustiva o completa del alcance entero de la invención o cualesquiera realizaciones de la misma. La clasificación o discusión de un material dentro de una sección de esta especificación como teniendo una utilidad particular (por ejemplo, como siendo un "material activo" o un ingrediente "portador") es hecha por conveniencia, y no se debe inferir que el material deba funcionar necesariamente o solamente de acuerdo con su clasificación en la presente cuando es usado en cualquier composición dada.

La citación de referencias en la presente no constituye una admisión de que esas referencias sean arte previo o tengan relevancia alguna con relación a la patentabilidad de la invención descrita en la presente. Cualquier discusión del contenido de las referencias citadas en la Introducción es propuesta meramente para proporcionar un sumario general de afirmaciones hechas por los autores de las referencias, y no constituye una admisión en cuanto a la exactitud del contenido de tales referencias. Todas las referencias citadas en la sección de Descripción de esta especificación son de ese modo incorporadas por referencia en su totalidad.

La descripción y los ejemplos específicos, aunque indican unas realizaciones de la invención, son propuestos con fines ilustrativos solamente y no están destinados a limitar el alcance de la invención. Además, la narración de múltiples realizaciones que tienen características expuestas no está destinada a excluir otras realizaciones que tienen características adicionales, u otras realizaciones que incorporan diferentes combinaciones de las características expuestas. Los Ejemplos específicos son proporcionados con fines ilustrativos de la forma para elaborar y usar las composiciones y los métodos de esta invención y, a menos que se exponga explícitamente lo contrario, no están destinados a ser una representación de que unas realizaciones dadas de esta invención hayan sido o no hayan sido elaboradas o probadas.

Según se usa en la presente, las palabras "preferido" y "preferiblemente" se refieren a realizaciones de la invención que ofrecen ciertos beneficios, bajo ciertas

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circunstancias. Sin embargo, otras realizaciones también pueden ser preferidas, bajo las mismas u otras circunstancias. Adicionalmente, la narración de una o más realizaciones preferidas no implica que otras realizaciones no sean útiles, y no está destinada a excluir del alcance de la invención otras realizaciones.

Según se usa en la presente, la palabra "incluir", y sus variantes, está destinada a ser no limitativa, de tal modo que la indicación de artículos en una lista no excluye otros artículos similares que también pueden ser útiles en los materiales, las composiciones, los dispositivos y los métodos de esta invención.

Según se mencionan en la presente, todos los porcentajes de composición son en peso de la composición total, a menos que se especifique lo contrario.

Según se menciona en la presente, "diente" o "dientes" se refiere a los dientes naturales de mamíferos, dentaduras postizas, placas dentales, empastes, capas, coronas, puentes, implantes dentales y similares, y cualquier otra prótesis dental de superficie dura fijada permanente o temporalmente dentro de la cavidad oral. Según se usa en la presente, "blanqueo" se refiere a un cambio en la apariencia visual de un diente, preferiblemente de tal modo que el diente tenga un matiz más brillante. El aumento en la blancura de una superficie dental puede ser observado visualmente, por ejemplo con la ayuda de indicadores o tablas de comparación de colores, o medido por colorimetría, usando cualquier instrumento adecuado tal como un Cromámetro Minolta, por ejemplo el modelo CR-400 (Minolta Corp., Ramsey, NJ). El instrumento puede ser programado, por ejemplo, para medir los valores Hunter Lab o valores $L^*a^*b^*$ de acuerdo con el patrón establecido por el Comité Internacional de Iluminación (CIE). El sistema $L^*a^*b^*$ proporciona una representación numérica del espacio de color tridimensional, en donde L^* representa un eje de luminosidad, a^* representa un eje rojo-verde y b^* representa un eje amarillo-azul. Los ejes L^* y b^* son típicamente de mayor aplicabilidad para la medición de la blancura de los dientes. El aumento en la blancura puede ser calculado a partir de las diferencias en los valores L^* , a^* y b^* antes y después del tratamiento, o entre superficies tratadas y no tratadas. Un parámetro útil es ΔE^* , calculado como la raíz cuadrada de la suma de los cuadrados de las diferencias en los valores L^* , a^* y b^* , usando la fórmula:

$$\Delta E^* = [(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]^{1/2}$$

Un valor superior de ΔE^* indica un mayor aumento en la blancura. En varias realizaciones, el método de la presente invención puede lograr un ΔE^* de por lo menos aproximadamente 1, o por lo menos aproximadamente 3, o por lo menos aproximadamente 4, o por lo menos aproximadamente 5.

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Sistema para Blanquear los Dientes

En varias realizaciones, la presente invención proporciona un sistema mejorado para blanquear los dientes, que emplea una composición para blanquear los dientes que se adhiere a una superficie de un diente a ser blanqueada. La composición para blanquear los dientes comprende un agente blanqueador y un portador de polímero hidrófobo. En varias realizaciones, el portador de polímero hidrófobo de la composición blanqueadora es preferiblemente anhidro y proporciona un vehículo o portador estable para el agente blanqueador durante el almacenaje y antes del uso. La composición blanqueadora se disolverá o desintegrará gradualmente con la exposición a la saliva en el ambiente acuoso de la cavidad oral, proporcionando así la entrega del agente de blanqueo a una superficie dental. En algunas realizaciones, se prefiere que el portador de polímero hidrófobo no sea soluble en agua y así sea estable por un tiempo más largo durante la exposición a la saliva y otras soluciones acuosas encontradas en una cavidad oral, en comparación con las soluciones blanqueadoras solubles en agua del arte previo.

En varias realizaciones, la composición blanqueadora puede ser incorporada a una forma de película o tira dental, o a un producto líquido que puede ser aplicado a la superficie de un diente por aplicación manual. En la aplicación a la superficie de un diente, la composición blanqueadora aplicada forma una capa adherente de producto que contiene agente blanqueador que tiene la capacidad de liberar el agente blanqueador durante un período de tiempo extenso, por ejemplo desde aproximadamente 5 hasta aproximadamente 45 minutos. La capa aplicada se adhiere a la superficie dental y el agente blanqueador liberado efectúa el blanqueo de la superficie dental a la cual la composición es aplicada.

En otra realización, se proveen los métodos para blanquear la superficie de un diente.

Composiciones Blanqueadoras

La presente invención proporciona una composición blanqueadora para ser usada en un sistema para blanquear los dientes. En una realización, la composición blanqueadora comprende un agente blanqueador y un portador de polímero hidrófobo. La composición blanqueadora puede comprender adicionalmente un agente para mejorar la adhesión. Otros ingredientes adicionales que pueden ser añadidos incluyen aquéllos conocidos por las personas versadas en el arte, incluyendo uno o más de los siguientes componentes: surfactantes, agentes de sabor, edulcorantes, agentes desensibilizadores, agentes anti-microbianos, agentes anti-caries, agentes anti-

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cálculo, agentes anti-inflamatorios, vitaminas, pigmentos y agentes colorantes, y enzimas, como se discutirá con mayor detalle más adelante.

Los ingredientes activos útiles en la presente están opcionalmente presentes en las composiciones de la presente invención en cantidades seguras y efectivas. Una cantidad "segura y efectiva" de un material activo es una cantidad que es suficiente para tener el efecto terapéutico o profiláctico deseado en el sujeto humano o animal inferior al cual el material activo es administrado, sin efectos secundarios adversos indebidos (tales como toxicidad, irritación o respuesta alérgica), conmensurada con una relación beneficio/ riesgo razonable cuando es usada en la forma de esta invención. La cantidad segura y efectiva específica del material activo variará con factores tales como la condición particular que está siendo tratada, la condición física del sujeto, la naturaleza de la terapia concurrente (si la hay), el material activo específico usado, la forma de dosificación específica, el portador empleado y el régimen de dosificación requerido.

Agentes Blanqueadores

En varias realizaciones, las composiciones de la presente invención comprenden un agente blanqueador como el principal ingrediente activo. Tal como se discute adicionalmente más adelante, un "agente blanqueador" es un material que efectúa el blanqueo de una superficie dental a la cual es aplicado. En varias realizaciones, las composiciones blanqueadoras de esta invención comprenden un agente blanqueador seleccionado del grupo consistente en peróxidos, cloritos e hipocloritos. Unos ejemplos de cloritos e hipocloritos adecuados incluyen aquellos que tienen cationes de álcalis o metales alcalinos e incluyen clorito de calcio, clorito de bario, clorito de magnesio, clorito de litio, clorito de sodio, clorito de potasio, hipoclorito de calcio, hipoclorito de bario, hipoclorito de magnesio, hipoclorito de litio e hipoclorito de sodio.

En una realización, el agente blanqueador comprende un compuesto de peróxido. Tal como se menciona en la presente, un "compuesto de peróxido" es un compuesto oxidante que comprende un grupo oxígeno-oxígeno bivalente. Los compuestos de peróxido incluyen peróxidos e hidroperóxidos, tales como peróxido de hidrógeno, peróxidos de metales alcalinos y alcalinotérreos, compuestos de peroxi orgánicos, peroxi ácidos, sales farmacéuticamente aceptables de los mismos y mezclas de los mismos. Los peróxidos de metales alcalinos y alcalinotérreos incluyen peróxido de litio, peróxido de potasio, peróxido de sodio, peróxido de magnesio, peróxido de calcio, peróxido de bario y mezclas de los mismos. Los compuestos de peroxi orgánicos incluyen peróxido de carbamida (también conocido como peróxido de

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hidrógeno de urea), peróxido de hidrógeno de glicerilo, peróxidos de hidrógeno de alquilo, peróxidos de dialquilo, peroxi ácidos de alquilo, peroxi ésteres, peróxidos de diacilo, peróxido de benzoilo y monoperoxiftalato, y mezclas de los mismos. Los peroxi ácidos y sus sales incluyen peroxi ácidos orgánicos tales como peroxi ácidos de alquilo, y monoperoxiftalato y mezclas de los mismos, así como sales de peroxi ácidos inorgánicos tales como sales de persulfato, dipersulfato, percarbonato, perfosfato, perborato y persilicato de metales alcalinos y alcalinotérreos tales como litio, potasio, sodio, magnesio, calcio y bario, y mezclas de los mismos. En varias realizaciones, el compuesto de peróxido comprende peróxido de hidrógeno, peróxido de urea, percarbonato de sodio y mezclas de los mismos.

Los compuestos de liberación de peróxido particularmente útiles en las composiciones blanqueadoras de la presente invención incluyen compuestos que contienen peróxido, tales como peróxido de urea, percarbonato de sodio, perborato de sodio y complejos de polivinilpirrolidona- H_2O_2 (en adelante "PVP- H_2O_2 "). La polivinilpirrolidona es también conocida como poli-N-vinil-poli-2-pirrolidona y es comúnmente abreviada "PVP". PVP se refiere generalmente a un polímero que contiene vinilpirrolidona (también mencionada como N-vinilpirrolidona, N-vinil-2-pirrolidona y N-vinil-2-pirrolidinona) como una unidad monomérica. La unidad monomérica consiste en un grupo imida polar, cuatro grupos metileno no polares y un grupo metano no polar.

Unos complejos tanto lineales como enlazados transversalmente de PVP- H_2O_2 son conocidos en el arte y son descritos en la Patente de EE.UU. 3.376.110 y la Patente de EE.UU. 3.480.557, las cuales son incorporadas en la presente por referencia, y han sido usados en composiciones para tratar acné vulgaris (Patente de EE.UU. 5.122.370). Unos complejos de PVP- H_2O_2 son también descritos en la patente de EE.UU. 5.122.370. PVP- H_2O_2 es estable en un ambiente anhidro. En la exposición a ambientes altamente acuosos, tales como en la cavidad oral, el PVP- H_2O_2 se disocia en especies individuales (polímero de PVP y H_2O_2). En una realización, el complejo de PVP- H_2O_2 es aproximadamente 80% en peso de polivinilpirrolidona y 20% en peso de H_2O_2 .

En realizaciones alternativas, el agente blanqueador comprende una solución de peróxido líquido. El portador de polímero hidrófobo de la composición blanqueadora proporciona suficiente estabilidad para permitir el uso de un peróxido de hidrógeno líquido. El peróxido de hidrógeno líquido comprende H_2O_2 generalmente contenido en una solución a base de agua. En algunas realizaciones, el peróxido de hidrógeno

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líquido tiene una concentración de peróxido con respecto a la solución total de aproximadamente 0,5 hasta aproximadamente 10%, de preferencia 0,5 a 5% en peso. Adicionalmente, un estabilizador puede estar presente. Por ejemplo, una solución de peróxido de hidrógeno al 3% con aproximadamente 0,1 hasta aproximadamente 0,5% de un estabilizador puede ser usada. Acetanilida o un material orgánico similar puede ser también usado con un estabilizador de pirofosfato tal como pirofosfato ácido de sodio (aproximadamente 0,1 hasta aproximadamente 1,0%) con una cantidad preferida de aproximadamente 0,5%.

En ciertas realizaciones, un agente para mejorar la liberación del peróxido en la cavidad oral está presente como parte del agente blanqueador de componente de peróxido. Polypore®, que es un polímero cruzado de metacrilato de alquilo, disponible de Amcol Health & Beauty Solutions, Inc., es un agente mejorador de este tipo.

En varias realizaciones, el agente blanqueador de la composición blanqueadora comprende desde aproximadamente 0,1% hasta aproximadamente 50%, opcionalmente desde aproximadamente 0,5% hasta aproximadamente 50%, y opcionalmente desde aproximadamente 10% hasta aproximadamente 40% de la composición para el cuidado oral.

Portador de Polímero Hidrófobo

La presente invención comprende preferiblemente un portador que comprende un polímero hidrófobo. El término "hidrófobo" o "insoluble en agua", según se aplica a los polímeros y según se emplea en la presente, se refiere a un polímero orgánico que es sustancialmente no acuoso, teniendo una solubilidad en agua inferior a un gramo por 100 gramos de agua a 25°C. En ciertas realizaciones, un polímero hidrófobo es compatible con los agentes blanqueadores previamente descritos anteriormente. En ciertas realizaciones, un polímero hidrófobo es seleccionado para el portador para producir una composición para blanquear los dientes que tiene una viscosidad superior a aproximadamente 1.000 centipoise (cP) e inferior a aproximadamente 900.000 cP, preferiblemente superior a aproximadamente 10.000 cP e inferior a aproximadamente 100.000 cP.

Una clase preferida de polímeros hidrófobos comprende los polímeros de siloxano, los cuales son también generalmente conocidos en el arte como polímeros de "silicona". En ciertas realizaciones de la presente invención, los polímeros hidrófobos en el portador son aquéllos en los cuales un agente blanqueador puede ser dispersado y son muy conocidos en el arte. Muchos de tales polímeros de silicona están disponibles en el comercio. En varias realizaciones, un polímero hidrófobo

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preferido a base de silicona es un poliorganosiloxano. Un poliorganosiloxano de este tipo es producido por condensación de una resina de silicona y un organosiloxano tal como un polidiorganosiloxano. Tales polímeros hidrófobos son materiales elastoméricos, pegajosos, cuya adhesión a las superficies de esmalte dental puede ser variada alterando la relación de resina de silicona a polidiorganosiloxano en la molécula de copolímero. Preferiblemente, los polímeros son polímeros hidrófobos sensibles a la presión, diseñados específicamente para uso farmacéutico y son permeables a muchos compuestos de fármacos y encuentran uso en la aplicación transdérmica de varios compuestos. En una realización de este tipo, los polímeros de silicona son el producto de copolímero de la mezcla de un polidiorganosiloxano terminado en silanol, tal como polidimetil siloxano, con una resina de silicona que contiene silanol, con lo cual los grupos silanol del polidiorganosiloxano experimentan una reacción de condensación con los grupos silanol de la resina de silicona, de modo que el polidiorganosiloxano es ligeramente enlazado transversalmente por la resina de silicona (es decir, las cadenas de polidiorganosiloxano son enlazadas entre sí a través de las moléculas de resina para proporcionar ramificación y enredo de cadena y/o una pequeña cantidad de carácter de red) para formar los polímeros hidrófobos de silicona. Un catalizador, por ejemplo un material alcalino tal como amoníaco, hidróxido de amonio o carbonato de amonio, puede ser mezclado con el polidiorganosiloxano terminado en silanol y la resina de silicona para promover esta reacción de enlace transversal. Con la copolimerización de la resina de silicona con el polidiorganosiloxano terminado en silanol, resulta un polímero con propiedades auto-adherentes y las propiedades cohesivas de una matriz de elastómero suave, características de los polímeros sensibles a la presión, que se distinguen de las propiedades no elastoméricas y duras de otras resinas de silicona. En una realización, los polímeros hidrófobos usados en el portador pueden ser obtenidos de la Dow-Corning Company bajo la denominación de marca BIO-PSA.

