Oral Care Marketing & Technology

Technical & Marketing Intelligence Newsletter

Oral / Dental Care

Number 33 – February / March 2014

TOPICS

• Industrial Property
• Regulations / Safety
• Innovation - Marketing - Business - News
• Scientific publications
Overview of the different topics (7 pages)

Industrial property
To be pointed out amongst the retained application / granted patents during that period (23rd January to 19th March 2014).
Through specific queries, a particular attention is given to Universities, Spin-off / Start-Up and Biotechnology Companies as they are likely to negotiate licenses (Development of innovative products/systems, Distribution,...). Innovations from suppliers as well as possible transfer of technologies coming from other fields are also investigated.

- From Universities / Start-Up and Biotechnology Co:
  - Ferrate(VI)-containing compositions and methods of using ferrate(VI) - Granted US patent - Battelle Memorial Institute.
  - Growth control of oral and superficial microorganisms using gallium compounds - Sinai School Medicine.
  - Ionic complexes (highly stabilized amorphous calcium phosphate complexes) - Melbourne University.
  - Dental composition (containing fluoride salt and beta-tricalcium phosphate) - Indiana Nanotech Division of TherameTric Technologies.
  - Multicomponent glasses for use in personal care products - Repregen & IMP Innovations.
  - Water-soluble pharmaceutical compositions of hops resins - Bioactives.
  - Oral care (containing an extract of Heteropyxis natalensis) - Pretoria University.
  - Composition comprising licoricidine - Analyticon Discovery Gmbh & brain AG
  - Use of statins for periodontal disease and bone regeneration - Univ de Los Andes.
  - Antimicrobial and immunostimulatory system comprising an oxidoreductase enzyme - Institute of Technology Sligo.
  - Materials and methods for treating conditions associated with pathogenic biofilm - Quorum Innovations.
  - Antisense oligonucleotide targeting bacterial glucosyltransferases - UAB Bioseka.
  - Compound comprising alpha-MSH for use in endodontic regeneration - Strasbourg University.

- From Flavours suppliers:
  - Organic compounds having cooling properties - Granted US patent - Givaudan.
  - Process for producing (3S)-1-methyl 3-hydroxybutyrate and sensate composition - Takasago.
  - Spray-dried compositions and their uses - Firmenich.
  - Use of defined cyclohexenones as agents for the superadditive enhancement of an olfactory - Symrise.
  - Stable, flowable silica capsule formulation - IFF.

- From Ingredients/Raw Materials / Equipment Suppliers:
  - Novel lactic acid bacteria and compositions containing them against bacterial colds - Organobalance Medical.
  - Personal care compositions comprising sulfated poloxamers and methods of making and using same - BASF.
- **From Colgate:**
  - Color changing consumer products (visual signal for consumers) - **Granted US patent.**
  - Oral care compositions (containing metal oxide particles + amino acids) - **Granted US patent.**
  - Oral compositions containing extracts of garcinia mangostana l. and related methods.
  - Oral compositions containing extracts of myristica fragrans and related methods.
  - Oral compositions containing extracts of zizyphus joazeiro and related methods.
  - Oral care compositions.
  - Mouthwash comprising peroxy compound, a first acid and a second acid.

**EQUIPMENT, DEVICE...**
- Powered Toothbrush Package - **Granted US patent.**
- Oral care implement with air flossing system.
- Oral care implements having fluid delivery system.
- Toothbrush having oral care fluid delivery.
- Oral care implement having multi-component handle.
- Package of oral care implements.
- Oral care kit including visible sticker panel.
- Oral care implement having one or more moving sections.

- **From other oral care producers:**
  - Oral care compositions (containing complexes of Zn + curcumin) - Unilever.
  - Tooth remineralizing oral care compositions - Unilever.
  - Methods and compositions for treating tooth hypersensitivity (2 different applications with calcium carbonate of different crystal structures) - Unilever.
  - Process for oral care material taste and/or odor improvement - P&G.
  - Novel composition (hypersensitivity treatment) - GSK.
  - Novel use (to treat dental erosion/caries) - GSK.
  - Lactoperoxidase activating oral and tooth care and cleaning agents - Henkel.
  - Strip for the delivery of oral care compositions - Sylphar.
  - Mouth rinses and tooth sensitivity treatment compositions - Johnson & Johnson.
  - Compositions for mouth containing an anionic surfactant having reduced astringency - **Granted US patent** - Kao.
  - Composition for oral cavity (brightness & whiteness effects) - Kao.
  - Dentifrice composition (improvement of fluoride uptake) - Kao.
  - Antioxidant compositions for soft oral tissue and methods of formulation and use thereof - Perio Sciences.
  - Oral care composition for promoting and maintaining oral health and method of forming and using same - Dr. Fresh.
  - Oral care and oral hygiene products having photocatalytic activity comprising inorganic particles superficially functionalised with Tio2 nanoparticles - Coswell.

These patents (55) may be split as follows according to 2 ways:
- One depending on the Assignee
- An other depending on the application.
Patent family count

Breakdown depending on the Assignee

<table>
<thead>
<tr>
<th>Assignee</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universities/Biotech. Co/Start-up</td>
<td>14</td>
</tr>
<tr>
<td>Flavours suppliers</td>
<td>5</td>
</tr>
<tr>
<td>Other RM suppliers</td>
<td>4</td>
</tr>
<tr>
<td>CP</td>
<td>15</td>
</tr>
<tr>
<td>Other TP producers</td>
<td>17</td>
</tr>
</tbody>
</table>

Universities/Biotech. Co/Start-up:
- Sinal School
- Battelle Memorial
- Melbourne U.
- Indiana Nano
- IMP Innov.
- Bioctives
- Pretoria U.
- Analytical Disco.
- Las Andes U.
- Sigo Techno.
- Qorum
- Biseka
- Strasbourg U.

Flavours suppliers:
- Givaudan
- Takasago
- Firmenich
- Symrise
- IFF

Other RM suppliers:
- Du Pont
- Blausio
- Organobalance
- BASF

CP:
- 15 with 7 on equipment, device

Other TP producers:
- Unilever
- P&G
- GSK
- Henkel
- Syphor
- JBI
- Kao
- Squigle
- Perio Sciences
- Dr Fresh
- Coswell
Regulations / Safety

Europe

✓ Call for information on the safety of Silica (nano). SCCS calls for nano silica safety information.
✓ Public consultation on fragrance allergens.
✓ Final Opinion on Environmental risks and indirect health effects of mercury from dental amalgam (update 2014).
✓ Germany BfR publishes risk assessment of cosmetics.
✓ REACH to make changes to its nano annex.
✓ Safer science on the way as SEURAT-1 continues development.

USA

✓ Report of the ICCR (International Cooperation on Cosmetics Regulation) working group: safety approaches to nanomaterials in cosmetics.
✓ Inventory of validated alternatives to animal testing applicable for cosmetic products and their ingredients in all ICCR Regions.
✓ Senomyx provides additional information regarding Generally Recognized As Safe (GRAS) determination for Sweetmyx S617.
✓ ICMAD, PBA respond to letter from the FDA regarding cosmetics regulation.
✓ Cosmetics research could be subject to IND requirements.

Miscellaneous: Other certifications - Safety - Sustainability...

✓ ADA paper addresses bringing disease prevention in oral health to communities.
✓ Scientists study effect of silver particles on algae.
✓ Research into nanosilver leads scientists to give warning.

Innovation – New Products - Marketing – Business

Innovation

✓ C3 Jian Initiates Phase 2 Clinical Trial of Anti-Cavity Drug
  Targeted antimicrobial treatment to re-establish a healthy microbial flora for long-term protection.
✓ New shrinking gel steers tooth tissue formation.
  Developmentally-inspired shrink-wrap polymers for mechanical induction of tissue differentiation.
✓ Formulation and characterization of buccal mucoadhesive patch of chlorhexidine gluconate.

New Products / New technologies / New services

✓ Ortek announces launch of BasicBites™ (Ortek Therapeutics, Inc.).
✓ Calcivis® Caries Activity Imaging System granted CE mark.
✓ Introducing Colgate® Optic White™ Toothbrush + Whitening Pen.
✓ For gums to be proud of (PeriProducts).
✓ At the speed of white (Colgate).
✓ Experiential purchases behind New Crest Be Toothpaste Line.

Marketing

✓ Firefly® and Oral Health America® join forces.
✓ Colgate-Palmolive and Children’s Health fund partner for Black History Month to inspire Americans to honor their past and treasure their health by sharing healthy smiles to support children’s health and wellness.
The LISTERINE® brand supports the FDI World Dental Federation In 2014 Global Oral Health Initiative.
Colgate Partners with champions for Kids' SIMPLE Giving Program to help create healthy smiles among children.
Euromonitor Infographic tracks beauty industry growth trends.

News
PVMA: preventive care is key in protecting pets from periodontal disease.
Unilever selects go global digital marketing partners.
L’Oréal steps up its biotech business with Evolva collaboration.
EU Parliament adopts new ABS biodiversity rules in ‘landmark vote’.
Going green: Unilever issues its first ever ‘green bond’.
IFF and Amyris Advance innovative collaboration to develop ingredients for the flavors and fragrances market.
IFF and Amyris Advance to collaborate on renewable fragrance ingredients.

Ingredients/Raw materials
TEGO® Solve 61 – Naturally derived solubilizer for lipophilic & natural oils.
Evonik launches solubilizer for natural and lipophilic oils.

Scientific publications
Choice of relevant publications (with links to corresponding publishers for free abstract and purchase of the article or free article).

- Antiplaque/Antimicrobial:
  Evaluation of the stability and antimicrobial activity of an ethanolic extract of Libidibia ferrea.
  Systematic screening of plant extracts from the brazilian pantanal with antimicrobial activity against bacteria with cariogenic relevance.
  Honey - a potential agent against Porphyromonas gingivalis: an in vitro study (free article).

- Bleaching:
  Evaluation of the effects of conventional versus laser bleaching techniques on enamel microroughness.

- Cavity protection, fluoride bioavailability, remineralization...:
  The safety, efficacy and value of water fluoridation in oral health care.
  Biochemical indicators of dental caries in saliva: an in vivo study.
  Ion release from calcium and fluoride containing dental varnishes.
  Evaluating the effectiveness of structural and metabolic tooth enamel reparation by magnesium-calcium remineralizing complex (one co-author from DRC-group, Russian-Switzerland company).
  Calcium lactate pre-rinse increased fluoride protection against enamel erosion in a randomized controlled in situ trial.
  Effect of fluoride gels supplemented with sodium trimetaphosphate on enamel erosion and abrasion: in vitro study.

- Dental erosion (prevention):
  Prevention of dental erosion of a sports drink by nano-sized hydroxyapatite in situ study.

- Methods (Measurements):
  Monitoring the maturation process of a dental microcosm biofilm using the Quantitative Light-induced Fluorescence-Digital (QLF-D).
- Microbiology:
  ✓ In healthy mouths good fungi keep bad ones in check. Oral mycobiome analysis of hiv-infected patients: identification of pichia as an antagonist of opportunistic fung (free article).
  ✓ Symbiotic relationship between Streptococcus mutans and Candida albicans synergizes the virulence of plaque-biofilms in vivo (free article).
  ✓ Innocent until proven guilty: mechanisms and roles of Streptococcus–Candida interactions in oral health and disease (free article).
  ✓ Adhesion forces and composition of planktonic and adhering oral microbiomes.

- Mouthrinses:
  ✓ In vitro comparison of commercial oral rinses on bacterial adhesion and their detachment from biofilm formed on hydroxyapatite disks.
  ✓ Antibacterial effect of iranian green tea containing mouthrinse vs chlorhexidine 0.2%: an in vitro study.

- Oils (essential oils):
  ✓ A case of anaphylaxis to peppermint (free article).

- Periodontal/gingival therapy:
  ✓ Classifying gum disease genetically could help earlier diagnosis and treatment.
  ✓ Salivary biomarkers of gingivitis: Information important for personalized decision-making.
  ✓ Inhibition of oral biofilm and cell-cell communication using natural-products derivatives.
  ✓ Identification of quercitrin as potential therapeutic agent for periodontal applications.
  ✓ Xylitol, an anti-caries agent, exhibits potent inhibition of inflammatory responses in human thp-1-derived macrophages infected with porphyromonas gingivalis.

- Relationship oral diseases – other diseases:
  ✓ Byproducts from bacteria-causing gum disease incite deadly oral cancer growth. Short chain fatty acids from periodontal pathogens suppress HDACs, EZH2, and SUV39H1 to promote Kaposi’s Sarcoma-associated Herpesvirus Replication.

- Toothbrushes:
  ✓ Influence of different toothpaste abrasives on the bristle end-rounding quality of toothbrushes.