La modificación de una relación de resina de silicona a polidiorganosiloxano modifica la pegajosidad del polímero hidrófilo. Esta relación puede estar en el intervalo de aproximadamente 70:30 hasta aproximadamente 50:50. Por ejemplo, la silicona BIO-PSA vendida por Dow-Corning está disponible en tres relaciones de resina de silicona a polímero de silicona, a saber, 65/35 (baja pegajosidad), 60/40 (pegajosidad media), 55/45 (alta pegajosidad). Un adhesivo de poliorganosiloxano sensible a la presión de este tipo puede ser obtenido disuelto en solvente de acetato de etilo o dimeticona.

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En varias realizaciones, el portador de polímero hidrófobo está preferiblemente presente en las composiciones blanqueadoras líquidas de la presente invención en una concentración de desde aproximadamente 1 hasta aproximadamente 80% (en peso), opcionalmente desde aproximadamente 15% hasta aproximadamente 80%. En una realización, el portador de polímero hidrófobo está presente en un nivel de desde aproximadamente 15% hasta aproximadamente 40%. En una realización, el portador hidrófobo está presente en un nivel de desde aproximadamente 40% hasta aproximadamente 80%.

Agentes para Mejorar la Adhesión

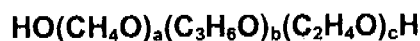
En una realización de la presente invención, la composición blanqueadora comprende adicionalmente un agente para mejorar la adhesión, que aumenta la adhesión de la composición blanqueadora anhidra a la superficie del diente, es decir, la adhesión al esmalte. Los agentes para mejorar la adhesión, útiles con la presente invención, incluyen materiales inorgánicos así como polímeros orgánicos naturales y sintéticos. Los materiales inorgánicos incluyen compuestos de sílice amorfa que funcionan como agentes de espesamiento, e incluyen compuestos de sílice coloidal disponibles bajo marcas registradas tales como sílice humeada Cab-O-Sil elaborada por Cabot Corporation y distribuida por Lenape Chemical, bound Brook, NJ; Zeodent 165 de J.M. Huber Chemicals Division, Havre de Grace, MD 21078; y Sylox 15, también conocido como Sylodent 15, disponible de Davison Chemical Division de W.R. Grace Corporation, Baltimore, MD 21203. En ciertas realizaciones, el material inorgánico para mejorar la adhesión, tal como sílice, es tratado superficialmente para compatibilizar el agente para mejorar la adhesión con los componentes hidrófobos en la composición blanqueadora.

Los materiales orgánicos que pueden ser incluidos en las composiciones de la presente invención para mejorar las propiedades de los polímeros hidrófobos de la presente invención incluyen agentes para mejorar la adhesión tales como ceras, incluyendo cera de abejas, aceite mineral, plastigel (una mezcla de aceite mineral y polietileno), petrolato, petrolato blanco, laca, versagel (mezcla de parafina líquida, copolímero hidrogenado de buteno/etileno/estireno), ceras de polietileno, ceras microcristalinas, poliisobuteno, copolímeros de polivinil pirrolidona/acetato de vinilo, y copolímeros de poliacrilato insolubles.

También son efectivos como agentes para mejorar la adhesión los polímeros hidrófilos líquidos que incluyen polietilenglicoles, polímeros no iónicos de óxido de etileno que tienen la fórmula general:



en la cual n representa el número promedio de grupos oxietileno. Los polietilenglicoles disponibles de Dow Chemical son designados por un número tal como 200, 300, 400, 600, 2000, el cual representa el peso molecular promedio aproximado del polímero, así como un copolímero de bloque no iónico de óxido de etileno y óxido de propileno de la fórmula:



El copolímero de bloque es preferiblemente seleccionado (con respecto a a, b y c) de tal modo que el constituyente de óxido de etileno comprenda desde aproximadamente 65 hasta aproximadamente 75% en peso de la molécula de copolímero y el copolímero tenga un peso molecular promedio de desde aproximadamente 2.000 hasta aproximadamente 15.000, el copolímero estando presente en la composición líquida para blanquear los dientes en una concentración tal que la composición sea líquida a temperatura ambiente (23°C).

Un copolímero de bloque particularmente conveniente para ser usado en la puesta en práctica de la presente invención está disponible en el comercio, de BASF, y es designado Pluraflon L1220, el cual tiene un peso molecular promedio de aproximadamente 9.800. El bloque hidrófilo de poli(óxido de etileno) promedia aproximadamente 65% en peso del polímero.

Los agentes para mejorar la adhesión empleados en composiciones de varias realizaciones de la invención están presentes en una cantidad de desde aproximadamente 0 hasta aproximadamente 20% en peso. Preferiblemente, los agentes para mejorar la adhesión están presentes en una cantidad de desde aproximadamente 2 hasta aproximadamente 15% en peso.

Ingredientes Adicionales

Tal como se describió previamente, muchos otros componentes pueden ser adicionalmente incluidos en las composiciones blanqueadoras de la presente invención, e incluyen sabores, agentes edulcorantes, surfactantes, agentes antimicrobianos, agentes anti-inflamatorios, soluciones amortiguadoras de placa, vitaminas, agentes anti-caries, agentes anti-placa, agentes desensibilizadores, agentes colorantes, pigmentos y agentes opacadores, por ejemplo.

En ciertas realizaciones, unos surfactantes no iónicos están presentes en la composición blanqueadora. Estos surfactantes son preferiblemente compatibles con los agentes blanqueadores y sirven como agentes de solubilización, dispersión, emulsión y humidificación. En un aspecto, los surfactantes son especialmente

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efectivos para solubilizar un agente de sabor, si se desea un sabor para la composición blanqueadora líquida. Un surfactante no iónico particularmente útil es un monoéster de polioxietileno de sorbitol soluble en agua con un ácido graso C10 a C18, comercializado bajo la marca registrada Tween. Los surfactantes Tween son mezclas de ésteres de ácidos grasos C10 a C18 de sorbitol (y anhídridos de sorbitol), que consisten predominantemente en el monoéster, condensado con aproximadamente 10-30, preferiblemente aproximadamente 20, moles de óxido de etileno. El ácido graso (ácido hidrocarbonil monocarboxílico alifático) puede ser saturado o insaturado, por ejemplo los ácidos láurico, palmítico, esteárico, oleico. El polisorbato 20 (por ejemplo Tween 20) es especialmente preferido y es comúnmente mencionado como monolaurato de sorbitan de polioxietileno (20). El surfactante no iónico constituye aproximadamente 0 a 50% en peso y preferiblemente 0,5 a 40% en peso de la composición líquida.

En una realización en la cual la composición blanqueadora tiene un agente de sabor, el agente de sabor es seleccionado de aceites esenciales, así como varios aldehídos, ésteres, alcoholes de sabor y materiales similares. Unos ejemplos de los aceites esenciales incluyen aceites de menta verde, menta, gaulteria, sasafrás, clavo de olor, salvia, eucalipto, mejorana, canela, limón, lima, toronja y naranja. También son útiles los productos químicos tales como mentol, carvone y anetol. De éstos, los más comúnmente empleados son los aceites de menta verde, menta y gaulteria. El agente de sabor es preferiblemente incorporado en la composición blanqueadora de la presente realización en una concentración de aproximadamente 0 hasta aproximadamente 2% en peso y de preferencia aproximadamente 0,1 hasta aproximadamente 0,5% en peso.

En realizaciones en las cuales la composición blanqueadora es endulzada, un material edulcorante es usado como una alternativa al agente de sabor o complemento del mismo. Los agentes edulcorantes adecuados son solubles en agua e incluyen sacarina de sodio, ciclamato de sodio, xilitol, perillartien, D-triptofano, aspartame, dihidrocalconas y similares, en concentraciones de aproximadamente 0,01 hasta aproximadamente 1% en peso. Se prefiere la sacarina de sodio.

Otros ingredientes que son incluidos en varias realizaciones de la composición blanqueadora líquida comprenden materiales comúnmente usados en las formulaciones para el cuidado oral. Éstos incluyen: agentes anti-microbianos, por ejemplo Triclosan, clorhexidina, sales de cobre, zinc y estañosas tales como citrato de zinc, sulfato de zinc, glicinato de zinc, citrato de sodio y zinc y pirofosfato estañoso,

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extracto de sanguinarina, metronidazol, compuestos de amonio cuaternario, tales como cloruro de cetilpiridinio; bis-guanidas, tales como digluconato de clorhexidina, hexetidina, octenidina, alexidina; y compuestos bisfenólicos halogenados, tales como 2,2'-metilenobis-(4-cloro-6-bromofenol); agentes anti-inflamatorios, tales como ibuprofeno, flurbiprofeno, aspirina, indometacina; agentes anti-caries tales como fluoruro de sodio, calcio, magnesio y estañoso, fluoruros de amina, monofluorofosfato de disodio y trimetafosfato de sodio; soluciones amortiguadoras de placa tales como urea, lactato de calcio, glicerofosfato de calcio y poliacrilatos de estroncio; vitaminas tales como Vitamina C; extractos de plantas; agentes desensibilizadores, por ejemplo citrato de potasio, cloruro de potasio, tartrato de potasio, bicarbonato de potasio, oxalato de potasio, nitrato de potasio y sales de estroncio; agentes efectivos contra el cálculo dental tales como las sales de pirofosfato, incluyendo las sales de tripolifosfato y pirofosfato de mono, di, tri y tetra metal alcalino y amonio; biomoléculas, por ejemplo bacteriocinas, anticuerpos, enzimas tales como papaína, glucoamilasa; agentes opacadores, pigmentos, agentes colorantes y sales que proporcionan iones fluoruro que tienen eficacia anti-caries, tales como fluoruro de sodio, fluoruro de potasio, un fluoruro de estaño tal como fluoruro estañoso. En otra realización, la composición blanqueadora comprende uno o más agentes desensibilizadores, tales como nitrato de potasio, ácido cítrico, sales de ácido cítrico, cloruro de estroncio y similares.

En una realización, la composición para blanquear los dientes tiene la siguiente fórmula general:

Componente	Contenido
Portador de Polímero Hidrófobo	1 a 80% en peso
Agente para Mejorar la Adhesión	0 a 20% en peso
Agente Blanqueador (Peróxido)	0,5 a 50% en peso
Surfactante	0 a 50% en peso
Sabor	0,1 a 1% en peso
Otros Componentes (pueden ser HOH)	0 a 10% en peso

Tira

La composición blanqueadora de la presente invención puede tener la forma de una capa de una tira preparada usando un proceso de moldeo por solvente convencional. Las tiras, entre aquellas útiles en la presente, comprenden polímeros, materiales tejidos naturales y sintéticos, material no tejido, lámina metálica, papel, caucho y combinaciones de los mismos. Preferiblemente la tira de material es sustancialmente insoluble en agua. Unos polímeros adecuados incluyen polietileno,

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acetato de etil-vinilo, poliésteres, alcohol etil-vinílico, fluoro-plásticos y combinaciones de los mismos. En varias realizaciones, la tira de material tiene generalmente menos de aproximadamente 1 mm (milímetro) de espesor, opcionalmente menos de aproximadamente 0,05 mm de espesor, opcionalmente aproximadamente 0,001 hasta aproximadamente 0,03 mm. La forma de la tira es cualquier forma y tamaño que cubra la superficie oral deseada. En una realización, la longitud del material de tira es desde aproximadamente 2 cm (centímetro) hasta aproximadamente 12 cm, en otra realización desde aproximadamente 4 cm hasta aproximadamente 9 cm. La anchura del material de tira también dependerá del área superficial oral a ser cubierta. La anchura de la tira es generalmente desde aproximadamente 0,5 cm hasta aproximadamente 4 cm, en una realización desde aproximadamente 1 cm hasta aproximadamente 2 cm. El material de tira puede comprender bolsillos huecos, opcionalmente llenados con una composición de esta invención. Unas tiras, entre aquéllas útiles en la presente, son descritas en la Patente de EE.UU. 6.514.484, Rajaiah et al., expedida el 4 de febrero de 2003.

Por ejemplo, en algunas realizaciones, una tira es preparada mediante moldeo por solvente; un polímero adhesivo o resina tal como colofonia y/o polivinilpirrolidona es disuelto en una cantidad suficiente de un solvente compatible tal como etanol. Después de que una solución ha sido formada, sigue la adición de la composición blanqueadora de base y cualesquiera otros ingredientes, tales como edulcorantes o sabores. La solución es recubierta sobre un material portador de moldeo adecuado desde el cual la tira formada puede ser fácilmente desprendida sin dañarse. El material portador debe tener una tensión superficial que permita que la solución sea esparcida de manera uniforme a través de la anchura del portador propuesto sin empaparlo para formar un enlace destructivo entre los dos sustratos. Unos ejemplos de materiales portadores adecuados incluyen vidrio, acero inoxidable, teflón, papel kraft impregnado con polietileno. La tira puede ser secada a una forma utilizable sólida en un baño de aire a alta temperatura usando un horno de secado, un túnel de secado, una secadora al vacío, o cualquier otro equipo de secado adecuado a cierta temperatura. Posteriormente la tira formada sobre el portador es pelada desde la superficie el portador y cortada en pedazos de tamaño y forma adecuados para su uso por el consumidor y envasada en un recipiente adecuado.

Para usar la tira blanqueadora de la presente invención, la tira, cuando sea aplicada a la superficie dental, se adherirá a los dientes de una manera apropiada y, en el curso de 1 a 60 minutos, las superficies de los dientes se blanquearán hasta una

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apariencia natural a medida que uno o más agentes blanqueadores presentes en la matriz de la tira emigran a las superficies dentales. La composición puede ser aplicada a la superficie dental a ser blanqueada por una pluralidad de minutos al día. La aplicación de la composición puede ser repetida por múltiples días para blanquear de ese modo los dientes.

A este respecto, la tira blanqueadora es formada para tener una dimensión de anchura adecuada para cubrir uno o más dientes en una fila (superior o inferior). Por lo tanto, la tira blanqueadora puede ser aplicada a uno o más del juego superior de dientes, o a uno o más del juego inferior de dientes, ya sea por separado o simultáneamente. La dimensión de longitud de la tira blanqueadora es determinada por la cantidad de cobertura deseada. A este respecto, el número de dientes que se desea blanquear determinará las dimensiones para la tira blanqueadora. Por ejemplo, se puede desear blanquear solamente los dientes frontales, los cuales son más fácilmente vistos por otros. Por consiguiente, la longitud de la tira blanqueadora puede ser reducida en este caso, en comparación con el caso en el cual se desea blanquear todos los dientes. La duración de aplicación de tira blanqueadora a los dientes dependerá del tipo y la concentración de dichos uno o más agentes blanqueadores, así como el tipo y la intensidad de la mancha. Después de que los dientes son blanqueados a satisfacción del usuario, las porciones de la tira pueden ser fácilmente removidas enjuagando la boca con agua y cepillado.

Blanqueador de Dientes por Pintado

En una realización preferida, la composición blanqueadora es aplicada usando una técnica de "pintado". Un pequeño dispositivo de aplicación, tal como un cepillo o espátula, es recubierto con una composición de esta invención y la composición es entonces colocada sobre una superficie dental. Preferiblemente, la composición es esparcida de manera uniforme sobre tales superficies, en cantidad suficiente para entregar uno o más agentes blanqueadores a las superficies manchadas.

La composición blanqueadora de pintado de la presente invención es preparada en forma de una suspensión líquida viscosa fluible que contiene el agente blanqueador y es aplicada tal como está a los dientes del sujeto, por aplicación manual, tal como pintando los dientes con un pincel aplicador suave de manera similar a la aplicación de barniz de uñas, y sin la intervención de un dentista u operaciones tecnológicas. La aplicación por el usuario y la evaporación o disolución del solvente deja un recubrimiento adherente blanco de apariencia natural sobre los dientes.

En varias realizaciones, la capa de composición para blanquear los dientes

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aplicada al esmalte dental no contiene ingredientes que impartan a la misma un sabor o una textura inaceptables, haciéndola desagradable para el usuario mientras que se adhiere fuertemente al esmalte dental. La composición es suficientemente adherente al esmalte dental para permanecer sobre los dientes de modo que la composición blanqueadora aplicada permita que el recubrimiento aplicado resista las fuerzas comúnmente aplicadas por los labios y la lengua así como aquellas fuerzas encontradas durante la masticación normal, ya que con la evaporación o disolución del solvente en la boca después de la aplicación, se forma un recubrimiento duro de composición blanqueadora en aproximadamente 1 minuto, dicho recubrimiento quedando unido de manera segura al esmalte dental al cual es aplicado. Mientras que la capa aplicada de composición blanqueadora de pintado está en su lugar, el usuario debe abstenerse de masticar. La composición blanqueadora puede ser removida cómo y cuándo se requiera, a voluntad, mediante el empleo de procedimientos estándar de higiene oral tales como cepillado o mediante un enjuague bucal alcohólico.