- Miscellaneous:
  ✓ Comparison of total antioxidant capacity in saliva of children with severe early childhood caries and caries-free children.
  ✓ Effects of sugar-free chewing gum sweetened with xylitol or maltitol on the development of gingivitis and plaque: a randomized clinical trial.
  ✓ Antibacterial efficacy of photosensitizer functionalized biopolymeric nanoparticles in the presence of tissue inhibitors in root canal.
  ✓ Composition of enamel pellicle from dental erosion patients (one co-author from Colgate).
Search methodology
Issue/Publication date: from 23rd January to 19th March 2014.

Patents search is carried out in USPTO, EPO and WIPO through 2 complementary ways:

✓ one with the use of keywords in the title or abstract:
  toothpaste OR dentifrice OR mouthwash OR gingi* OR periodon* OR "oral care"
  (cooling OR freshness OR flavor OR menthol) AND (dentifrice OR toothpaste OR mouthwash OR "oral care")
  (nano OR enzyme OR capsul* OR peptide OR polymer) AND ("oral care" OR gingi* OR periodont*)
✓ an other one with the use of the CPC (Cooperative Patent Classification):

<table>
<thead>
<tr>
<th>CPC Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A61Q11/00</td>
<td>Preparations for care of the teeth, of the oral cavity or of dentures; Dentifrices, e.g. toothpastes; Mouth rinses</td>
</tr>
<tr>
<td>A61C15</td>
<td>Devices for cleaning between the teeth</td>
</tr>
<tr>
<td>A46B</td>
<td>Brushes (handles not integral with brushware B25G)</td>
</tr>
<tr>
<td>A61K8/21</td>
<td>Cosmetic or similar toilet preparations containing Fluorides and Derivatives thereof</td>
</tr>
</tbody>
</table>

When applying the here-before methodology, a large number of documents is found among which 55 are retained.
In the here-before overview section, these documents have been split according 2 ways:
- One depending on the assignee
- An other depending on the application.

These 55 documents are reported here-after with, for each of them:
- A link with either EPO, USPTO or WIPO.
- The title, abstract and priority (country and date).
- Some comments including the relevant documents mentioned in the international/European Search Report when published.
These documents are classified X, Y, L or P as defined by the official following definitions:
✓ “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.
✓ “P” Document published prior to international filling date but later than the priority date claimed.
  Documents classified “P” will be considered for the novelty but not for the inventive step.
- Eventually, data on the Assignee (main business, R&D fields of excellence, possible sale of license, interest in developing partnership...).
### Universities, Start-Up and Biotechnology Companies

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>APPLICATION NR. &amp; PUBLICATION DATE</th>
<th>PRIORITY (Country &amp; Date)</th>
<th>TITLE</th>
<th>ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BATTELLE MEMORIAL INSTITUTE [US]</td>
<td>Granted US8663607B2 2014-03-04</td>
<td>US 2007-03-09</td>
<td>Ferrate(VI)-containing compositions and methods of using ferrate(VI)</td>
<td>Compositions containing ferrate (VI) are disclosed. Also, methods are disclosed that utilize ferrate (VI).</td>
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<td></td>
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<td>- Extracts from the application:</td>
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<td></td>
<td>✓ The actions of ferrate(VI) can be applied in several ways. One application is oral care; for example using powders, pellets, pills, lozenges tablets, creams, salves, ointments, and the like, for killing mouth bacteria or viruses, removing mouth odor, or removing tooth stains and disinfecting tooth caries, e.g. by rinsing, brushing, and the like.</td>
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<td></td>
<td>✓ The invention also provides methods to deliver and apply the formulations to accomplish teeth whitening and/or cleaning. Such methods include media such as tooth paste creams or gels, teeth cleaning powder, contact strips of plastics containing encapsulated ferrate(VI) salts and/or emulsions, with those most preferred that rely on activation by moisture present in the saliva.</td>
</tr>
<tr>
<td>SINAI SCHOOL MEDICINE [US]</td>
<td>EP2689783 2014-01-29</td>
<td>US 2005 11 01</td>
<td>Growth control of oral and superficial microorganisms using gallium compounds</td>
<td>The present invention provides methods for treating or preventing diseases and disorders caused by iron-dependent pathogenic microorganisms/ such as bacteria, fungi, and parasites, by applying a gallium compound to an affected area. In particular, the present invention provides methods for treating or preventing dental caries, vaginal infections, skin infections, and so forth. Gallium compounds can be formulated as toothpaste, mouthwash, cream, ointment, gel, solution, eye drops, suppository, and the like. Furthermore, the invention provides methods for controlling microbial growth on environmental surfaces, including those of toothbrush, denture, dental retainer, contact lens, catheter, food stuff, and so forth.; In addition, the present invention provides animal feeds which contain gallium compounds that promote the animal growth and prevent the animals from infections as well as protect consumers from post processing infections.</td>
</tr>
</tbody>
</table>
An European patent belonging to the same patents family [EP1962774B1](http://www.sideromics.com/) was granted on 2014-01-01. US application still pending. One of the co-inventor, Sharon Moalem, is a co-founder of Sideromics, a pharmaceutical company developing novel compounds including gallium’s ones to treat and prevent infections caused by antibiotic resistant microorganisms.

- Extracts from the application:
  - [0008] Accordingly, one aspect of the present invention provides methods for treating or preventing diseases or disorders caused by oral bacteria or fungi in a subject, comprising applying gallium compounds to the oral cavity. In a specific embodiment, the disease or disorder includes dental caries, gingivitis, halitosis, oral thrush and the like.
  - [0009] In another aspect, the present invention provides methods for controlling the growth of iron-dependent pathogenic microorganisms on the surfaces of objects, such as tooth brushes, dentures, dental retainers, contact lenses, bandages, dressings, medical devices, etc., by applying gallium compounds to the surfaces of the objects to disinfect them or to prevent them from contamination with pathogenic microorganisms.

### UNIV MELBOURNE [AU]

**EP2705826**

2014-03-12

Fluoride composition and methods for dental mineralization

The present invention relates to a composition for mineralizing a dental surface, in particular tooth enamel. Methods of mineralizing hypomineralized lesions (including subsurface lesions) in the tooth enamel caused by dental caries, dental corrosion, erosion and fluorosis are also provided.


- Extracts from the document:
  - [0010] In one aspect, the present invention provides a composition for dental mineralization including stabilized amorphous calcium phosphate (ACP) and a source of fluoride ions. The ACP may also contain some fluoride ions, and these fluoride ions may be part of a stabilised amorphous calcium fluoride phosphate (ACFP) complex.
  - [0023] Preferably the ACP is phosphopeptide (PP)-stabilized. Preferably, the phosphopeptide (as defined below) is a casein phosphopeptide. In a preferred embodiment the ACP is in the form of a casein phosphopeptide stabilized ACP complex.