Métodos

En una realización, la presente invención proporciona un método para blanquear la superficie de un diente en la cavidad oral de un sujeto humano u otro sujeto animal usando una composición para blanquear los dientes que comprende un agente blanqueador y un portador de polímero hidrófobo. El método comprende poner en contacto la composición con la superficie del diente. La puesta en contacto ocurre por una duración de tiempo suficiente para efectuar un blanqueo satisfactorio de los dientes. Así, la puesta en contacto ocurre por un período de tiempo suficiente para blanquear por lo menos parcialmente los dientes. Éste puede ser un período de tiempo desde aproximadamente 1 minuto hasta 2 horas o más. En ciertas realizaciones, la puesta en contacto es por un período de tiempo desde aproximadamente 1 minuto hasta aproximadamente 5 minutos hasta aproximadamente 45 minutos. La composición sustancialmente no acuosa para blanquear los dientes es efectiva durante un período más largo de tiempo, ya que no es significativamente diluida o removida de la cavidad oral durante el tiempo de tratamiento.

En otra realización de la presente invención, se proporciona un método para blanquear una superficie de un diente en una cavidad oral de un sujeto humano u otro sujeto animal, que comprende preparar una composición líquida para blanquear los dientes como se describió previamente. La composición es aplicada a la superficie

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dental a ser blanqueada por una pluralidad de minutos al día. La aplicación es entonces repetida por múltiples días para exponer los dientes a múltiples dosis de agente blanqueador y, así, blanquear de ese modo la superficie de los dientes.

Las composiciones blanqueadoras líquidas de la presente invención son preparadas añadiendo y mezclando los ingredientes de la composición en un recipiente adecuado, tal como un tanque de acero inoxidable provisto de una mezcladora. En la preparación de la composición blanqueadora líquida, los ingredientes son ventajosamente añadidos a la mezcladora en el siguiente orden: polímero líquido anhidro sensible a la presión a base de silicona (portador de polímero, hidrófobo), agente blanqueador de peróxido, agente para mejorar la adhesión y cualquier agente de sabor o edulcorante deseado. Los ingredientes son entonces mezclados para formar una dispersión/ solución homogénea.

La presente invención es ilustrada mediante los siguientes ejemplos pero no es limitada por los mismos.

Ejemplo I

Se prepara una serie de composiciones blanqueadoras líquidas de pintado usando los ingredientes indicados en la Tabla I a continuación.

TABLA I		
Composición Ingredientes	A	B
BIO PSA (pegajosidad media/alta)*	30,0	30,0
Plastigel	44,2	44,0
Percarbonato de sodio	25	--
PVP H ₂ O ₂ cx**	--	25,0
Sacarina	0,8	0,50
Sabor	--	0,50
PEG 400	--	--
Poliisobuteno	--	--
* Disuelto en 60% en peso de dimeticona		
** cx = enlazado transversalmente		

Las composiciones blanqueadoras A y B son preparadas mezclando el percarbonato de sodio o PVP-H₂O₂ con el Plastigel seguido por el adhesivo sensible a la presión BIO PSA, sacarina, sabor, PEG 400 o poliisobuteno. Las composiciones blanqueadoras líquidas de la Tabla I pueden ser envasadas en botellas de polipropileno selladas.

Ejemplo II

Se prepara una segunda serie de composiciones blanqueadoras sensibles a la

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presión, basadas en polímero de silicona, con los ingredientes indicados en la Tabla II a continuación, con los métodos descritos anteriormente.

TABLA II		
Composición Ingredientes	C	D
Acetato de etilo	13,50	13,50
BIO PSA (pegajosidad media/alta)	35,00	35,0
Pluracare L1220	5,00	5,0
Sacarina de sodio	1,00	1,0
Petrolato blanco nieve	5,00	12,0
Óxido de zinc	7,00	--
Percarbonato de sodio	33,00	33,0
Sabor	<u>0,50</u>	<u>0,50</u>
Total	100,00	100,00

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REIVINDICACIONES

1. Una composición para blanquear los dientes, para blanquear una superficie de un diente, caracterizada porque comprende un agente blanqueador y un portador de polímero hidrófobo, en donde dicha composición blanqueadora se adhiere a la superficie del diente para efectuar el blanqueo de la misma.
2. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho portador hidrófobo de dicha composición blanqueadora es sustancialmente no soluble en agua.
3. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende desde aproximadamente 1 hasta aproximadamente 80% en peso de dicho portador de polímero hidrófobo.
4. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende desde aproximadamente 40 hasta aproximadamente 80% en peso de dicho portador de polímero hidrófobo.
5. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho polímero hidrófobo de dicho portador comprende un siloxano.
6. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho polímero hidrófobo de dicho portador comprende una resina de silicona.
7. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho polímero hidrófobo de dicho portador comprende un poliorganosiloxano.
8. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho polímero hidrófobo de dicho portador es un adhesivo sensible a la presión.
9. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende desde aproximadamente 0,5 hasta aproximadamente 50% en peso de dicho agente blanqueador.
10. Una composición de acuerdo con la Reivindicación 1, en la cual el agente blanqueador es seleccionado del grupo consistente en peróxidos, cloritos e hipocloritos.
11. Una composición de acuerdo con la Reivindicación 1, caracterizada porque el agente blanqueador es seleccionado del grupo consistente en polivinilpirrolidona/peróxido de hidrógeno, peróxido de hidrógeno líquido, peróxido de urea, percarbonato de sodio, perborato de sodio y mezclas de los mismos.
12. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende adicionalmente un agente para mejorar la adhesión, en una cantidad desde aproximadamente 0,1 hasta aproximadamente 20%

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en peso de la composición blanqueadora.

13. Una composición de acuerdo con la Reivindicación 12, caracterizada porque dicho agente para mejorar la adhesión comprende uno o más componentes seleccionados del grupo consistente en: ceras, polímeros no iónicos que comprenden óxido de etileno, copolímeros no iónicos que comprenden óxido de etileno y óxido de propileno, aceite mineral gelatinizado con polietileno, petrolato, compuestos que contienen sílice hidrófoba, y mezclas de los mismos.

14. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende adicionalmente uno o más de los siguientes componentes: un surfactante, un agente de sabor, un agente desensibilizador, un agente anti-microbiano, un agente anti-caries y un agente anti-cálculo.

15. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende desde aproximadamente 1 hasta aproximadamente 80% en peso de dicho portador hidrófobo, desde aproximadamente 0,5 hasta aproximadamente 50% en peso de dicho agente blanqueador, desde aproximadamente 0 hasta aproximadamente 20% en peso de un agente para mejorar la adhesión, desde aproximadamente 0 hasta aproximadamente 50% en peso de un surfactante no iónico, desde aproximadamente 0 hasta aproximadamente 1% en peso de un agente de sabor, y desde aproximadamente 0 hasta aproximadamente 10% en peso de otros componentes.

16. Un método para blanquear una superficie de un diente en una cavidad de un sujeto humano u otro sujeto animal, caracterizado porque comprende:

- (a) aplicar una composición líquida para blanquear los dientes de la Reivindicación 1 a la superficie del diente a ser blanqueada por una pluralidad de minutos al día; y
- (b) repetir por múltiples días para blanquear de ese modo los dientes.

17. Un método para blanquear un diente en un mamífero, caracterizado porque comprende aplicar al diente una composición que comprende un portador de polímero hidrófobo y un agente blanqueador.

18. Un método de acuerdo con la Reivindicación 17, caracterizado porque dicha aplicación es efectuada poniendo en contacto una película, que comprende dicha composición para blanquear los dientes, con una superficie del diente.

19. Un método de acuerdo con la Reivindicación 17, caracterizado porque dicha aplicación es efectuada poniendo en contacto una forma líquida de dicha composición para blanquear los dientes con una superficie del diente.

BUENOS AIRES, AGOSTO DE 2005

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RESUMEN

COMPOSICIÓN LÍQUIDA PARA BLANQUEAR LOS DIENTES, A BASE DE PORTADOR DE POLÍMERO HIDRÓFOBO

Un sistema para blanquear los dientes que comprende una composición para blanquear los dientes que comprende un agente blanqueador y un portador de polímero hidrófobo. La composición para blanquear los dientes es preferiblemente sustancialmente no soluble en agua. La composición para blanquear los dientes es aplicada a la superficie de un diente a ser blanqueado en un mamífero para efectuar el blanqueo sobre la superficie del diente. También se proporcionan unos métodos para blanquear una superficie de un diente.

PATENT COOPERATION TREATY

MAR - 1 2005

PCT

From the INTERNATIONAL SEARCHING AUTHORITY

To:

COLGATE PALMOLIVE COMPANY
Attn. Park, Ellen K.
909 River Road
Piscataway, NJ 08855
UNITED STATES OF AMERICA

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing (day/month/year) 25/02/2005	
Applicant's or agent's file reference 7419-00	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/US2004/026413	International filing date (day/month/year) 13/08/2004
Applicant COLGATE-PALMOLIVE COMPANY	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until **30 months** from the priority date (in some Offices even later); otherwise, the applicant must, within **29 months** from the priority date, perform the prescribed acts for entry into the national phase before the designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the PCT Applicant's Guide, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the International Searching Authority  European Patent Office, P.O. Box 5010 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, T. 31 65 40 01, Fax: (+31-70) 340-3016	Authorized officer Nora Hick
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NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the International application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

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The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 7419-00	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US2004/026413	International filing date (day/month/year) 13/08/2004	(Earliest) Priority Date (day/month/year) 15/08/2003
Applicant COLGATE-PALMOLIVE COMPANY		

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 6 sheets.

☒ 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**,

☒ 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**,

☒ 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 regard 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/US2004/026413

2156

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K7/20 A61K7/22 A61K7/30

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 A61K

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/074274 A (PROCTER & GAMBLE) 26 September 2002 (2002-09-26) claims 1,2,4,6,7,9,10 page 21 page 23; examples 26-30,32 page 24; example 2	1-19
X	US 5 310 563 A (CURTIS JOHN ET AL) 10 May 1994 (1994-05-10) column 2, lines 56-58; claims 1,3,7-10 figures 1,2 column 9; example II	1-19
X	WO 01/01942 A (MITRA SEKHAR ; YUE JIANG (US); PROCTER & GAMBLE (US)) 11 January 2001 (2001-01-11) tables 1-3	1-19
	----- -/--	

☒ Further documents are listed in the continuation of box C.

☒ 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.
- *Z* document member of the same patent family

Date of the actual completion of the international search

16 February 2005

Date of mailing of the international search report

25/02/2005

Name and mailing address of the ISA

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

Authorized officer

Grillenberger, S

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2004/026413

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/01939 A (MITRA SEK HAR ; BURGESS STEVEN CARL (US); CRISANTI MARK MATTHEW (US); L) 11 January 2001 (2001-01-11) claims 1,2,5,7,15 page 23; examples 7-12; table 2b page 11, line 30 - page 12, line 14 page 4, line 16 - page 8, line 4 page 2, line 9 page 26, lines 13-21	1-19
P, X	WO 03/094877 A (PROCTER & GAMBLE) 20 November 2003 (2003-11-20) page 29; example 7 claims 1-9	1-19
A	US 2002/141950 A1 (CHEN TIANMING) 3 October 2002 (2002-10-03) claims 1-3 figures 2-5	1-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/026413

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 02074274	A	26-09-2002	CA 2441536 A1 26-09-2002
			CA 2441865 A1 26-09-2002
			EP 1370227 A2 17-12-2003
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			EP 1196136 A1 17-04-2002
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			EP 1196137 A1 17-04-2002
			ES 2199168 T3 16-02-2004
			HK 1047035 A1 05-03-2004
			HU 0201620 A2 28-09-2002
			HU 0201865 A2 28-11-2002
			JP 2003525210 T 26-08-2003
			JP 2003531814 T 28-10-2003
			MA 25681 A1 01-04-2003
			MX PA02000269 A 21-06-2002
			NO 20020004 A 28-02-2002
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			PL 353998 A1 15-12-2003
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/026413

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0101942	A	RU 2222315 C2	27-01-2004
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		RU 2223746 C2	20-02-2004
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/026413

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0101939	A	SK 19402001 A3	06-08-2002
		SK 19412001 A3	06-08-2002
		TR 200103821 T2	22-04-2002
		WO 0101939 A1	11-01-2001
WO 03094877	A	20-11-2003	CA 2483911 A1
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			11-09-2002

PATENT COOPERATION TREATY

94/60

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.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. PCT/US2004/026413	International filing date (day/month/year) 13.08.2004	Priority date (day/month/year) 15.08.2003	
International Patent Classification (IPC) or both national classification and IPC A61K7/20, A61K7/22, A61K7/30			
Applicant COLGATE-PALMOLIVE COMPANY			

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 43bis.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 66.1bis(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.

Name and mailing address of the ISA: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Grillenberger, S Telephone No. +49 89 2399-8938
--	---

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/026413

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:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/026413

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-19
Inventive step (IS)	Yes: Claims	
	No: Claims	1-19
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43bis.1 and 70.10)

and /or

2. Non-written disclosures (Rules 43bis.1 and 70.9)

see form 210

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No. 

PCT/US2004/026413

Re Item V.

The following documents are referred to in this communication:

- D1 : WO02/074274 A (PROCTER & GAMBLE) 26 September 2002 (2002-09-26)
D2 : US 5 310 563 A (CURTIS J ET AL) 10 May 1994 (1994-05-10)
D3 : WO 01/01942 A (PROCTER & GAMBLE) 11 January 2001 (2001-01-11)
D4 : WO 01/01939 A (PROCTER & GAMBLE) 11 January 2001 (2001-01-11)

1. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claims 1, 16, and 17 is not novel over **D1-D4** in the sense of Article 33(2) PCT.

1.1 Claim 1:

i) **D1** deals with oral care kits and compositions (claims 1, 2, 4, 6, 7, 9, 10), which are based on hydrophobic polybutene, and intended for application directly to a tooth surface. Product forms include whitening gels (see also p.21) and are illustrated in Ex.26-30 and Ex.32 comprising Na-percarbonate, urea peroxide, calcium peroxide or PVP-peroxide complex as tooth whitening agent.

ii) **D2** deals with shapeable silicone polymers which can be easily moulded to conform to the contours of the teeth and gums. The dental shaping compositions (claim 7) comprise whitening agents such as PVP-H₂O₂, or urea peroxide (claims 2, 3; Ex.II), which release H₂O₂ to the tooth surface.

iii) **D3** and **D4** disclose teeth whitening compositions (D3: T.1-3; D4: Ex.7-12) comprising organosiloxane resins.

1.2 The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding independent claims 16 and 17 directed to "method(s) of application" which are also considered to be at least implicitly anticipated by D1-D4.

1.3 Dependent claims 2-15, 18 and 19 do not contain any features which, in combination

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

by
International application No.

PCT/US2004/026413

with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty, see D1-D4.

Re Item VI

Certain documents cited

Certain published documents

Application No Patent No	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
WO 03/094877	20.11.2003	09.05.2003	09.05.2002

Ex.7 of WO03/094877 illustrates topical whitening gels comprising dicarboxy functionalised polyorganosiloxanes and urea peroxide.

For this reason, said document anticipates directly and unambiguously the subject-matter of the independent claims, and will become relevant at least for novelty in a regional phase before the EPO.

Re Item VIII.

1. Present claim 16 advises in step (b) to "repeat b", and should possibly read "repeating (a)".
2. Present claims 18 and 19 refer to a "claim 20", which does not exist in the present application.

TRANSMITTAL LETTER TO THE UNITED STATES RECEIVING OFFICE

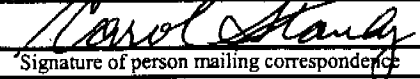
Date	13 August 2004
International Application No.	
Attorney Docket No.	IF 7419-00

I. Certification under 37 CFR 1.10 (if applicable)

EV 360778113 US
Express Mail mailing number

13 August 2004
Date of Deposit

I hereby certify that the application/correspondence attached hereto is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Assistant Commissioner for Patents, Washington, D.C. 20231.