### UNIV MELBOURNE [AU]

**US2014056824**

2014-02-27

Ionic complexes

The present invention provides a phosphopeptide or phosphoprotein (PP) stabilized amorphous calcium phosphate or amorphous calcium fluoride phosphate complex having a calcium ion greater than about 30 moles of calcium per mole of PP.
- A US patent belonging to the same patents family US8603988B2 was granted on 2013-12-10. European application still pending. International Search report: No document classified X or Y.
- Comments:
  ✓ A US patent US2009022672 from the same inventor, Prof. Eric Reynolds, was published on 2009 01 22 – Title: Fluoride composition and methods for dental mineralization. It claimed the protection of a new product, the Recaldent CPP-ACP (Casein phosphopeptide - Amorphous calcium phosphate), derived from milk casein and used for enamel remineralization.
  ✓ This new patent claims the protection of a better stabilized amorphous calcium phosphate complex through a high ratio of calcium ion per mole of phosphoprotein.

Indiana Nanotech Division of TherameTric Technologies. [US]

<table>
<thead>
<tr>
<th>US</th>
<th>Dental composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>US2014056827</td>
<td>Aqueous homogeneous oral care compositions including a fluoride salt and unfunctionalised beta-tricalcium phosphate, characterised in that beta-tricalcium phosphate is present in a catalytic and fluoride-stable amount relative to the fluoride salt. Such compositions are of use in combating dental caries, dental erosion and/or tooth wear.</td>
</tr>
</tbody>
</table>

- Extract from Extracts from the application:
  ✓ [0023] Without wishing to be bound by theory, it is believed that a catalytic amount of unfunctionalised [beta]-tricalcium phosphate can act as a nucleating template or seed, thereby enhancing the efficacy of fluoride, together with calcium and phosphate ions naturally present in saliva, in remineralising dental enamel.
  ✓ [0029] It has further been discovered that such low amounts of [beta]-tricalcium phosphate can enhance the efficacy of fluoride in strengthening dental enamel from acidic challenges. The present novel technology is therefore based upon the two-fold discovery that a fluoride salt can be combined together with unfunctionalised [beta]-tricalcium phosphate in a single phase aqueous oral care composition providing that [beta]-tricalcium phosphate is present in a catalytic and fluoride-stable amount relative to the fluoride salt, so to enhance fluoride efficacy but not to compromise long term storage stability of the fluoride in the composition.
- Indiana Nanotech, LLC
  ✓ Indiana Nanotech was founded to address dental maladies through the research and development of patent-pending tailored calcium phosphate systems.
  http://www.indianananotech.com/
### REPREGEN LTD [GB] IMP INNOVATIONS LTD [GB]

<table>
<thead>
<tr>
<th>Country</th>
<th>Date</th>
<th>Application</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB</td>
<td>2009 06 30</td>
<td>Multicomponent glasses for use in personal care products</td>
<td>The present invention relates to multicomponent glasses and their use in powdered form as an additive in personal care products such as toothpastes.</td>
</tr>
</tbody>
</table>

- International search report of the PCT’s file: 6 X-rated documents.

- Extracts from the application:
  - The glasses of the invention are of the system SiO2-Na2O-CaO-K2O-SrO-MgO-ZnO-P2O5-B2O3-MFx (where M is a monovalent or divalent cation and x is 1 or 2). The glasses may comprise at least four components of this system, preferably at least six.
  - [0021] Saliva is saturated with respect to calcium and phosphate and on leaching of ions in the glass (e.g. fluoride, calcium and phosphorus), super-saturation will occur, which can induce precipitation of apatite, repairing the tooth enamel. Glass particles of small enough size can also block the dentinal tubules which when exposed due to enamel loss cause pain. Potassium leached from the glass prevents re-polarisation of the nerve fibre, exposed from lost enamel, which reduces pain and dental sensitivity. Bactericidal ions in the glass such as zinc, when released from the toothpaste, will kill unwanted bacteria reducing conditions such as gingivitis. The inclusion of strontium within the glass composition further enhances the activity of the glass by up-regulating activity of odontoblast cells and enhancing bioactivity.

- Assignees:
  - Imperial Innovations:
  Imperial Innovations provides technology commercialisation services related to the R&D conducted at the Imperial College of London
  [http://www.imperialinnovations.co.uk/](http://www.imperialinnovations.co.uk/)
  Regarding Healthcare, Imperial Innovations builds and invests in technology based on research from the UK’s four leading universities: Imperial College London, Cambridge, Oxford and University College London.
  - Repregen Ltd
  RepRegen Ltd is an emerging medical device company from Imperial College London using patent-pending repair and regeneration technology to mend and regrow tissue in the body.

### BIOACTIVES INC [US]

<table>
<thead>
<tr>
<th>Country</th>
<th>Date</th>
<th>Application</th>
<th>Description</th>
</tr>
</thead>
</table>
| US      | 2006 04 21 | Water-soluble pharmaceutical compositions of hops resins | The present invention is drawn to water-soluble compositions for providing hops constituents, particularly alpha acids, iso-alpha acids, and beta acids. A pharmaceutical gel composition can comprise a hops extract and a surfactant. Such compositions can be formulated into products for various therapeutic applications, including oral and topical uses. Such compositions can also

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be dissolved in water to yield a clear solution containing more dilute hops acids. The invention also provides methods of treatment comprising administering water-soluble hops compositions. The present invention is also drawn to methods for making water-soluble preparations of hops constituents.

- 2 US patents US8071136 (B2) and US8349375 (B2) belonging to the same patents family were granted respectively in 2011 & 2013. International search report of the PCT’s file: 1 (X,Y)-rated document.

- Extracts from the application:
  ✓ Hops acids, particularly beta acids, have been shown to inhibit growth in a number of types bacteria that inhabit the human body such as gastritis-causing Helicobacter pylori, as well as oral Streptococcus bacteria such as Streptococcus mutans, Streptococcus sanguis, and Streptococcus salivarius.
  ✓ Therefore, in accordance with these recognitions, the present invention provides a method for making a water-soluble hops extract composition. It has been discovered that non-ionic surfactants can be used to increase or provide the solubility of hops acids in certain aqueous formulations.