Signature of person mailing correspondence

Carol Stanley
Typed or printed name of person mailing correspondence

II. ☒ New International Application

TITLE	HYDROPHOBIC POLYMER CARRIER BASED LIQUID TOOTH WHITENING COMPOSITION
-------	--

Earliest priority date (Day/Month/Year)
15 August 2003

SCREENING DISCLOSURE INFORMATION: In order to assist in screening the accompanying international application for purposes of determining whether a license for foreign transmittal should and could be granted and for other purposes, the following information is supplied. (Note: check as many boxes as apply):

- A. ☐ The invention disclosed was **not** made in the United States.
- B. ☐ There is no prior U.S. application relating to this invention.
- C. ☒ The following prior U.S. application(s) contain subject matter which is related to the invention disclosed in the attached international application. (NOTE: priority to these applications may or may not be claimed on form PCT/RO/101 (Request) and this listing does not constitute a claim for priority).

application no.	USSN 10/642,458	filed on	15 August 2003
application no.	USSN TO BE ASSIGNED	filed on	12 August 2004

- D. ☐ The present international application ☐ is identical ☐ contains less subject matter than that found in the prior U.S. application(s) identified in paragraph C.
- E. ☐ The present international application ☐ contains additional subject matter not found in the prior U.S. application(s) identified in paragraph C. above. The additional subject matter is found on pages and ☐ DOES NOT ALTER ☐ MIGHT BE CONSIDERED TO ALTER the general nature of the invention in a manner which would require the U.S. application to have been made available for inspection by the appropriate defense agencies under 35 U.S.C. 181 and 37 CFR 5.1. See 37 CFR 5.15

III. ☐ A Response to an Invitation from the RO/US. The following document(s) is (are) enclosed:

- A. ☐ A Request for An Extension of Time to File a Response
- B. ☐ A Power of Attorney (General or Regular)
- C. ☐ Replacement pages:

pages		of the request (PCT/RO/101)	pages		of the figures
pages		of the description	pages		of the abstract
pages		of the claims			

- D. ☐ Submission of Priority Documents

Priority document		Priority document	
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- E. ☐ Fees as specified on attached Fee Calculation sheet form PCT/RO/101 annex

IV. ☐ A Request for Rectification under PCT 91 ☐ A Petition ☐ A Sequence Listing Diskette

V. ☐ Other (please specify):

The person signing this form is the:	☐ Applicant	Ellen K. Park
	☒ Attorney/Agent (Reg. No.) 34,055	Typed name of signer
	☐ Common Representative	Signature

EV360778113US

P 65

PCT REQUEST

Original (for SUBMISSION)

0	For receiving Office use only	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form - PCT/RO/101 PCT Request	
0-4-1	Prepared Using	PCT-SAFE [EASY model] Version 3.50 (Build 0002.158)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	United States Patent and Trademark Office (USPTO) (RO/US)
0-7	Applicant's or agent's file reference	7419-00
I	Title of Invention	HYDROPHOBIC POLYMER CARRIER BASED LIQUID TOOTH WHITENING COMPOSITION
II	Applicant	
II-1	This person is:	applicant only
II-2	Applicant for	all designated States except US
II-4	Name:	COLGATE-PALMOLIVE COMPANY
II-5	Address:	300 Park Avenue New York, New York 10022 United States of America
II-6	State of nationality	US
II-7	State of residence	US
II-8	Telephone No.	732-878-7157
II-9	Facsimile No.	732-878-7853
III-1	Applicant and/or inventor	
III-1-1	This person is:	applicant and inventor
III-1-2	Applicant for	US only
III-1-4	Name (LAST, First)	CHOPRA, Suman, K.
III-1-5	Address:	505 Major Road Dayton, New Jersey 08810 United States of America
III-1-6	State of nationality	US
III-1-7	State of residence	US

PCT REQUEST

Original (for SUBMISSION)

III-2	Applicant and/or inventor	
III-2-1	This person is:	applicant and inventor
III-2-2	Applicant for	US only
III-2-4	Name (LAST, First)	ZAIDEL, Lynette, A.
III-2-5	Address:	510 Cranford Avenue Cranford, New Jersey 07016 United States of America
III-2-6	State of nationality	US
III-2-7	State of residence	US
III-3	Applicant and/or inventor	
III-3-1	This person is:	applicant and inventor
III-3-2	Applicant for	US only
III-3-4	Name (LAST, First)	PAN, Guisheng
III-3-5	Address:	38 Hamilton Drive Spotswood, New Jersey 08884 United States of America
III-3-6	State of nationality	US
III-3-7	State of residence	US
III-4	Applicant and/or inventor	
III-4-1	This person is:	applicant and inventor
III-4-2	Applicant for	US only
III-4-4	Name (LAST, First)	PATEL, Suryakant
III-4-5	Address:	103 Pine Street Bridgewater, New Jersey 08807 United States of America
III-4-6	State of nationality	US
III-4-7	State of residence	US
III-5	Applicant and/or inventor	
III-5-1	This person is:	applicant and inventor
III-5-2	Applicant for	US only
III-5-4	Name (LAST, First)	CAMERON, Ryan, B.
III-5-5	Address:	92 Kingsberry Drive Somerset, New Jersey 08873 United States of America
III-5-6	State of nationality	JM
III-5-7	State of residence	US

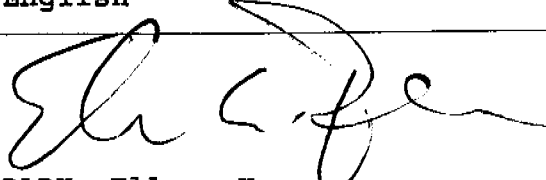
PCT REQUEST

Original (for SUBMISSION)

III-6	Applicant and/or inventor	
III-6-1	This person is:	applicant and inventor
III-6-2	Applicant for	US only
III-6-4	Name (LAST, First)	PRENCIPE, Michael
III-6-5	Address:	39 Spruce Street West Windsor, New Jersey 08550 United States of America
III-6-6	State of nationality	US
III-6-7	State of residence	US
IV-1	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
IV-1-1	Name (LAST, First)	PARK, Ellen, K.
IV-1-2	Address:	COLGATE-PALMOLIVE COMPANY 909 River Road Piscataway, New Jersey 08855 United States of America
IV-1-3	Telephone No.	732-878-7157
IV-1-4	Facsimile No.	732-878-7853
IV-1-5	e-mail	ellen_park@colpal.com
IV-1-6	Agent's registration No.	34055
V	DESIGNATIONS	
V-1	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.	
VI-1	Priority claim of earlier national application	
VI-1-1	Filing date	15 August 2003 (15.08.2003)
VI-1-2	Number	10/642,458
VI-1-3	Country	US
VI-2	Priority claim of earlier national application	
VI-2-1	Filing date	12 August 2004 (12.08.2004)
VI-2-2	Number	
VI-2-3	Country	US

PCT REQUEST

Original (for SUBMISSION)

VI-3	Priority document request The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):	VI-1, VI-2	
VII-1	International Searching Authority Chosen	European Patent Office (EPO) (ISA/EP)	
VIII	Declarations	Number of declarations	
VIII-1	Declaration as to the identity of the inventor	-	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	-	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	-	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	-	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	-	
IX	Check list	number of sheets	electronic file(s) attached
IX-1	Request (including declaration sheets)	5	✓
IX-2	Description	22	-
IX-3	Claims	3	-
IX-4	Abstract	1	✓
IX-5	Drawings	0	-
IX-7	TOTAL	31	
	Accompanying Items	paper document(s) attached	electronic file(s) attached
IX-8	Fee calculation sheet	✓	-
IX-17	PCT-SAFE physical media	-	✓
IX-19	Figure of the drawings which should accompany the abstract		
IX-20	Language of filing of the international application	English	
X-1	Signature of applicant, agent or common representative		
X-1-1	Name (LAST, First)	PARK, Ellen, K.	
X-1-2	Name of signatory		
X-1-3	Capacity		

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10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
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10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/EP
10-6	Transmittal of search copy delayed until search fee is paid	

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HYDROPHOBIC POLYMER CARRIER BASED LIQUID TOOTH WHITENING COMPOSITION

INTRODUCTION

[0001] The present invention relates to tooth whitening systems employing compositions comprising hydrophobic polymers. Embodiments of the present invention include tooth whitening compositions comprising a hydrophobic polymer carrier and a whitening agent.

[0002] It has become desirable for a person's teeth to appear bright or "white". Society places a high value on the "whiteness" of one's teeth. One whose teeth are white may enjoy more personal confidence and satisfaction and may even enjoy greater social acceptance.

[0003] In a mammal, a tooth is comprised of an inner dentin layer and an outer hard enamel layer that is the protective layer of the tooth. The enamel layer of a tooth is naturally an opaque white or slightly off-white color. It is the enamel layer that can become stained or discolored. The enamel layer of a tooth is composed of hydroxyapatite mineral crystals that create a somewhat porous surface. These hydroxyapatite crystals form microscopic hexagonal rods or prisms that make up the enamel surface. As a result, the surface of the enamel layer presents microscopic spaces or pores between the prisms. It is believed that this porous nature of the enamel layer is what allows staining agents and discoloring substances to permeate the enamel and discolor the tooth. These remaining substances can occupy the microscopic spaces and eventually alter the color of the tooth.

[0004] Many substances that a person confronts or comes in contact with on a daily basis can "stain" or reduce the "whiteness" of one's teeth. In particular, the foods, tobacco products and fluids that one consumes tend to stain one's teeth. These products or substances tend to accumulate on the enamel layer of the tooth and form a pellicle film over the teeth.

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These staining and discoloring substances can then permeate the enamel layer. This problem occurs gradually over many years, but imparts a noticeable discoloration of the enamel of one's teeth. So long as the discolored teeth are still healthy and do not pose any health risk or problem, a product or substance that would whiten the discolored teeth would be advantageous.

[0005] It is also essential that a tooth whitening product that is to be used at home or in private by the consumer be safe and easy to use and be stable and retain its whitening efficacy during its storage on retail store shelves as well as over the period of use by the consumer.

[0006] Products and substances that are presently available to whiten teeth include a variety of different ingredients, but the primary active ingredient is a peroxide agent formulated into an aqueous liquid, solution, paste or gel carrier. These products potentially lose their whitening efficacy over time as peroxide compounds in aqueous solutions are relatively unstable. This tendency toward instability of peroxide during storage has limited the utility of aqueous liquid whitening products for whitening teeth. It would be highly desirable, therefore, to provide a stable peroxide whitening liquid to effect substantive whitening.

SUMMARY

[0007] The present invention provides tooth whitening systems for whitening a surface of a tooth. Embodiments include a tooth whitening composition comprising a whitening agent and a hydrophobic polymer carrier, wherein the whitening composition adheres to the tooth surface to effect whitening thereof.

[0008] In another embodiment, the present invention provides a method of whitening a surface of a tooth in a mammal, comprising applying to the tooth a whitening composition comprising a whitening agent and a hydrophobic polymer carrier.

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[0009] It has been discovered that compositions and methods of this invention afford advantages over whitening compositions among those known in the art including one or more of: enhanced whitening efficacy, providing a higher available concentration of whitening agent, stability of the whitening agent during storage, adherence of the whitening composition to the tooth surface even in the presence of saliva and sustained and controlled delivery of the whitening agent for a longer duration of time. Further uses, benefits and embodiments of the present invention are apparent from the description set forth herein.

DESCRIPTION

[0010] The following definitions and non-limiting guidelines must be considered in reviewing the description of this invention set forth herein. The headings (such as "Introduction" and "Summary,") and sub-headings (such as "Whitening Compositions" and "Methods", for example) used herein are intended only for general organization of topics within the disclosure of the invention, and are not intended to limit the disclosure of the invention or any aspect thereof. In particular, subject matter disclosed in the "Introduction" may include aspects of technology within the scope of the invention, and may not constitute a recitation of prior art. Subject matter disclosed in the "Summary" is not an exhaustive or complete disclosure of the entire scope of the invention or any embodiments thereof. Classification or discussion of a material within a section of this specification as having a particular utility (e.g., as being an "active" or a "carrier" ingredient) is made for convenience, and no inference should be drawn that the material must necessarily or solely function in accordance with its classification herein when it is used in any given composition.

[0011] The citation of references herein does not constitute an admission that those references are prior art or have any relevance to the patentability of the invention

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disclosed herein. Any discussion of the content of references cited in the Introduction is intended merely to provide a general summary of assertions made by the authors of the references, and does not constitute an admission as to the accuracy of the content of such references. All references cited in the Description section of this specification are hereby incorporated by reference in their entirety.

[0012] The description and specific examples, while indicating embodiments of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention. Moreover, recitation of multiple embodiments having stated features is not intended to exclude other embodiments having additional features, or other embodiments incorporating different combinations the stated of features. Specific Examples are provided for illustrative purposes of how to make and use the compositions and methods of this invention and, unless explicitly stated otherwise, are not intended to be a representation that given embodiments of this invention have, or have not, been made or tested.

[0013] As used herein, the words “preferred” and “preferably” refer to embodiments of the invention that afford certain benefits, under certain circumstances. However, other embodiments may also be preferred, under the same or other circumstances. Furthermore, the recitation of one or more preferred embodiments does not imply that other embodiments are not useful, and is not intended to exclude other embodiments from the scope of the invention.

[0014] As used herein, the word “include,” and its variants, is intended to be non-limiting, such that recitation of items in a list is not to the exclusion of other like items that may also be useful in the materials, compositions, devices, and methods of this invention.

[0015] As referred to herein, all compositional percentages are by weight of the total composition, unless otherwise specified.

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[0016] As referred to herein, "tooth" or "teeth" refers to natural mammalian teeth, dentures, dental plates, fillings, caps, crowns, bridges, dental implants, and the like, and any other hard surfaced dental prosthesis either permanently or temporarily fixed within the oral cavity. As used herein, "whitening" refers to a change in visual appearance of a tooth, preferably such that the tooth has a brighter shade. Increase in whiteness of a dental surface can be observed visually, for example with the aid of color comparison charts or gauges, or measured by colorimetry, using any suitable instrument such as a Minolta Chromameter, e.g., model CR-400 (Minolta Corp., Ramsey, NJ). The instrument can be programmed, for example, to measure Hunter Lab values or L*a*b* values according to the standard established by the International Committee of Illumination (CIE). The L*a*b* system provides a numerical representation of three-dimensional color space where L* represents a lightness axis, a* represents a red-green axis and b* represents a yellow-blue axis. The L* and b* axes are typically of greatest applicability to measurement of tooth whiteness. Increase in whiteness can be computed from differences in L*, a* and b* values before and after treatment, or between untreated and treated surfaces. A useful parameter is ΔE^* , calculated as the square root of the sum of the squares of differences in L*, a* and b* values, using the formula:

$$\Delta E^* = [(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]^{1/2}$$

[0017] A higher value of ΔE^* indicates greater increase in whiteness. In various embodiments, the method of the present invention can effect a ΔE^* of at least about 1, or at least about 3, or at least about 4, or at least about 5.

Tooth Whitening System

[0018] In various embodiments, the present invention provides an improved tooth whitening system that employs a tooth whitening composition that adheres to a surface of a tooth to be whitened. The tooth whitening composition comprises a whitening agent and a

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hydrophobic polymer carrier. In various embodiments, the hydrophobic polymer carrier of the whitening composition is preferably anhydrous and provides a stable vehicle or carrier for the whitening agent during storage and before use. The whitening composition will gradually dissolve or disintegrate upon exposure to the saliva in the aqueous oral cavity environment, thus providing delivery of the whitening agent to a tooth surface. In some embodiments, it is preferred that the hydrophobic polymer carrier is non-water soluble and thus is stable for longer durations during exposure to saliva and other aqueous solutions found in an oral cavity, as compared to prior art water-soluble whitening solutions.

[0019] In various embodiments, the whitening composition can be incorporated into a dental strip or film form, or into a liquid product which can be applied to the surface of a tooth by manual application. Upon application to the surface of a tooth, the applied whitening composition forms an adherent layer of whitening agent containing product that has the capacity to release the whitening agent over an extended period of time, e.g., from about 5 to about 45 minutes. The applied layer adheres to the tooth surface and the released whitening agent effects whitening of the tooth surface to which the composition is applied.

[0020] In another embodiment, methods of whitening a surface of a tooth are provided.

Whitening Compositions

[0021] The present invention provides a whitening composition for use in a tooth whitening system. In one embodiment, the whitening composition comprises a whitening agent and a hydrophobic polymer carrier. The whitening composition may further comprise an adhesion enhancing agent. Other additional ingredients that may be added include those known to one of skill in the art, including one or more of the following components: surfactants, flavoring agents, sweeteners, desensitizing agents, antimicrobial agents, anti-caries agents, anti-

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calculus agents, anti-inflammatory agents, vitamins, pigments and coloring agents, and enzymes, as will be discussed in greater detail below.

[0022] Active ingredients useful herein are optionally present in the compositions of the present invention in safe and effective amounts. A "safe and effective" amount of an active is an amount that is sufficient to have the desired therapeutic or prophylactic effect in the human or lower animal subject to whom the active is administered, without undue adverse side effects (such as toxicity, irritation, or allergic response), commensurate with a reasonable benefit/risk ratio when used in the manner of this invention. The specific safe and effective amount of the active will vary with such factors as the particular condition being treated, the physical condition of the subject, the nature of concurrent therapy (if any), the specific active used, the specific dosage form, the carrier employed, and the desired dosage regimen.

Whitening Agents

[0023] In various embodiments, the compositions of the present invention comprise a whitening agent as the main active ingredient. As further discussed below, a "whitening agent" is a material which effects whitening of a tooth surface to which it is applied. In various embodiments, the whitening compositions of this invention comprise a whitening agent selected from the group consisting of peroxides, chlorites, and hypochlorites. Examples of suitable chlorites and hypochlorites include those having alkali or alkaline metal cations and include calcium chlorite, barium chlorite, magnesium chlorite, lithium chlorite, sodium chlorite, potassium chlorite, calcium hypochlorite, barium hypochlorite, magnesium hypochlorite, lithium hypochlorite, lithium hypochlorite, and sodium hypochlorite.

[0024] In one embodiment, the whitening agent comprises a peroxide compound. As referred to herein, a "peroxide compound" is an oxidizing compound

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comprising a bivalent oxygen-oxygen group. Peroxide compounds include peroxides and hydroperoxides, such as hydrogen peroxide, peroxides of alkali and alkaline earth metals, organic peroxy compounds, peroxy acids, pharmaceutically-acceptable salts thereof, and mixtures thereof. Peroxides of alkali and alkaline earth metals include lithium peroxide, potassium peroxide, sodium peroxide, magnesium peroxide, calcium peroxide, barium peroxide, and mixtures thereof. Organic peroxy compounds include carbamide peroxide (also known as urea hydrogen peroxide), glyceryl hydrogen peroxide, alkyl hydrogen peroxides, dialkyl peroxides, alkyl peroxy acids, peroxy esters, diacyl peroxides, benzoyl peroxide, and monoperoxyphthalate, and mixtures thereof. Peroxy acids and their salts include organic peroxy acids such as alkyl peroxy acids, and monoperoxyphthalate and mixtures thereof, as well as inorganic peroxy acid salts such as persulfate, dipersulfate, percarbonate, perphosphate, perborate and persilicate salts of alkali and alkaline earth metals such as lithium, potassium, sodium, magnesium, calcium and barium, and mixtures thereof. In various embodiments, the peroxide compound comprises hydrogen peroxide, urea peroxide, sodium percarbonate and mixtures thereof.

[0025] Peroxide releasing compounds particularly useful in the whitening compositions of the present invention include peroxide containing compounds such as urea peroxide, sodium percarbonate, sodium perborate and polyvinylpyrrolidone- H_2O_2 complexes (hereinafter "PVP- H_2O_2 "). Polyvinylpyrrolidone is also known as poly-N-vinyl-poly-2-pyrrolidone and commonly abbreviated to "PVP". PVP generally refers to a polymer containing vinylpyrrolidone (also referred to as N-vinylpyrrolidone, N-vinyl-2-pyrrolidone and N-vinyl-2-pyrrolidinone) as a monomeric unit. The monomeric unit consists of a polar imide group, four non-polar methylene groups and a non-polar methane group.

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[0026] Both linear and cross-linked complexes of PVP-H₂O₂ are known in the art and are disclosed in U.S. Patent 3,376,110 and U.S. Patent 3,480,557, which are herein incorporated by reference, and have been used in compositions for treating acne vulgaris (U.S. Patent 5,122,370). PVP-H₂O₂ complexes are also disclosed in U.S. Patent 5,122,370. PVP-H₂O₂ is stable in an anhydrous environment. Upon exposure to highly aqueous environments, such as in the oral cavity, the PVP-H₂O₂ dissociates into individual species (PVP polymer and H₂O₂). In one embodiment, the PVP-H₂O₂ complex is about 80% by weight polyvinylpyrrolidone and 20% by weight H₂O₂.

[0027] In alternate embodiments, the whitening agent comprises a liquid peroxide solution. The hydrophobic polymer carrier of the whitening composition provides sufficient stability to permit the use of a liquid hydrogen peroxide. The liquid hydrogen peroxide comprises H₂O₂ generally contained in an aqueous water-based solution. In some embodiments, the liquid hydrogen peroxide has a concentration of peroxide to the total solution of about 0.5 to about 10 %, more preferably 0.5 to 5% by weight). Additionally, a stabilizer may be present. For example, a 3% hydrogen peroxide solution with about 0.1 to about 0.5 % of a stabilizer may be used. Acetanilide or a similar organic material can also be used with a pyrophosphate stabilizer such as sodium acid pyrophosphate (about 0.1 to about 1.0%) with a preferred amount of about 0.5%.

[0028] In certain embodiments, an agent to enhance release of the peroxide in the oral cavity is present as a part of the peroxide component whitening agent. P olypore® which is an allyl methacrylate crosspolymer available from Amcol health & Beauty Solutions, Inc. is such an enhancing agent.

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[0029] In various embodiments, the whitening agent of the whitening composition comprises from about 0.1% to about 50%, optionally from about 0.5% to about 50%, and optionally from about 10% to about 40% of the oral care composition.

Hydrophobic Polymer Carrier

[0030] The present invention preferably comprises a carrier that comprises a hydrophobic polymer. The term "hydrophobic" or "water-insoluble" as applied to polymers and as employed herein refers to an organic polymer which is substantially non-aqueous having a water solubility of less than one gram per 100 grams of water at 25°C. In various embodiments, a hydrophobic polymer is compatible with the whitening agents previously described above. In certain embodiments, a hydrophobic polymer is selected for the carrier to produce a tooth whitening composition having a viscosity of greater than about 1,000 centipoise (cP) and less than about 900,000 cP, preferably greater than about 10,000 cP and less than about 100,000 cP.

[0031] One preferred class of hydrophobic polymers comprise siloxane polymers, which are also generally known in the art as "silicone" polymers. In certain embodiments of the present invention, the hydrophobic polymers in the carrier are those in which a whitening agent can be dispersed and are well known in the art. Many such silicone polymers are commercially available. In various embodiments, a preferred silicone-based hydrophobic polymer is a polyorganosiloxane. One such polyorganosiloxane is produced by condensing a silicone resin and an organosiloxane such as a polydiorganosiloxane. Such hydrophobic polymers are an elastomeric, tacky material, adhesion of which to dental enamel surfaces can be varied by altering the ratio of silicone resin to polydiorganosiloxane in the copolymer molecule. Preferably, the polymers are pressure sensitive hydrophobic polymers specifically designed for pharmaceutical use and are permeable to many drug compounds and

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find application for the transdermal application of various compounds. In one such embodiment, the silicone polymers are the copolymer product of mixing a silanol terminated polydiorganosiloxane such as polydimethyl siloxane with a silanol-containing silicone resin whereby the silanol groups of the polydiorganosiloxane undergo a condensation reaction with the silanol groups of the silicone resin so that the polydiorganosiloxane is lightly crosslinked by the silicone resin (that is, the polydiorganosiloxane chains are bonded together through the resin molecules to give chain branching and entanglement and/or a small amount of network character) to form the silicone hydrophobic polymers. A catalyst, for example, an alkaline material, such as ammonia, ammonium hydroxide or ammonium carbonate, can be mixed with the silanol-terminated polydiorganosiloxane and the silicone resin to promote this crosslinking reaction. By copolymerizing the silicone resin with the silanol terminated polydiorganosiloxane, there results a polymer with self adhering properties and the cohesive properties of a soft elastomer matrix characteristic of pressure sensitive polymers being distinguished from the hard, non-elastomeric properties of other silicone resins. In one embodiment, hydrophobic polymers used in the carrier are available from the Dow-Corning Company under the brand name BIO-PSA.

[0032] The modification of a ratio of silicone resin to polydiorganosiloxane modifies the tackiness of the hydrophilic polymer. This ratio can be in the range of about 70:30 to about 50:50. For example, the BIO-PSA silicone sold by Dow-Corning is available in three silicone resin to silicone polymer ratios namely, 65/35 (low tack), 60/40 (medium tack), 55/45 (high tack). Such a polyorganosiloxane pressure sensitive adhesive is available dissolved in either ethyl acetate solvent or dimethicone.

[0033] In various embodiments, the hydrophobic polymer carrier is preferably present in the liquid whitening compositions of the present invention at a concentration of from

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about 1 to about 80% (by weight), optionally from about 15% to about 80%, optionally from about 15% to about 80%. In one embodiment, the hydrophobic polymer carrier is present at a level of from about 15% to about 40%. In one embodiment, the hydrophobic carrier is present at a level of from about 40% to about 80 %.

Adhesion Enhancing Agents

[0034] In one embodiment of the present invention, the whitening composition further comprises an adhesion enhancing agent, that augments adhesion of the anhydrous whitening composition to the surface of the tooth, i.e., adhesion to the enamel. Adhesion enhancing agents useful with the present invention include inorganic materials as well as organic natural and synthetic polymers. Inorganic materials include amorphous silica compounds which function as thickening agents, and include colloidal silica compounds available under trademarks such as Cab-o-sil fumed silica manufactured by Cabot Corporation and distributed by Lenape Chemical, bound Brook, NJ; Zeodent 165 from J.M. Huber Chemicals Division, Havre de Grace, MD 21078; and Sylox 15 also known as Sylodent 15, available from Davison Chemical Division of W.R. Grace Corporation, Baltimore, MD 21203. In certain embodiments, the inorganic adhesion enhancing material, such as silica, is surface treated to compatibilize the adhesion enhancing agent with the hydrophobic components in the whitening composition.

[0035] Organic materials which may be included in the compositions of the present invention to enhance the properties of the hydrophobic polymers of the present invention include adhesion enhancing agents such as waxes, inclusive of bees' wax, mineral oil, plastigel, (a blend of mineral oil and polyethylene), petrolatum, white petrolatum, shellac, versagel (blend of liquid paraffin, butene/ethylene/styrene hydrogenated copolymer)

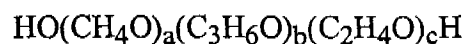
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polyethylene waxes, microcrystalline waxes, polyisobutene, polyvinyl pyrrolidone/vinyl acetate copolymers, and insoluble polyacrylate copolymers.

[0036] Also effective as adhesion enhancing agents are liquid hydrophilic polymers including polyethylene glycols, nonionic polymers of ethylene oxide having the general formula:



wherein n represents the average number of oxyethylene groups. Polyethylene glycols available from Dow Chemical are designated by a number such as 200, 300, 400, 600, 2000 which represents the approximate average molecular weight of the polymer, as well as nonionic block copolymer of ethylene oxide and propylene oxide of the formula:



The block copolymer is preferably chosen (with respect to a, b and c) such that the ethylene oxide constituent comprises from about 65 to about 75% by weight, of the copolymer molecule and the copolymer has an average molecular weight of from about 2,000 to about 15,000 with the copolymer being present in the liquid tooth whitening composition in such concentration that the composition is liquid at room temperatures (23°C).

[0037] A particularly desirable block copolymer for use in the practice of the present invention is available commercially from BASF and designated Pluraflo L1220 which has an average molecular weight of about 9,800. The hydrophilic poly(ethylene oxide) block averages about 65% by weight of the polymer.

[0038] Adhesion enhancing agents employed in compositions of various embodiments of the invention are present in an amount of from about 0 to about 20% by weight. Preferably, the adhesion enhancing agents are present in an amount of from about 2 to about 15% by weight.

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Additional Ingredients

[0039] As previously described, many other components may further be included in the whitening compositions of the present invention, and include flavors, sweetening agents, surfactants, anti-microbial agents, anti-inflammatory agents, plaque buffers, vitamins, anti-carries agents, anti-plaque agents, desensitizing agents, coloring agents, pigments and opacifying agents, for example.

[0040] In certain embodiments, nonionic surfactants are present in the whitening composition. These surfactants are preferably compatible with the whitening agents and serve as solubilizing, dispersing, emulsifying and wetting agents. In one aspect, surfactants are especially effective to solubilize a flavoring agent, if flavor is desired for the liquid whitening composition. A particularly useful nonionic surfactant is a water soluble polyoxyethylene monoester of sorbitol with a C10 to C18 fatty acid, marketed commercial under the Tween trademark. The Tween surfactants are mixtures of C10 to C18 fatty acid esters of sorbitol (and sorbitol anhydrides), consisting predominately of the monoester, condensed with about 10-30, preferably about 20, moles of ethylene oxide. The fatty acid (aliphatic hydrocarbonyl monocarboxylic acid) may be saturated or unsaturated, e.g., lauric, palmitic, stearic, oleic acids. Polysorbate 20 (e.g., Tween 20) is especially preferred and is commonly referred to as polyoxyethylene (20) sorbitan monolaurate. The nonionic surfactant constitutes about 0 to 50% by weight and preferably 0.5 to 40% by weight of the liquid composition.

[0041] In an embodiment where the whitening composition has a flavoring agent, the flavoring agent is selected from essential oils, as well as various flavoring aldehydes, esters, alcohols, and similar materials. Examples of the essential oils include oils of spearmint, peppermint, wintergreen, sassafras, clove, sage, eucalyptus, marjoram, cinnamon, lemon, lime, grapefruit, and orange. Also useful are such chemicals as menthol, carvone, and anethole. Of

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these, the most commonly employed are the oils of peppermint, spearmint and wintergreen. The flavoring agent is preferably incorporated in the whitening composition of the present embodiment at a concentration of about 0 to about 2% by weight and more preferably about 0.1 to about 0.5% by weight.

[0042] In embodiments where the whitening composition is sweetened, a sweetening material is used as an alternative or complement to the flavoring agent. Suitable sweetening agents are water-soluble and include sodium saccharin, sodium cyclamate, xylitol, perillartien, D-tryptophan, aspartame, dihydrochalcones and the like, in concentrations of about 0.01 to about 1% by weight. Sodium saccharin is preferred.

[0043] Other ingredients which are included in various embodiments of the liquid whitening composition comprise materials commonly used in the oral care formulations. These include: antimicrobial agents, e.g., Triclosan, chlorhexidine, copper-, zinc- and stannous salts such as zinc citrate, zinc sulfate, zinc glycinate, sodium zinc citrate and stannous pyrophosphate, sanguinarine extract, metronidazole, quaternary ammonium compounds, such as cetylpyridinium chloride; bis-guanides, such as chlorhexidine digluconate, hexetidine, octenidine, alexidine; and halogenated bisphenolic compounds, such as 2,2' methylenebis-(4-chloro-6-bromophenol); anti-inflammatory agents such as ibuprofen, flurbiprofen, aspirin, indomethacine; anti-caries agents such as sodium-, calcium-, magnesium- and stannous fluoride, aminefluorides, disodium monofluorophosphate and sodium trimetaphosphate; plaque buffers such as urea, calcium lactate, calcium glycerophosphate and strontium polyacrylates; vitamins such as Vitamin C; plant extracts; desensitizing agents, e.g., potassium citrate, potassium chloride, potassium tartrate, potassium bicarbonate, potassium oxalate, potassium nitrate and strontium salts; agents effective against dental calculus such as pyrophosphate salts including the mono, di, tri and tetra alkali metal and ammonium pyrophosphate and

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tripolyphosphate salts; biomolecules, e.g., bacteriocins, antibodies, enzymes such as papain, glucoamylase; opacifying agents, pigments, coloring agents and fluoride ion providing salts having anti-carries efficacy such as sodium fluoride, potassium fluoride, a tin fluoride such as stannous fluoride. In another embodiment, the whitening composition comprises one or more desensitizing agents, such as potassium nitrate, citric acid, citric acid salts, strontium chloride and the like.

[0044] In one embodiment, the tooth whitening composition has the following general formula:

Component	Content
Hydrophobic Polymer Carrier	1 to 80 wt %
Adhesive Enhancing Agent	0 to 20 wt %
Whitening Agent (Peroxide)	0.5 to 50 wt %
Surfactant	0 to 50 wt %
Flavor	0.1 to 1 wt %
Other Components (can be HOH)	0 to 10 wt %

Strip

[0045] The whitening composition of the present invention may be in the form of a layer of a strip prepared using a conventional solvent casting process. Strips among those useful herein comprise polymers, natural and synthetic woven materials, non-woven material, foil, paper, rubber and combinations thereof. Preferably the strip of material is substantially water insoluble. Suitable polymers include polyethylene, ethylvinylacetate, polyesters, ethylvinyl alcohol, fluoroplastics, and combinations thereof. In various embodiments, the strip of material is generally less than about 1 mm (millimeter) thick, optionally less than about 0.05 mm thick, optionally about 0.001 to about 0.03 mm thick. The shape of the strip is any shape and size that covers the desired oral surface. In one embodiment, the length of the strip material is from about 2 cm (centimeter) to about 12 cm, in another embodiment from about 4

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cm to about 9 cm. The width of the strip material will also depend on the oral surface area to be covered. The width of the strip is generally from about 0.5 cm to about 4 cm, in one embodiment from about 1 cm to about 2 cm. The strip material may comprise shallow pockets, optionally filled by a composition of this invention. Strips among those useful herein are disclosed in U.S. Patent 6,514,484, Rajaiah et al. issued February 4, 2003.