- Bioactives Inc:
  Cf. also the use of one of their products MicroActive® CoQ10, a water-soluble and highly bio-available form of CoQ10 due to its encapsulation by β-cyclodextrin, in a range of products (toothpaste, mouthrinse and chewing-gum) by Perfect Smile Corporation: [http://www.4theperfectsmile.com/](http://www.4theperfectsmile.com/)

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| UNIV PRETORIA [ZA] | ZA 2012 08 27 | Oral care | The invention relates to oral care. In particular the invention relates to an oral care composition for inhibiting the growth of potentially pathogenic oral microorganisms, said composition comprising an extract of Heteropyxis natalensis. The invention further relates to an oral care composition which includes Heteropyxis natalensis in combination with other essential oils and plant extracts.
- Extracts from the document:
The invention also relates to the use of a Heteropyxis natalensis extract in the manufacturing of an oral care composition which inhibits the growth of potentially pathogenic oral microorganisms. The pathogenic oral microorganisms may include any one or more microorganisms selected from the group of Actinomyces israelii, Streptococcus mutans, Prevotella intermedia and Candida albicans. The invention further relates to use of a composition which includes Heteropyxis natalensis extract, Melaleuca alternifolia essential oils, Mentha piperita essential oils and concentrated green tea extract in the manufacturing of an oral care composition for the treatment of periodontal disease by the composition's antioxidant activity.

The synergistic assay showed that there is an overall increase in inhibitory activity when H. natalensis extract is used in combination with Melaleuca alternifolia essential oil, Mentha piperita essential oil, and concentrated green tea extract.

The present invention relates to a composition comprising licoricidine and at least one component selected from the group consisting of glyasperin D, glyasperin C, gancaonin I and glycyrrhisoflavone, preferably wherein said composition is a Glycyrrhiza pallidiflora, Glycyrrhiza uralensis or Glycyrrhiza glabra extract, and to a method for preparing the same. Furthermore, the present invention relates to pharmaceutical or cosmetic composition or a method for preparing the same, said pharmaceutical or cosmetic composition comprising licoricidine and at least one component selected from the group consisting of glyasperin D, glyasperin C, gancaonin I and glycyrrhisoflavone, wherein said composition is preferably a Glycyrrhiza pallidiflora, Glycyrrhiza uralensis or Glycyrrhiza glabra extract. Furthermore, the present invention relates to a pharmaceutical or cosmetic composition, as described above, for body and oral care, in particular for use as deodorant or for use in treating or preventing dental caries.


- Extracts from the document:
  - Preferably, the oxidoreductase enzyme is glucose oxidase, hexose oxidase, galactose oxidase and/or pyranose oxidase and the respective substrate for the oxidoreductase enzyme is D-glucose, hexose, D-galactose and/or pyranose. According to a preferred embodiment of this aspect of the invention, the oxidoreductase enzyme is glucose oxidase and the substrate is D-glucose.
  - Another cosmetic application includes the use of the system of the present invention in a method for whitening teeth. Advantageously, the system of the present invention is provided in a form adapted for oral delivery via a dissolvable film strip or strips, dental floss, toothpaste, mouthwash and/or adapted for delivery via a mouth guard. Delivery by these means facilitates the lightening of the colour of teeth whereby hydrogen peroxide is released from the system of the present invention. The system of the present invention provides a sustained release of hydrogen peroxide which is ideal for whitening teeth.
<table>
<thead>
<tr>
<th>UNIV DE LOS ANDES [CL]</th>
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<tbody>
<tr>
<td><strong>Assignees:</strong></td>
<td></td>
</tr>
<tr>
<td>✓ AnalytiCon Discovery is a research and development Co involved in products made from natural materials. The libraries of AnalytiCon include over 25,000 compounds, based on about 2,000 different chemotypes, all having their structures completely resolved: <a href="http://www.ac-discovery.com/content/About_Us/CompanyProfile.php">http://www.ac-discovery.com/content/About_Us/CompanyProfile.php</a></td>
<td></td>
</tr>
<tr>
<td>✓ BRAIN discovers and develops novel natural BioActive compounds, microbial producer strains, proprietary enzymes and biocatalysts for its customers in the chemical and pharmaceutical as well as in the food and cosmetics industries: <a href="http://www.brain-biotech.de/about-brain.html">http://www.brain-biotech.de/about-brain.html</a></td>
<td></td>
</tr>
<tr>
<td><strong>UNIV DE LOS ANDES [CL]</strong></td>
<td><strong>US 2012 08 22</strong></td>
</tr>
<tr>
<td><strong>WO2014030132</strong></td>
<td>2014-02-27</td>
</tr>
<tr>
<td><strong>Use of statins for periodontal disease and bone regeneration</strong></td>
<td>The present invention discloses topical compositions comprising at least one statin as the main active compound for primary prevention or treatment of periodontal disease, for complementing standard treatment of periodontal disease, and for bone regeneration. The topical compositions are formulated for example, but not limited to, as toothpaste, mouthwash, tablets to dissolve in the mouth, elements or devices for intraoral slow-release of statins, dental floss, gel for being applied in dental trays, concentrated gel for irrigation of periodontal pockets, fluid (for example in blisters), powder, powder or liquid for preparing a solution, and gel. The present invention also discloses method for primary prevention or treatment of periodontal disease, for complementing standard treatment of periodontal disease, and for bone regeneration, comprising administering the topical compositions in the different formulations to a subject in need thereof.</td>
</tr>
<tr>
<td><strong>- International Search Report:</strong></td>
<td>Not yet available</td>
</tr>
<tr>
<td><strong>- Extracts from the document:</strong></td>
<td></td>
</tr>
<tr>
<td>✓ Statins are potent cholesterol lowering agents that inhibit cholesterol biosynthesis in the liver and consequently have proved beneficial effects in the primary and secondary prevention of ischemic heart disease.</td>
<td></td>
</tr>
<tr>
<td>✓ Based on the background described above, related to the inflammatory mechanisms involved in the development of cardiovascular disease, there is a certain parallelism between them and the inflammatory changes responsible for the pathogenesis of periodontal disease.</td>
<td></td>
</tr>
<tr>
<td>✓ From the above it is concluded that the systemic use of statins contributes to the prevention of periodontal diseases, since it reduces the clinical inflammation of the periodontal tissues, and also contributes even without local treatment.</td>
<td></td>
</tr>
</tbody>
</table>
### INSTITUTE OF TECHNOLOGY SLIGO [IE]

**US2014023597**  
**2014-01-23**  
**GB 2006 10 06**

**Antimicrobial and immunostimulatory system comprising an oxidoreductase enzyme**

The present invention relates to an antimicrobial and immunostimulatory system, applications thereof and a process for the production of the antimicrobial and immunostimulatory system. The present invention provides a storage-stable antimicrobial and immunostimulatory system comprising an oxidoreductase enzyme, a substrate for the oxidoreductase enzyme and hydrogen peroxide in an aqueous solution wherein the substrate for the oxidoreductase enzyme is present up to 90% by weight and water is present up to 20% by weight based on the weight of the total composition; the system has a pH from approximately 4 to 8; and the system provides a two-stage hydrogen peroxide release.