[0046] For example, in some embodiments, a strip is prepared by solvent casting, an adhesive polymer or resin such as colophonium and/or polyvinylpyrrolidone is dissolved in a sufficient amount of a compatible solvent such as ethanol. After a solution has been formed, the addition of the base whitening composition follows and any other ingredients such as sweeteners or flavors. The solution is coated onto a suitable casting carrier material from which the formed strip can be easily released from without damage. The carrier material must have a surface tension which allows the solution to spread evenly across the intended carrier width without soaking in to form a destructive bond between the two substrates. Examples of suitable carrier materials include glass, stainless steel, teflon, polyethylene impregnated kraft paper. The strip may be dried to a solid usable form in a high temperature air bath using a drying oven, drying tunnel, vacuum drier, or any other suitable drying equipment at a temperature. Thereafter the strip formed on the carrier is peeled off the carrier surface and cut into pieces of suitable size and shape for consumer use and packed into a suitable container.

[0047] To use the whitening strip for the present invention, the strip when applied to the teeth surface will adhere to the teeth in an appropriate manner and within 1 to 60 minutes, the teeth surfaces will whiten to a natural appearance as the whitening agent(s) present in the strip matrix migrate to the tooth surfaces. The composition can be applied to the tooth surface to be whitened for a plurality of minutes per day. The application of the composition can be repeated for multiple days to thereby whiten the teeth.

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[0048] In this regard, the whitening strip is formed to have a width dimension suitable to cover one or more teeth in a row (upper or lower). Therefore, the whitening strip may be applied to one or more of the upper set of teeth, or to one or more of the lower set of teeth either separately or simultaneously. The length dimension of the whitening strip is determined by the amount of coverage desired. In this regard, the number of teeth which it is desired to whiten will determine the dimensions for the whitening strip. For instance, it may be desired to only whiten the front teeth, which are most easily seen by others. Accordingly, the length of whitening strip can be reduced in this case, as compared to the case where it is desired to whiten all of the teeth. The duration of application of whitening strip to the teeth will depend upon the type and concentration of the whitening agent(s), as well as the type and intensity of stain. After the teeth are whitened to the satisfaction of the user, the portions of the strip can be easily removed by rinsing the mouth with water and brushing.

Paint-On Tooth Whitener

[0049] In one preferred embodiment, the whitening composition is applied using a "paint-on" technique. A small application device, such as a brush or spatula is coated with a composition of this invention and the composition is then placed on a tooth surface. Preferably, the composition is spread evenly on such surfaces, in sufficient quantity to deliver whitening agent(s) to the stained surfaces.

[0050] The paint-on whitening composition of the present invention is prepared in the form of a flowable viscous liquid suspension containing the whitening agent and is applied as such to the subject's teeth, by manual application, such as by painting the teeth with a soft applicator brush in the same manner as application of nail polish to a finger nail and without the intervention of a dentist or technological operations. Application by the user and evaporation or dissolution of the solvent leaves an adherent natural appearing white coating on the teeth.

a7 8 8

[0051] In various embodiments, the layer of tooth whitening composition applied to tooth enamel contains no ingredients imparting thereto an unacceptable taste or texture, rendering it unpleasant to the user while adhering strongly to tooth enamel. The composition is sufficiently adherent to tooth enamel to remain on the teeth for the applied whitening composition enabling the applied coating to resist the forces commonly applied by the lips and tongue as well as those forces encountered during normal mastication, as upon the evaporation or dissolution of the solvent in mouth after application a hard coating of whitening composition forms in about 1 minute which coating is bonded securely to the tooth enamel to which it is applied. While the layer of applied paint-on whitening composition is in place, the user is to refrain from mastication. The whitening composition can be removed as and when required, at will, by an employment of standard oral hygiene procedures such as brushing or by rinsing with an alcoholic mouthwash.

Methods

[0052] In one embodiment, the present invention provides a method of whitening the surface of a tooth in the oral cavity of a human or other animal subject using a tooth whitening composition comprising a whitening agent and a hydrophobic polymer carrier. The method comprises contacting the composition with the surface of the tooth. The contacting occurs for a duration of time sufficient to satisfactorily effect whitening of the teeth. Thus, the contacting occurs for a sufficient period of time to at least partially whiten teeth. This can be a period of time from about 1 minute to 2 hours or longer. In certain embodiments, the contacting is for a period of time from about 1 minute to about 5 minutes to about 45 minutes. The substantially non-aqueous tooth whitening composition is effective over a longer period of time, since it is not significantly diluted washed away in the oral cavity during the treatment time.

C24 35

[0053] In another embodiment of the present invention, a method is provide for whitening a surface of a tooth in an oral cavity of a human or other animal subject which comprises preparing a liquid tooth whitening composition as previously described. The composition is applied to the tooth surface to be whitened for a plurality of minutes per day. The application is then repeated for multiple days to expose the teeth to multiple doses of whitening agent, and thus, thereby whitens the surface of the tooth.

[0054] The liquid whitening compositions of the present invention are prepared by adding and mixing the ingredients of the composition in a suitable vessel such as a stainless steel tank provided with a mixer. In the preparation of the liquid whitening composition, the ingredients are advantageously added to the mixer in the following order: liquid anhydrous silicone based pressure sensitive polymer (hydrophobic polymer carrier), peroxide whitening agent, adhesion enhancing agent and any desired flavoring or sweetener. The ingredients are then mixed to form a homogeneous dispersion/solution.

[0055] The present invention is illustrated by the following examples but is not to be limited thereby.

Example I

[0056] A series of liquid whitening paint-on composition are prepared using the ingredients listed in Table I below.

9/10

TABLE I		
Composition Ingredients	A	B
BIO PSA (medium/high tack)*	30.0	30.0
Plastigel	44.2	44.0
Sodium percarbonate	25	--
PVP H ₂ O ₂ cx**	--	25.0
Saccharin	0.8	0.50
Flavor	--	0.50
PEG 400	--	--
Polyisobutene	--	--
*Dissolved in 60% by weight dimethicone		
**cx=cross-linked		

[0057] The whitening compositions A and B are prepared by mixing the sodium percarbonate or PVP·H₂O₂ with the Plastigel followed by the pressure sensitive adhesive BIO PSA, saccharin, flavor, PEG 400 or polyisobutene. The liquid whitening composition of Table I can be packaged in sealed polypropylene bottles.

Example II

[0058] A second series of silicone polymer based pressure sensitive whitening compositions are prepared with the ingredients listed in Table II below, with the methods as described above.

ab 71

TABLE II		
Composition		
Ingredient	C	D
Ethyl acetate	13.50	13.50
Bio PSA (medium/high tack)	35.00	35.0
Phuracare L1220	5.00	5.0
Sodium saccharin	1.00	1.0
Snow white petrolatum	5.00	12.0
Zinc oxide	7.00	--
Sodium percarbonate	33.00	33.0
Flavor	0.50	0.50
Total	100.00	100.00

ax 92

CLAIMS

What is claimed is:

1. A tooth whitening composition for whitening a surface of a tooth comprising a whitening agent and a hydrophobic polymer carrier, wherein said whitening composition adheres to the tooth surface to effect whitening thereof.
2. A composition according to Claim 1, wherein said hydrophobic carrier of said whitening composition is substantially non-water soluble.
3. A composition according to Claim 1, wherein said whitening composition comprises from between about 1 to about 80 weight % of said hydrophobic polymer carrier.
4. A composition according to Claim 1, wherein said whitening composition comprises from between about 40 to about 80 weight % of said hydrophobic polymer carrier.
5. A composition according to Claim 1, wherein said hydrophobic polymer of said carrier comprises a siloxane.
6. A composition according to Claim 1, wherein said hydrophobic polymer of said carrier comprises a silicone resin.
7. A composition according to Claim 1, wherein said hydrophobic polymer of said carrier comprises a polyorganosiloxane.
8. A composition according to Claim 1, wherein said hydrophobic polymer of said carrier is a pressure sensitive adhesive.
9. A composition according to Claim 1, wherein said whitening composition comprises from between about 0.5 to about 50 weight % of said whitening agent.
10. A composition according to Claim 1, wherein the whitening agent is selected from the group consisting of peroxides, chlorites and hypochlorites.

9893

11. A composition according to Claim 1, wherein the whitening agent is selected from the group consisting of polyvinylpyrrolidone/hydrogen peroxide, liquid hydrogen peroxide, urea peroxide, sodium percarbonate, sodium perborate, and mixtures thereof.

12. A composition according to Claim 1, wherein said whitening composition further comprises an adhesion enhancing agent from about 0.1 to about 20 weight % of the whitening composition.

13. A composition according to Claim 12, wherein said adhesion enhancing agent comprises one or more components selected from the group consisting of: waxes, nonionic polymers comprising ethylene oxide, nonionic copolymers comprising ethylene oxide and propylene oxide, polyethylene gelled mineral oil, petrolatum, hydrophobic silica containing compounds, and mixtures thereof.

14. A composition according to Claim 1, wherein said whitening composition further comprises one or more of the following components: a surfactant, a flavoring agent, a desensitizing agent, an antimicrobial agent, an anti-caries agent, and an anti-calculus agent.

15. A composition according to Claim 1, wherein said whitening composition comprises between about 1 to about 80 weight % of said hydrophobic carrier, between about 0.5 to about 50 weight % of said whitening agent, between about 0 to about 20 weight % of an adhesive enhancing agent; between about 0 to about 50 weight % of a non-ionic surfactant; between about 0 to about 1 weight % of a flavoring agent; and between about 0 to about 10 weight % of other components.

16. A method for whitening a surface of a tooth in an oral cavity of a human or other animal subject which comprises

- (a) applying a liquid tooth whitening composition of Claim 1 to the tooth surface to be whitened for a plurality of minutes per day; and

(b) repeating b for multiple days to thereby whiten the teeth.

17. A method of whitening a tooth in a mammal, the method comprising applying to the tooth a composition comprising a hydrophobic polymer carrier and a whitening agent.

18. A method according to Claim 20, wherein said applying is achieved by contacting a film comprising said tooth whitening composition with a surface of a the tooth.

19. A method according to Claim 20, wherein said applying is achieved by contacting a liquid form of said tooth whitening composition with a surface of the tooth.

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ABSTRACT

A tooth whitening system comprising a tooth whitening composition comprising a whitening agent and a hydrophobic polymer carrier. The tooth whitening composition is preferably substantially non-water soluble. The tooth whitening composition is applied to the surface of a tooth to be whitened in a mammal to effect whitening on the tooth surface. Methods of whitening a surface of a tooth are also provided.

PCT

GENERAL POWER OF ATTORNEY

(for several international applications filed under the Patent Cooperation Treaty)

(PCT Rule 90.5)

The undersigned person(s):

(Family name followed by given name; for a full legal entity, full official designation. The address must include postal code and name of country.)

COLGATE-PALMOLIVE COMPANY

300 Park Avenue

New York, New York 10022

United States of America

hereby appoint(s) the following person 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.)

Bernard Lieberman, Rosemary M. Miano, Ellen K. Park and Clifford E. Wilkins, Jr. of

COLGATE-PALMOLIVE COMPANY

909 River Road

P.O. Box 1343

Piscataway, New Jersey 08855-1343

United States of America

to represent the undersigned before



all the competent International Authorities



the International Searching Authority only



the International Preliminary Examining Authority only

in connection with any and all international applications filed by the undersigned with the following Office

RO/US

as receiving Office

and to make or receive payments on behalf of the undersigned.

Signature(s) (where there are several persons, each of them must sign; 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 this power):

COLGATE-PALMOLIVE COMPANY

By

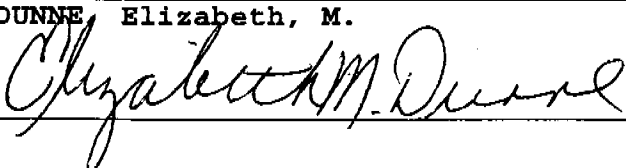
Andrew D. Hendry

Senior Vice President, General Counsel and Secretary

Date: April 8, 2004

PCT (ANNEX - FEE CALCULATION SHEET)Original (for **SUBMISSION**)

(This sheet is not part of and does not count as a sheet of the international application)

0	For receiving Office use only		
0-1	International Application No.		
0-2	Date stamp of the receiving Office		
0-4	Form PCT/RO/101 (Annex) PCT Fee Calculation Sheet		
0-4-1	Prepared Using	PCT-SAFE [EASY mode] Version 3.50 (Build 0002.158)	
0-9	Applicant's or agent's file reference		7419-00
2	Applicant		COLGATE-PALMOLIVE COMPANY
12	Calculation of prescribed fees	fee amount/multiplier	Total amounts (USD)
12-1	Transmittal fee T	⇒	300
12-2-1	Search fee S	⇒	1818
12-2-2	International search to be carried out by	EP	
12-3	International filing fee (first 30 sheets) i1	1035	
12-4	Remaining sheets	1	
12-5	Additional amount (X)	11	
12-6	Total additional amount i2	11	
12-7	i1 + i2 = i	1046	
12-12	EASY Filing reduction R	-74	
12-13	Total International filing fee (i-R) I	⇒	972
12-14	Fee for priority document Number of priority documents requested	2	
12-15	Fee per document (X)	20	
12-16	Total priority document fee: P	⇒	40
12-17	TOTAL FEES PAYABLE (T+S+I+P)	⇒	3130
12-19	Mode of payment	authorization to charge deposit account	
12-20	Deposit account instructions The receiving Office	United States Patent and Trademark Office (USPTO) (RO/US)	
12-20-1	Authorization to charge the total fees indicated above.	✓	
12-20-2	Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.	✓	
12-20-3	Authorization to charge the fee for priority document.	✓	
12-21	Deposit account No.	03-2457	
12-22	Date	13 August 2004 (13.08.2004)	
12-23	Name and signature	DUNNE, Elizabeth, M. 	

As: 100 yu
APOSTILLE

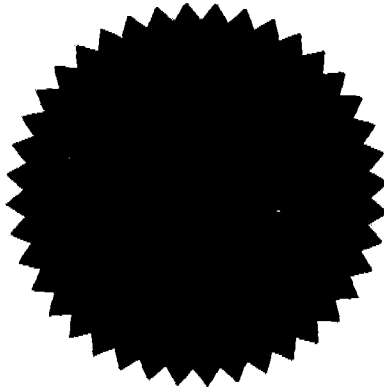
(CONVENTION DE LA HAYE DU 5 OCTOBRE 1961)

1. COUNTRY: UNITED STATES OF AMERICA
2. THIS PUBLIC DOCUMENT HAS BEEN SIGNED BY:
ELAINE M FLYNN
3. ACTING IN THE CAPACITY OF:
COUNTY CLERK
4. BEARS THE SEAL/STAMP OF:
COUNTY OF MIDDLESEX

CERTIFIED

5. AT TRENTON, NEW JERSEY
6. THE 25TH DAY OF JANUARY 2006
7. BY: Bradley I Abelow, NEW JERSEY TREASURER
8. NO. A249755
9. SEAL/STAMP: 10. SIGNATURE

Bradley Abelow



7419.00
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COUNTY OF MIDDLESEX

STATE OF NEW JERSEY

UNITED STATES OF AMERICA

I, Katherine M. Lally, of COLGATE-PALMOLIVE COMPANY, do hereby declare that the copies attached hereto are true photocopies of the assignments in support of U.S. Serial Nos. 10/642,458 filed August 15, 2003 and 10/917,263 filed August 12, 2004, and all corresponding U.S. non-provisional and foreign patent applications, all divisional, continuation, continuation-in-part, reissue and reexamination applications of the aforesaid U.S. application, and all Letters Patent or comparable rights issuing thereon in the United States and in all foreign countries, together with the right of priority under the International Convention for the Protection of Industrial Property, Inter-American Convention Relating to Patents, Designs and Industrial Models, and any other international agreements to which the United States of America adheres.