- This US application is the equivalent of the European patent [EP2068949B1](http://www.ep.espacenet.com) granted on 2012 03 14.

- Extracts from the document:
  - [0040] Preferably, the oxidoreductase enzyme is glucose oxidase, hexose oxidase, galactose oxidase and/or pyranose oxidase and the respective substrate for the oxidoreductase enzyme is D-glucose, hexose, D-galactose and/or pyranose.
  - [0041] According to a preferred embodiment of this aspect of the invention, the oxidoreductase enzyme is glucose oxidase and the substrate is D-glucose.
  - [0090] Another cosmetic application includes the use of the system of the present invention in a method for whitening teeth. Advantageously, the system of the present invention is provided in a form adapted for oral delivery via a dissolvable film strip or strips, dental floss, toothpaste, mouthwash and/or adapted for delivery via a mouth guard. Delivery by these means facilitates the lightening of the colour of teeth whereby hydrogen peroxide is released from the system of the present invention. The system of the present invention provides a sustained release of hydrogen peroxide which is ideal for whitening teeth.

- Institute of Technology Sligo:
  - More on Research & Innovation at the Institute Of Technology of Sligo located in Ireland: [http://itsligo.ie/research-innovation/](http://itsligo.ie/research-innovation/)

### QUORUM INNOVATIONS [US]

**US2014037688**  
**2014-02-06**  
**US 2011 03 01**

**Materials and methods for treating conditions associated with pathogenic biofilm**

The subject invention provides materials and methods that effectively support innate immunity and/or disperse pathogenic biofilms using readily available, nontoxic, natural substances, while supporting restoration of normal microbiotic homeostasis. In one embodiment, the subject invention provides anti-biofilm compositions comprising one or more probiotic organisms, antimicrobial honey, and other ingredients such as prebiotic compounds, other hive products, green tea derivatives, other plant derivatives, and vitamin D3.
Extracts from the document:

- [0039] Examples of such locally directed therapies include skin medicaments, nasal sprays and washes, ear drops, oral inhalers and nebulizers, ocular drops, contact lenses, contact lens solutions, oral troches, dentifrices such as mouthwash, toothpaste, floss, periodontal treatment, etc.

- [0108] The subject invention also provides for therapeutic or pharmaceutical compositions comprising the ingredients of the invention in a form that can be combined with a pharmaceutically acceptable carrier. In one embodiment, the composition of the subject invention is formulated for ocular, periocular, nasal, dental, or pulmonary administration.

Quorum Innovations:
- Quorum Innovations’ scientists are a multidisciplinary group of researchers assembled to develop antibiofilm treatments and solutions for the global market. Our products are targeted against common biofilms relevant to human infection and the medical industry: http://quoruminnovations.com/about-quorum/

- Extracts from the document:
  ✓ [0039] Examples of such locally directed therapies include skin medicaments, nasal sprays and washes, ear drops, oral inhalers and nebulizers, ocular drops, contact lenses, contact lens solutions, oral troches, dentifrices such as mouthwash, toothpaste, floss, periodontal treatment, etc.
  ✓ [0108] The subject invention also provides for therapeutic or pharmaceutical compositions comprising the ingredients of the invention in a form that can be combined with a pharmaceutically acceptable carrier. In one embodiment, the composition of the subject invention is formulated for ocular, periocular, nasal, dental, or pulmonary administration.

- Quorum Innovations:
  ✓ Quorum Innovations’ scientists are a multidisciplinary group of researchers assembled to develop antibiofilm treatments and solutions for the global market. Our products are targeted against common biofilms relevant to human infection and the medical industry: http://quoruminnovations.com/about-quorum/

Antisense oligonucleotide targeting bacterial glucosyltransferases

The present invention provides isolated antisense oligonucleotides (ASO) and methods for reducing, preventing or inhibiting biofilm formation such as biofilm in the oral cavity. The present invention further provides compositions such as pharmaceutical compositions comprising said ASO.

- Extracts from the document:
  ✓ The present invention relates to the field of bacterial biofilm formation in the oral cavity and dental caries.
  ✓ The main structural and binding material of biofilm is a glucan polymer synthesized by several isoforms of glucosyltransferase (Gtf) enzyme present in certain species of oral bacteria, including mutans group streptococci: Streptococcus mutans, S. sobrinus, S. downei and S. criceti.
  ✓ The present inventors have found that certain antisense oligonucleotides (ASO) are useful for inhibiting formation of biofilm. Further aspects include a method of inhibiting, reducing and/or preventing biofilm formation on a solid surface or in the oral cavity, said method comprising administering an effective dose of an ASO as described herein, i.e...
<table>
<thead>
<tr>
<th>Topic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOSEKA, UAB</td>
<td>A Lithuanian Biotech company developing antisense oligonucleotide technology, with applications to bacterial biofilms and other biological systems: <a href="http://www.bioseka.eu/">http://www.bioseka.eu/</a></td>
</tr>
<tr>
<td>US2014050773</td>
<td>Compound comprising alpha-MSH for use in endodontic regeneration</td>
</tr>
<tr>
<td>PCT 2010 11 26</td>
<td>The present invention concerns a compound comprising an alpha-MSH peptide, coupled to a polypeptide consisting of a chain of about 15 to about 400 amino acids, for use in endodontic regeneration and/or for the treatment of dental inflammatory diseases. The invention further concerns pharmaceutical compositions, in particular nanostructured compositions, comprising such a compound.</td>
</tr>
</tbody>
</table>

- Extracts from the document:
  - Alpha-melanocyte stimulating hormone peptides (also known as [alpha]-MSH, or melanocortin peptides) are crucial in cutaneous biology, but also involved in other tissues metabolism as adipose tissue and bone. a-MSH have been shown to possess antiinflammatory effects in many experimental models of acute and chronic inflammation.. a-MSH is also able to reduce tissue fibrosis.
  - More specifically, the inventors have surprisingly found that while the presence of a-MSH alone or of a poly(glutamic acid) polypeptide (PGA) alone inhibits proliferation of pulp fibroblasts, the presence of a-MSH coupled to PGA (a-MSH-PGA) promotes proliferation of pulp fibroblasts (see Figure 4). In addition, it has unexpectedly been found that a-MSH- PGA promotes adhesion of pulp fibroblasts more efficiently than a-MSH alone or PGA alone (see Figures 5, 6 and 7).
  - The a-MSH peptides in accordance with the invention are biologically active. By a "biologically active" a-MSH peptide is meant a peptide that exhibits anti-inflammatory activity.
### Flavours suppliers

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>APPLICATION NR. &amp; PUBLICATION DATE</th>
<th>PRIORITY (Country &amp; Date)</th>
<th>TITLE</th>
<th>ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIVAUDAN [CH]</td>
<td>Granted US8664261B2 2014-03-04</td>
<td>US 2009 05 05</td>
<td>Organic compounds having cooling properties</td>
<td>Provided are compounds of formula (I) wherein m is 0, 1 or 2; R1 is a mono- or bicyclic heterocyclic ring system including one, two or three heteroatoms selected from nitrogen, sulphur and oxygen; R2 is selected from hydrogen, methyl and ethyl; I) R3 is hydrogen, methyl, or ethyl; and R4 and R5 are independently selected from ethyl and isopropyl; and R3, R4 and R5 together have at least 6 carbon atoms: or II) any two or all of R3, R4 and R5 form together with the carbon atom to which they are attached 3-para-menthyl, bornyl, or adamantyl; having cooling properties, their use as cooling agent and compositions including them.</td>
</tr>
<tr>
<td>TAKASAGO [JP]</td>
<td>US2014037559 2014-02-06</td>
<td>JP 2009 04 24</td>
<td>Process for producing (3S)-1-menthyl 3-</td>
<td>Disclosed is a cooling component or sensate component which does not have undesirable stimulus feeling, bitterness and the like and is excellent in the persistence of refresh-feeling and cool-feeling, a sensate composition which comprises the same, and various products that</td>
</tr>
</tbody>
</table>
hydroxybutyrate and sensate composition comprise said sensate composition. Also disclosed is a cooling agent comprising (3S)-1-menthyl 3-hydroxybutyrate represented by the following formula (I).


- Extracts from the document:
  ✓ Industrial Applicability
  [0123] The (3S)-1-menthyl 3-hydroxybutyrate to be used in the invention is a cooling component which, in comparison with its racemate, does not have undesirable stimulus, bitterness and the like and is excellent in the persistency of refresh-feeling and cool-feeling. In addition, according to the invention, there can be provided a sensate composition, which comprises the aforementioned compound that has no bitterness, is excellent in sense stimulus effect such as cooling effect and is also excellent in the persistency of these effects, and a flavor or fragrance composition, food or drink, fragrance or cosmetic, daily necessities and household goods, oral composition or pharmaceutical, which comprises said sensate composition.

FIRMENICH [CH]

- International search report: 1 (X,Y) & 2 Y-rated documents.
Extracts from the application:

- As pointed out above, gum Arabic has very good emulsifying properties but limited emulsifying capacity. For this reason it works extremely well with respect to flavor retention when used as a carrier in spray drying. However, the performance of such a carrier can be adversely affected when an additional emulsifier/surfactant is added as part of the formulation. We have however found that the addition of a non-ionic surfactant has no detrimental effect on the spray drying of up to 50% by weight of mint flavours in gum Arabic matrices and this is a very surprising result.

SYMRISE AG
[DE]

US2014023770
2014-01-23

EP 2012 07 17

Use of defined cyclohexenones as agents for the superadditive enhancement of an olfactory impression and fragrance and/or flavor material composition

A compound of Formula (I) or of a mixture comprising two, three, four, five, six or a plurality of different compounds of Formula (I) for the superadditive enhancement of an olfactory impression. The invention also relates to novel fragrance and/or flavor material compositions which, in addition to a compound of Formula (I) or a mixture thereof, further contains one, two, three or a plurality of further fragrance and/or flavor materials, the fragrance and/or flavor material or the further fragrance and/or flavor materials not being compound of Formula (I).


Extracts from the patent:

- [0162] The fragrance and/or flavor material composition according to the invention may be incorporated into aromatized products or products to be aromatized, in particular preparations used for foodstuff, oral hygiene or semi luxury food.
- [0167] The preparations used for oral hygiene are, in particular, oral and/or dental hygiene formulations, such as toothpastes, tooth gels, tooth powders, mouth washes, chewing gums and other oral formulations.
- Toothpastes & mouthwashes are reported in the Examples 79 to 83.

IFF
[US]

US2014044760
2014-02-13

Stable, flowable silica capsule

A flowable, stable silica capsule formulation composed of a silica capsule suspension and an adjuvant for use in a personal care product, a beauty care product, a fabric care product, a home care product and/or a cosmetic.
- An other US application [US2014044761], Hybrid fragrance encapsulate formulation and method for using the same, belonging to the same patents family was published the same date. International search report: Not yet available.

- Extracts from the document:

  ✓ [0011] Accordingly, the present invention is a silica gel capsule formulation composed of a silica capsule slurry or suspension and an adjuvant and a method of using the same to provide a stable, flowable capsule in a consumer product. In particular embodiments of the invention, the silica capsule suspension is composed of core-shell silica capsules that encapsulate an active material such as a fragrance oil, essential oil, plant extract or mixture thereof, as described herein.
## Ingredients / Raw materials suppliers

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>APPLICATION NR. &amp; PUBLICATION DATE</th>
<th>PRIORITY (Country &amp; Date)</th>
<th>TITLE</th>
<th>ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DU PONT [US]</td>
<td>Granted US8663616B2 2014-03-04</td>
<td>PCT/US 2010 12 20</td>
<td>Enzymatic peracid generation for use in oral care products</td>
<td>Disclosed herein are compositions and methods to treat an oral cavity surface with a peracid-based benefit agent. The peracid benefit agent can be used for oral surface bleaching, whitening, disinfecting, destaining, deodorizing, decreasing or removing biofilm, and combinations thereof. The peracid is enzymatically generated from a carboxylic acid ester substrate using a CE-7 carbohydrate esterase having perhydrolytic activity (perhydrolase) in the presence of a source of peroxygen. A fusion protein comprising the perhydrolase coupled to a peptidic component having affinity for an oral cavity surface, either directly or through an optional linker, may be used to target the perhydrolytic activity to the oral cavity surface.</td>
</tr>
<tr>
<td>BIOGAIA AB</td>
<td>US</td>
<td></td>
<td>Selection and use</td>
<td>New strains of Lactobacillus that have been selected for their capability of improved reduction</td>
</tr>
</tbody>
</table>


- Extracts from the patent:
  ✓ This invention relates to the field of personal care products comprising at least one peracid as an oral care benefit agent. The peracid is enzymatically produced in the presence of at least one suitable carboxylic acid ester substrate and a source of peroxygen. Specifically, an enzyme catalyst having perhydrolytic activity is used to produce a peracid benefit agent for use in an oral care product. The perhydrolytic enzyme may be in the form of a fusion protein (a “targeted perhydrolase”) engineered to contain at least one peptidic component having affinity for an oral cavity surface such that the enzymatically produced peracid is produced on or near the desired surface.
  ✓ This data (Example 15) demonstrates that enzymatically generated peracetic acid, using a variety of different substrates with EZ-1, is effective at whitening coffee-tea stained bovine teeth.