Katherine M. Lally
Patent Administrator
Colgate-Palmolive Company

Subscribed and sworn to
before me this 17th day
of January, 2006.



Carol M. Stanley
New Jersey

January 22, 2010

STATE OF NEW JERSEY }
County of Middlesex } ss.

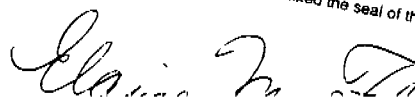


I, ELAINE M. FLYNN, Clerk of the County of Middlesex, do hereby certify that
whose name is subscribed to the annexed certificate or proof of acknowledgment of the annexed instrument was at the time of taking
the same as

CAROL M. STANLEY

acting in and for said county, duly commissioned and sworn, and qualified to act as such; that as such
NOTARY PUBLIC OF NEW JERSEY
he was duly authorized by the laws of the State of New Jersey to take and certify depositions; to administer oaths and affirmations; to
take affidavits and certify the acknowledgment and proof of deeds and other written instruments for lands, tenements and heredita-
ments to be read in evidence or recorded in this state; and further, that I am well acquainted with the handwriting of such

and verify that the signature to such proof or acknowledgment is genuine.
NOTARY PUBLIC OF NEW JERSEY
IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seal of the County of Middlesex, this 19 day
of JANUARY 2006



ASSIGNMENT

WHEREAS, we, Suman K. Chopra, Lynette A. Zaidel, Guisheng Pan, Suryakant Patel, Ryan B. Cameron, Michael Prencipe (below referred to as ASSIGNORS, residing, respectively, as set forth hereinafter, have made an invention for which application for Letters Patent of the United States was filed in the United States Patent and Trademark Office as Application Serial No. 10/642,458 filed 8/15/03 naming the ASSIGNORS as an inventor, and entitled Silicone Polymer Based Liquid Tooth Whitening Composition; and

WHEREAS, Colgate-Palmolive Company, a corporation duly organized and existing under the laws of the State of Delaware, United States of America and having its principal office and place of business at 300 Park Avenue, New York, New York 10022, and offices and place of business at 909 River Road, Piscataway, New Jersey 08855 (below referred to as "ASSIGNEE"), is desirous of obtaining the entire right, title and interest in and to the aforesaid invention and patent application and corresponding patent rights worldwide;

NOW, THEREFORE, in consideration of good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, ASSIGNORS, by these presents do sell, assign and transfer to ASSIGNEE, the full and exclusive right, title and interest in and to the aforesaid invention, the aforesaid U.S. and all corresponding foreign patent applications, all divisional, continuation, continuation-in-part, reissue and reexamination applications of the aforesaid U.S. application, and all Letters Patent or comparable rights issuing thereon in the United States and in all foreign countries, together with the right of priority under the International Convention for the Protection of Industrial Property, Inter-American Convention Relating to Patents, Designs and Industrial Models, and any other international agreements to which the United States of America adheres, and the ASSIGNORS hereby authorize and request the U.S. Commissioner of Patents and Trademarks and all foreign Patent Offices to issue all Letters Patent or comparable rights issuing on any application as aforesaid to ASSIGNEE, or to its successors, assigns or legal representatives;

ASSIGNORS hereby covenant that ASSIGNORS have full right to convey the entire interest herein assigned, and that ASSIGNORS have not executed, and will not execute, any agreement in conflict herewith;

ASSIGNORS agree to communicate to ASSIGNEE or to its successors, assigns or legal representatives any and all facts known to them or any of them respecting said invention, and without further remuneration to testify in any legal proceeding, sign all lawful papers, execute all divisional, continuation, continuation-in-part, reissue and reexamination applications, make all rightful oaths and generally do all lawful acts to aid ASSIGNEE or its successors, assigns or legal representatives to obtain and enforce proper patent protection for said invention in all countries and to enhance or perfect ASSIGNEE's title in and to the invention and patent rights therein.

ASSIGNORS hereby authorize attorneys for ASSIGNEE to enter on this document any applicable serial numbers and filing dates after ASSIGNORS' execution of this document.

This Assignment is effective as of August 15, 2003

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 6 day of
January 2004.

Address:

Suman Chopra
Suman K. Chopra
505 Major Road
Dayton, New Jersey 08810, USA

State of New Jersey
County of Middlesex

On this 6th day of January 2004, before me, a Notary Public in and for
the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that
name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 12 day of
January 2004.

Address:

Lynette A. Zaidel
Lynette A. Zaidel
510 Cranford Avenue
Cranford, New Jersey 07016, USA

State of New Jersey
County of Middlesex

On this 12th day of January 2004, before me, a Notary Public in and for
the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that
name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 5 day of
January 2004.

Address:

Guisheng Pan
Guisheng Pan
38 Hamilton Drive
Spotswood, New Jersey 08884, USA

State of New Jersey
County of Middlesex

On this 5th day of January 2004, before me, a Notary Public in and for
the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that
name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 5 day of
January 2004.

Address:

Suryakant Patel
Suryakant Patel
103 Pine Street
Bridgewater, New Jersey, 08807, USA

State of New Jersey
County of Middlesex

On this 5th day of January 2004, before me, a Notary Public in and for
the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that
name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 5 day of
January 2004.

Address:

Ryan B. Cameron
Ryan B. Cameron
~~4 Hana Road~~ 92 Kingsberry Dr
Edison, New Jersey 08817, USA
Somerset NJ 08873 USA

RC
1/5/04

State of New Jersey
County of Middlesex

On this 5th day of January 2004, before me, a Notary Public in and for
the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that
name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 7 day of
Jan 2004.

Address:

Michael Prencipe
Michael Prencipe
39 Spruce Street
West Windsor, New Jersey 08550, USA

State of New Jersey
County of Middlesex

On this 7th day of January 2004, before me, a Notary Public in and for
the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that
name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

Colgate Palmolive Company accepts this Assignment.

By:

Ellen K. Park
Ellen K. Park
Assistant General Counsel - Patents

ASSIGNMENT

WHEREAS, we, Suman K. Chopra, Lynette A. Zaidel, Guisheng Pan, Suryakant Patel, Ryan B. Cameron, Michael Principe (below referred to as ASSIGNOR(S)), residing, respectively, as set forth hereinafter, have made an invention for which application for Letters Patent of the United States was filed in the United States Patent and Trademark Office and is identified as Attorney Docket IR 7419-02 filed 8/12/04 naming the ASSIGNOR(S) as an inventor, and entitled Hydrophobic Polymer Carrier Based Liquid Tooth Whitening Composition; and

WHEREAS, Colgate-Palmolive Company, a corporation duly organized and existing under the laws of the State of Delaware, United States of America and having its principal office and place of business at 300 Park Avenue, New York, New York 10022, and offices and place of business at 909 River Road, Piscataway, New Jersey 08855 (below referred to as "ASSIGNEE"), is desirous of obtaining the entire right, title and interest in and to the aforesaid invention and patent application and corresponding patent rights worldwide;

NOW, THEREFORE, in consideration of good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, ASSIGNORS, by these presents do sell, assign and transfer to ASSIGNEE, the full and exclusive right, title and interest in and to the aforesaid invention, the aforesaid U.S. and all corresponding foreign patent applications, all divisional, continuation, continuation-in-part, reissue and reexamination applications of the aforesaid U.S. application, and all Letters Patent or comparable rights issuing thereon in the United States and in all foreign countries, together with the right of priority under the International Convention for the Protection of Industrial Property, Inter-American Convention Relating to Patents, Designs and Industrial Models, and any other international agreements to which the United States of America adheres, and the ASSIGNORS hereby authorize and request the U.S. Commissioner of Patents and Trademarks and all foreign Patent Offices to issue all Letters Patent or comparable rights issuing on any application as aforesaid to ASSIGNEE, or to its successors, assigns or legal representatives;

ASSIGNORS hereby covenant that ASSIGNORS have full right to convey the entire interest herein assigned, and that ASSIGNORS have not executed, and will not execute, any agreement in conflict herewith;

ASSIGNORS agree to communicate to ASSIGNEE or to its successors, assigns or legal representatives any and all facts known to them or any of them respecting said invention, and without further remuneration to testify in any legal proceeding, sign all lawful papers, execute all divisional, continuation, continuation-in-part, reissue and reexamination applications, make all rightful oaths and generally do all lawful acts to aid ASSIGNEE or its successors, assigns or legal representatives to obtain and enforce proper patent protection for said invention in all countries and to enhance or perfect ASSIGNEE's title in and to the invention and patent rights therein.

ASSIGNORS hereby authorize attorneys for ASSIGNEE to enter on this document any applicable serial numbers and filing dates after ASSIGNORS' execution of this document.

This Assignment is effective as of August 12, 2004.

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 10 day of Nov. 2004.

Suman Chopra

Address:

Suman K. Chopra
505 Major Road
Dayton, New Jersey 08810

State of New Jersey
County of Middlesex

On this 10 day of November 2004, before me, a Notary Public in and for the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 11 day of November 2004.

Lynette A. Zaidel

Address:

Lynette A. Zaidel
510 Cranford Avenue
Cranford, New Jersey 07016

State of New Jersey
County of Middlesex

On this 11 day of November 2004, before me, a Notary Public in and for the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 10 day of NOV 2004.

Address:

Guisheng Pan
38 Hamilton Drive
Spotswood, New Jersey 08884

State of New Jersey
County of Middlesex

On this 10 day of November 2004, before me, a Notary Public in and for the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 10 day of November 2004.

Address:

Suryakant Patel
Suryakant Patel
103 Pine Street
Bridgewater, New Jersey 08807
4 AVALON COURT
FLEMINGTON, NJ 08822

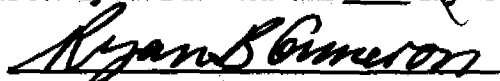
State of New Jersey
County of Middlesex

On this 10 day of November 2004, before me, a Notary Public in and for the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005

Maria V. Logatto
NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 10 day of November 2004.



Ryan B. Cameron
92 Kingsberry Drive
Somerset, New Jersey 08873

Address:

State of New Jersey
County of Middlesex

On this 10 day of November 2004, before me, a Notary Public in and for the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005


NOTARY PUBLIC

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 10 day of November 2004.



Michael Principe
39 Spruce Street
West Windsor, New Jersey 08550

Address:

State of New Jersey
County of Middlesex

On this 10 day of November 2004, before me, a Notary Public in and for the State and County aforesaid, personally appeared the above signatory, known to me to be the person of that name, who executed the foregoing instrument in my presence.

MARIA V. LOGATTO
Notary Public of New Jersey
My Commission Expires 8/8/2005


NOTARY PUBLIC

Colgate-Palmolive Company accepts this Assignment.

COLGATE-PALMOLIVE COMPANY

By



Ellen K. Park
Associate General Counsel &
Chief Patent Counsel

TRADUCCIÓN AL ESPAÑOL del documento de cesión de solicitud de patente a
Colgate-Palmolive Company, firmado por los cedentes y el cesionario.

APOSTILLA

(Convención de La Haya del 5 de Octubre de 1961)

1. PAÍS: ESTADOS UNIDOS DE AMERICA
2. ESTE DOCUMENTO PÚBLICO HA SIDO FIRMADO POR:
ELAINE M. FLYNN
3. ACTUANDO EN CAPACIDAD DE:
FUNCIONARIO DEL CONDADO
4. LLEVA EL SELLO/TIMBRE DE:
CONDADO DE MIDDLESEX

CERTIFICADO

5. EN TRENTON, NEW JERSEY
6. EL 25 DE ENERO DE 2005
7. POR Bradley I Abelow, TESORERO DE NEW JERSEY
8. NO. A249755
9. SELLO/TIMBRE
10. FIRMA

Bradley Abelow (Firma)

CONDADO DE MIDDLESEX

ESTADO DE NEW JERSEY

ESTADOS UNIDOS DE AMERICA

117
108

Yo Katherine M. Lally, de COLGATE-PALMOLIVE COMPANY, declaro que las copias anexas al presente son fotocopias verdaderas de las cesiones como base de U.S. número de serie 10/642,458 presentada el 15 de agosto de 2003, y 10/917,263 presentada el 12 de agosto de 2004, y todas las solicitudes de patente no provisionales de Estados Unidos y extranjeras correspondientes, todas las solicitudes divisionales, de continuación, continuación parcial, reemisión y reexaminación de las antes mencionadas solicitudes de Estados Unidos, y todas las patentes o derechos comparables emitidos sobre las mismas en Estados Unidos y todos los países extranjeros, junto con el derecho de prioridad bajo la Convención para la Protección de la Propiedad Industrial, Convención Inter-Americana Relacionada con Patentes, Diseños y Modelos Industriales, y cualquier otro acuerdo internacional al que se Adheira Estados Unidos.

(Firma)

Katherine M. Lally
Administrador de Patentes
Colgate-Palmolive Company

Suscrito y jurado
Ante mi este 17
de enero de 2006.

Carol M. Stanley (Firma)
Carol M. Stanley
Notario Público de New Jersey
Mi comisión expira el 22 de noviembre de 2010

ESTADO DE NEW JERSEY
Condado de Middlesex

Yo, Elaine M. Flinn, Funcionario del Condado de Middlesex, certifico que

CAROL M. STANLEY

Cuyo nombre aparece suscrito al certificado de prueba de reconocimiento del instrumento adjunto era al momento de tomar el mismo un

NOTARIO PUBLICO DE NEW JERSEY

Actuando en y para dicho condado, debidamente comisionada y juramentada, y calificada para actuar como tal; que como tal

NOTARIO PUBLICO DE NEW JERSEY

Estaba debidamente autorizada por las leyes del Estado de New Jersey para tomar y certificar declaraciones; para administrar juramentos y promesa solemnes; para tomar declaraciones juradas por escrito y certificar el reconocimiento y la prueba de instrumentos jurídicos y otros instrumentos escritos para tierras, arrendamientos y herencias ser leídos como evidencia o registrados en este estado; y además, que estoy familiarizada con la firma de tal

NOTARIO PUBLICO DE NEW JERSEY

Y verifico que la firma de tal prueba o reconocimiento es genuina.

EN TESTIMONIO DE LO CUAL, e firmado el presente y fijado el sello del Condado de Middlesex este 19 de enero de 2006.

Elaine M. Flinn (Firma)

CESIÓN

11407

CONSIDERANDO QUE, nosotros, Suman K. Chopra, Lynette A. Zaidel, Guisheng Pan, Suryakant Patel, Ryan B. Cameron, Michael Príncipe (referidos debajo como CEDENTES), residiendo, respectivamente, como se establece adelante, hemos hecho una invención para la cual se presentó solicitud de patente de Estados Unidos en la oficina de Marcas y Patentes de Estados Unidos como solicitud con número de serie 10/642,458 presentada el 8/15/03, nombrando a los CEDENTES como inventores y titulada **Composición líquida blanqueadora de dientes en base a polímero de silicona**; y

CONSIDERANDO QUE, Colgate-Palmolive Company, una corporación debidamente organizada y existente bajo las leyes del Estado de Delaware, Estados Unidos de América y que tiene sus oficinas principales y lugar de operación en 300 Park Avenue, New York, New York 10022, y oficinas y lugar de operación en 909 River Road, Piscataway, New Jersey 08855 (referido debajo como CESIONARIO), tiene deseos de obtener la totalidad del derecho, título e intereses en y para la invención y solicitud de patente mencionadas arriba y los correspondientes derechos de patente alrededor del mundo.

AHORA, POR LO TANTO, en consideración de la consideración buena y valiosa, el recibo y la suficiencia de la cual se reconocen, los CEDENTES, por la presente venden, ceden y transfieren al CESIONARIO el derecho, título e interés completo y exclusivo en y para la invención arriba mencionada, la solicitud de patente de los Estados Unidos arriba mencionada y todas las solicitudes de patente extranjeras correspondientes, todas las solicitudes de división, continuación, continuación parcial, reemisión y reexaminación de la solicitud de patente de los Estados Unidos arriba mencionada, y todas las Patentes o derechos comparables emitidos sobre la misma en los Estados Unidos y en todos los países extranjeros, junto con el derecho de prioridad bajo la Convención Internacional para la Protección de la Propiedad Industrial, la Convención Interamericana Relacionada con Patentes, Diseños y Modelos Industriales, u cualquier otro acuerdo internacional al cual se adhieran los Estados Unidos, y los CEDENTES por la presente autorizan y solicitan al Comisionado de Marcas y Patentes de los Estados Unidos y a todas las Oficinas de Patentes extranjeras a emitir todas las patentes o derechos comparables que puedan surgir de cualquier solicitud al CESIONARIO, o sus sucesores, cesionarios o representantes legales;

Los CEDENTES garantizan que los CEDENTES tienen pleno derecho para comunicar la totalidad del interés aquí cedido, y que los CEDENTES no han ejecutado, y no ejecutarán, ningún acuerdo en conflicto con el presente;

Los CEDENTES acuerdan comunicar al CESIONARIO o a sus sucesores, cesionarios o representantes legales cualquiera y todos los hechos conocidos por ellos o por cualquiera de ellos respecto a dicha invención, y sin remuneración adicional testificar en cualquier proceso legal, firmar todos los papeles legales, ejecutar todas las solicitudes de división, continuación, continuación parcial, reemisión y reexaminación, hacer todos los juramentos correctos y en general hacer todos los actos legales para ayudar al CESIONARIO o sus sucesores, cesionarios o representantes legales a obtener y hacer valer la protección de patente para dicha invención en todos los países y a mejorar o perfeccionar el derecho del CESIONARIO en y para la invención y los derechos de patente de la misma.

Los CEDENTES por la presente autorizan a los abogados del CESIONARIO a ingresar en este documento cualquier número de serie y fecha de presentación aplicable después que el CEDENTE ha ejecutado este documento.

Esta cesión es efectiva desde: Agosto 15 de 2003

1110

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 6 de enero de 2004.

(Firma)
Suman K. Chopra
Dirección: 505 Major Road
Dayton, New Jersey 08810, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 6 de enero de 2004, ante mí, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 12 de enero de 2004.

(Firma)
Lynette A. Zaidel
Dirección: 510 Cranford Avenue
Cranford, New Jersey 07016, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 12 de enero de 2004, ante mí, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 5 de enero de 2004.

(Firma)
Guisheng Pan
Dirección: 38 Hamilton Drive
Spotswood, New Jersey 08884, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 5 de enero de 2004, ante mí, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 5 de enero de 2004.

(Firma)
Suryakant Patel
Dirección: 103 Pine Street
Bridgewater, New Jersey 08807, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 5 de enero de 2004, ante mi, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 5 de enero de 2004.

(Firma)
Ryan B. Cameron
Dirección: 92 Kingsberry Dr.
Somerset, New Jersey 08873, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 5 de enero de 2004, ante mi, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 7 de enero de 2004.

(Firma)
Michael Prencipe
Dirección: 39 Spruce Street
West Windsor, New Jersey 08550, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 7 de enero de 2004, ante mi, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

Colgate-Palmolive Company acepta esta Cesión:

Por: (Firma)
Ellen K. Park
Abogado General Asistente – Patentes

CESIÓN

112

CONSIDERANDO QUE, nosotros, Suman K. Chopra, Lynette A. Zaidel, Guisheng Pan, Suryakant Patel, Ryan B. Cameron, Michael Príncipe (referidos debajo como CEDENTES), residiendo, respectivamente, como se establece adelante, hemos hecho una invención para la cual se presentó solicitud de patente de Estados Unidos en la oficina de Marcas y Patentes de Estados Unidos y se identifica como el Expediente de Abogado No. IR 7419-02 presentada el 8/12/04 nombrando a los CEDENTES como inventores, y titulada Composición líquida blanqueadora de dientes en base a un portador de polímero hidrofóbico; y

CONSIDERANDO QUE, Colgate-Palmolive Company, una corporación debidamente organizada y existente bajo las leyes del Estado de Delaware, Estados Unidos de América y que tiene sus oficinas principales y lugar de operación en 300 Park Avenue, New York, New York 10022, y oficinas y lugar de operación en 909 River Road, Piscataway, New Jersey 08855 (referido debajo como CESIONARIO), tiene deseos de obtener la totalidad del derecho, título e intereses en y para la invención y solicitud de patente mencionadas arriba y los correspondientes derechos de patente alrededor del mundo.

AHORA, POR LO TANTO, en consideración de la consideración buena y valiosa, el recibo y la suficiencia de la cual se reconocen, los CEDENTES, por la presente venden, ceden y transfieren al CESIONARIO el derecho, título e interés completo y exclusivo en y para la invención arriba mencionada, la solicitud de patente de los Estados Unidos arriba mencionada y todas las solicitudes de patente extranjeras correspondientes, todas las solicitudes de división, continuación, continuación parcial, reemisión y reexaminación de la solicitud de patente de los Estados Unidos arriba mencionada, y todas las Patentes o derechos comparables emitidos sobre la misma en los Estados Unidos y en todos los países extranjeros, junto con el derecho de prioridad bajo la Convención Internacional para la Protección de la Propiedad Industrial, la Convención Interamericana Relacionada con Patentes, Diseños y Modelos Industriales, u cualquier otro acuerdo internacional al cual se adhieran los Estados Unidos, y los CEDENTES por la presente autorizan y solicitan al Comisionado de Marcas y Patentes de los Estados Unidos y a todas las Oficinas de Patentes extranjeras a emitir todas las patentes o derechos comparables que puedan surgir de cualquier solicitud al CESIONARIO, o sus sucesores, cesionarios o representantes legales;

Los CEDENTES garantizan que los CEDENTES tienen pleno derecho para comunicar la totalidad del interés aquí cedido, y que los CEDENTES no han ejecutado, y no ejecutarán, ningún acuerdo en conflicto con el presente;

Los CEDENTES acuerdan comunicar al CESIONARIO o a sus sucesores, cesionarios o representantes legales cualquiera y todos los hechos conocidos por ellos o por cualquiera de ellos respecto a dicha invención, y sin remuneración adicional testificar en cualquier proceso legal, firmar todos los papeles legales, ejecutar todas las solicitudes de división, continuación, continuación parcial, reemisión y reexaminación, hacer todos los juramentos correctos y en general hacer todos los actos legales para ayudar al CESIONARIO o sus sucesores, cesionarios o representantes legales a obtener y hacer valer la protección de patente para dicha invención en todos los países y a mejorar o perfeccionar el derecho del CESIONARIO en y para la invención y los derechos de patente de la misma.

Los CEDENTES por la presente autorizan a los abogados del CESIONARIO a ingresar en este documento cualquier número de serie y fecha de presentación aplicable después que el CEDENTE ha ejecutado este documento.

Esta cesión es efectiva desde: Agosto 12 de 2004

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EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 10 de noviembre de 2004.

(Firma)
Suman K. Chopra
Dirección: 505 Major Road
Dayton, New Jersey 08810, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 10 de noviembre de 2004, ante mi, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 11 de noviembre de 2004.

(Firma)
Lynette A. Zaidel
Dirección: 510 Cranford Avenue
Cranford, New Jersey 07016, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 11 de noviembre de 2004, ante mi, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

11/13

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 10 de noviembre de 2004.

(Firma)
Guisheng Pan
Dirección: 38 Hamilton Drive
Spotswood, New Jersey 08884, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 10 de noviembre de 2004, ante mí, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 10 de noviembre de 2004.

(Firma)
Suryakant Patel
Dirección: 4 Avalon Court
Flemington, New Jersey 08822, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 10 de noviembre de 2004, ante mí, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

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114

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 10 de noviembre de 2004.

(Firma)
Ryan B. Cameron
Dirección: 92 Kingsberry Dr.
Somerset, New Jersey 08873, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 10 de Noviembre de 2004, ante mi, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

EN TESTIMONIO DE LO CUAL he puesto mi firma y fijado mi sello este 10 de noviembre de 2004.

(Firma)
Michael Prencipe
Dirección: 39 Spruce Street
West Windsor, New Jersey 08550, EE.UU.

Estado de New Jersey
Condado de Middlesex

Este 10 de noviembre de 2004, ante mi, un notario público en y para el Estado y Condado arriba mencionados, apareció personalmente el arriba firmante, a quien conozco como la persona de ese nombre quien ejecutó el instrumento anterior en mi presencia.

MARIA V. LOGATTO
Notario Público de New Jersey
Mi comisión expira 8/8/2005

(Firma)
NOTARIO PUBLICO

Colgate-Palmolive acepta esta Cesión:

COLGATE-PALMOLIVE COMPANY

Por: (Firma)
Ellen K. Park
Abogado General Asociado &
Abogado en Jefe de Patentes

6/1/6 722

 Industria y Comercio SUPERINTENDENCIA		SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO DIVISION DE NUEVAS CREACIONES EXTRACTO PARA PUBLICACIÓN SOLICITUD DE PATENTE DE INVENCION PCT	
(21) N° de solicitud: 06.20977		(51) Int Cl: A61K 7/20, 7/22, 7/30, 47/04	
22) Fecha de solicitud: 02.03.2006		(71) Solicitante(s) COLGATE – PALMOLIVE COMPANY	
(30) Prioridad	(31) No. Prioridad	32) Fecha	(33) País
	10/642,458	15-08-2003	US
	10/917,263	12-08-2004	US
(85) Fecha inicio fase nacional: 15-03-2006		(72) Inventor(es) Suman K. Chopra, Lynette A. Zaidel,	
(86) Datos relativos a la presentación de la solicitud PCT		Guisheng Pan, Suryakant Patel, Ryan B. Cameron, Michael	
Fecha de presentación de la solicitud: 13-08-2004		Prencipe	
No. De solicitud PCT/US2004/026413		(74) Agente: JUAN PABLO CADENA SARMIENTO	
(87) Publicación internacional		Fecha: 03-03-2005	
		N° publicación: WO 2005/018593 A2	
(54) Título: COMPOSICIÓN LÍQUIDA PARA BLANQUEAR LOS DIENTES, A BASE DE PORTADOR DE POLÍMERO HIDRÓFOBO			

Reivindicación(es):

- Una composición para blanquear los dientes, para blanquear una superficie de un diente, caracterizada porque comprende un agente blanqueador y un portador de polímero hidrófobo, en donde dicha composición blanqueadora se adhiere a la superficie del diente para efectuar el blanqueo de la misma.
- Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende desde aproximadamente 1 hasta aproximadamente 80% en peso de dicho portador hidrófobo, desde aproximadamente 0,5 hasta aproximadamente 50% en peso de dicho agente blanqueador, desde aproximadamente 0 hasta aproximadamente 20% en peso de un agente para mejorar la adhesión, desde aproximadamente 0 hasta aproximadamente 50% en peso de un surfactante no iónico, desde aproximadamente 0 hasta aproximadamente 1% en peso de un agente de sabor, y desde aproximadamente 0 hasta aproximadamente 10% en peso de otros componentes.

12-117-423

REIVINDICACIONES

1. Una composición para blanquear los dientes, para blanquear una superficie de un diente, caracterizada porque comprende un agente blanqueador y un portador de polímero hidrófobo, en donde dicha composición blanqueadora se adhiere a la superficie del diente para efectuar el blanqueo de la misma.
2. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho portador hidrófobo de dicha composición blanqueadora es sustancialmente no soluble en agua.
3. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende desde aproximadamente 1 hasta aproximadamente 80% en peso de dicho portador de polímero hidrófobo.
4. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende desde aproximadamente 40 hasta aproximadamente 80% en peso de dicho portador de polímero hidrófobo.
5. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho polímero hidrófobo de dicho portador comprende un siloxano.
6. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho polímero hidrófobo de dicho portador comprende una resina de silicona.
7. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho polímero hidrófobo de dicho portador comprende un poliorganosiloxano.
8. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicho polímero hidrófobo de dicho portador es un adhesivo sensible a la presión.
9. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende desde aproximadamente 0,5 hasta aproximadamente 50% en peso de dicho agente blanqueador.
10. Una composición de acuerdo con la Reivindicación 1, en la cual el agente blanqueador es seleccionado del grupo consistente en peróxidos, cloritos e hipocloritos.
11. Una composición de acuerdo con la Reivindicación 1, caracterizada porque el agente blanqueador es seleccionado del grupo consistente en polivinilpirrolidona/peróxido de hidrógeno, peróxido de hidrógeno líquido, peróxido de urea, percarbonato de sodio, perborato de sodio y mezclas de los mismos.
12. Una composición de acuerdo con la Reivindicación 1, caracterizada porque dicha composición blanqueadora comprende adicionalmente un agente para mejorar la adhesión, en una cantidad desde aproximadamente 0,1 hasta aproximadamente 20%

versada en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica".

El Nivel Inventivo se evaluó por comparación entre lo solicitado y encontrado en el estado de la técnica y que se relaciona con el objeto reivindicado y de acuerdo con la definición de nivel inventivo del Artículo 18 de la Decisión 486 de la Comisión de la Comunidad Andina.

El documento **US 5652238** (folios: 83 a 86) menciona oxazolidinonas y la administración de tales compuestos. Uno de estos compuestos es: (S)-N-[[3-(3-fluoro-4-[4-(hidroxiacetil)-1-piperazinil]-fenil]-2-oxo-5-oxazolidinil]-metil] acetamida, compuesto que aparece dentro de las reivindicaciones de la presente solicitud.

El documento **WO 97/09328** (folios: 87 a 89) menciona feniloxazolidinonas y la administración de composiciones farmacéuticas que los contienen, para administrar vía oral, parenteral o tópica. Dentro de los compuestos está: [4-(S)-cis]-(-)-N-[[3-(3-fluoro-4-(tetrahydro-1-óxido-2H-tiopiran-4-il) fenil]-2-oxo-5-oxazolidinil] metil] acetamida.

El documento **WO 97/27188** (folios: 90 a 92) menciona piperazinonefeniloxazolidinonas y composiciones que los contienen, entre tales compuestos está: N-((5S)-3-(3-fluoro-4-(4-(2-fluoroetil)-3-oxopiperazin-1-il) fenil)-2-oxooxazolidin-5-ilmetil] acetamida.

Estos tres documentos revelan composiciones de compuestos de oxazolidinona que pueden ser tópicos que, aunque en la descripción se mencionan composiciones transdérmicas y que son distintas a las tópicas, en ninguna parte de la solicitud se dice cuáles son los excipientes que hacen las composiciones transdérmicas distintas a las tópicas.

Cada uno de estos documentos junto con US 5688792 le sugieren a una persona medianamente versada en la materia el medicamento de la actual solicitud para tratar infecciones de tipo humano y veterinario.

La respuesta al problema técnico que se pretendía resolver, resulta obvia partiendo de las anterioridades citadas.

Como se observa, el objeto de esta solicitud podría resultar obvio para una persona del oficio normalmente versada en la materia y derivarse de manera evidente del estado de la técnica.

Evaluación de la Aplicación Industrial:

El artículo 19 de la Decisión 486 de la Comisión de la Comunidad Andina establece que "Se considerará que una invención es susceptible de aplicación industrial, cuando su objeto pueda ser producido o utilizado en cualquier tipo de industria, entendiéndose por industria la referida a cualquier actividad productiva, incluidos los servicios".

El objeto de la presente solicitud cumple con el requisito de Aplicación Industrial.

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

Nº	Documento	Reivindicaciones afectadas	Requisito que afecta
1	US 5688792	1 a 26	Novedad y Nivel Inventivo
2	US 5652238	1 a 26	Nivel Inventivo
3	WO 97/09328	1 a 26	Nivel Inventivo
4	WO 97/27188	1 a 26	Nivel Inventivo

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

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.

ALIX CARMENZA CÉSPEDES DE VERGEL

Jefe de la División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista, de fecha _____

CONCEPTO TÉCNICO Nº: 595	EXAMINADOR TÉCNICO Código N°: 202005	EXAMINADOR JURÍDICO Código N°:
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REPUBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

Bogotá,
2020

Doctor(a)
CADENA SARMIENTO JUAN PABLO

REFERENCIA	Radicación No.	6 20977
	Solicitud internacional	US2004/026413
	Fecha inicio fase nacional	15/03/2006
	Trámite	11
	Evento	378
	Actuación	430
	Oficio No.	4332

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. La solicitud no contiene el poder debidamente otorgado, con el lleno de los requisitos exigidos por los artículos 63 y subsiguientes del Código de Procedimiento Civil. Adicionalmente, deberá presentar el documento que acredita la existencia y representación legal de la sociedad solicitante, cuando ésta fuere persona jurídica.

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 27 ABR. 2006
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Industria y Comercio
SUPERINTENDENCIA

**Delegatura de Propiedad Industrial
División de Nuevas Creaciones**

**REQUISITOS NECESARIOS PARA PRESENTACIÓN Y AGILIZACIÓN DEL
TRAMITE**

		USUARIO	RADICADOR
PATENTE DE INVENCION (✓)	MODELO DE UTILIDAD ()	(✓)	()
-Indicación de que se solicita la concesión de una patente.		(✓)	()
-Datos de identificación del solicitante o de la persona que se presenta la solicitud.		(✓)	()
-Descripción de la invención.		(✓)	()
-Dibujos de ser estos pertinentes.		(✓)	()
-Comprobante de Pago de las tasas establecidas.		(✓)	()
COMPLETA ()	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:

2 Mar 2006