- Danisco/Dupont & Oral Health:
<table>
<thead>
<tr>
<th>[SE]</th>
<th><strong>Granted</strong> US8658157B2 2014-02-25</th>
<th>2003 01 29</th>
<th>Lactic acid bacteria for reducing dental caries and bacteria causing dental caries</th>
<th>the number of Streptococcus mutans in the mouth of mammals through inhibiting activity in combination with better binding to the oral mucins and dental plaque, thereby preventing, reducing or treating dental caries, and products derived from said strains, including agents for treatment or prophylaxis of caries for administration to humans.</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Biogaia AB:</td>
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<tr>
<td>✓ BioGaia Co is a Swedish Company which is developing ProcTectis &amp; ProDentis products containing Lactobacillus reuteri in chewable tablets and lozenges: <a href="http://biogaia.com/consumer">http://biogaia.com/consumer</a></td>
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<tr>
<td>ORGANO-BALANCE MEDICAL [DE]</td>
<td><strong>PCT/EP 2011 05 16</strong></td>
<td>Novel lactic acid bacteria and compositions containing them against bacterial colds</td>
<td>The invention describes a microorganism of the order of lactic acid bacteria or an analogue, fragment, derivative, mutant or combination thereof, wherein the microorganism, or analogue, fragment, derivative, mutant or combination thereof can coaggregate with Streptococcus pyogenes.</td>
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<td>- Extracts from the patent:</td>
<td></td>
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<tr>
<td>✓ [0003] Furthermore, the present invention relates to the use of the microorganism according to the invention, an analog or fragment thereof in compositions or pharmaceutical products or medical products (oral hygiene), for example, in the form of sprays, mouth washes or as throat lozenges or tablets, pastilles, coated pills, aerosols, toothpastes, juices, syrups or as an additive to foods and/or as food supplements.</td>
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<tr>
<td>- Organobalance Medical AG:</td>
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<td>✓ Organobalance Medical AG funds and promotes the research and development activities of ORGANOBALANCE GmbH into novel therapeutic concepts based on positive microorganisms, known as specific probiotic cultures. The objective is to develop patented active substances for innovative medicinal products and medical devices.</td>
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</table>
Provided are personal care compositions comprising a first surfactant comprising sodium lauryl sulfate and a second surfactant having a structure represented by Formula (I), wherein each a has a value of about 1 to about 110, b has a value of about 16 to about 70, and at least one R group is SO3, and the other R group is SO3 or hydrogen. Also provided are methods of producing personal care compositions and methods of ameliorating skin or mucosal membrane irritation due to sodium lauryl sulfate.


- Extracts from the document:
  ✓ [0023] It has been surprisingly discovered that sulfated poloxamers are able mitigate the negative effect of SLS on proteins, while maintaining or even exceeding the foaming properties of SLS, either as binary blends, or as ternary blends with other surfactants.
  ✓ Thus, the sulfated poloxamers may be used as partial replacements of SLS in personal care applications. They may be particularly useful in oral care applications, as they reduce irritation by SLS but maintain the foaming of SLS, and also do not have a negative taste to the user, unlike other surfactants used in the past.
## Colgate Palmolive

<table>
<thead>
<tr>
<th>APPLICATION NR. &amp; PUBLICATION DATE</th>
<th>PRIORITY (Country &amp; Date)</th>
<th>TITLE</th>
<th>ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCT/US 2009 04 02</strong></td>
<td><strong>Color changing consumer products</strong></td>
<td><strong>The invention relates to personal care products containing multilayer films with decorative layers and may impart a noticeable color change. The invention is applicable in products including type toothpaste, soaps, and other products until diluted with water (or saliva).</strong></td>
<td><strong>- European file still pending. European Search Report: 2 X-rated documents.</strong>&lt;br&gt;- Comments:&lt;br&gt;✔ Visual signal which appears during brushing in oral care application with the dissolution of “shielding” layers which make the “sandwich” decorative layer visible.</td>
</tr>
<tr>
<td><strong>PCT/US 2010 03 31</strong></td>
<td><strong>Oral care compositions</strong></td>
<td><strong>Disclosed are oral care compositions, for example dentifrice compositions, comprising an oral care composition comprising an orally acceptable vehicle, metal oxide particles having an average particle size of no greater than a dentin tubule and at least one amino acid capable of chelating the metal oxide. The composition may comprise a polymeric adherent material for adhering the metal oxide particles in the dentin tubule. The metal oxide particles have a median particle size of 5 microns or less, and may comprise zinc oxide.</strong></td>
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</table>

- Extracts from the document:
  - The present invention is predicated on the finding by the present inventors that charged amino acids and peptides have an affinity for the soft and/or hard tissue in the oral cavity and are also capable of chelating a metal oxide, such as zinc oxide, stannous oxide, or copper oxide, which has antiplaque/anticalculus efficacy when present in a therapeutically effective amount. Upon introduction of such a complex into the oral cavity, for example by brushing of the teeth, the amino acid/peptide can act to deliver the metal oxide to the desired location in the mouth.
  - The present inventors have found in particular that the delivery of zinc oxide from dentifrice to a hydroxyapatite surface can be increased with the addition of an amino acid such as L-arginine.

<table>
<thead>
<tr>
<th>Publication</th>
<th>Title</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>US 2009 12 04</td>
<td>Oral compositions containing extracts of garcinia mangostana L. and related methods</td>
<td>Described herein are compositions comprising a combination of extracts, and methods of preparing and using the same.</td>
</tr>
<tr>
<td>EP2689805 2014-01-29</td>
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<td></td>
<td>Extract from the application:</td>
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<tr>
<td></td>
<td>✓ The extract of Garcinia mangostana L., containing xanthones and other beneficial chemicals, can be added to dentifrice compositions so that the amount delivered to the oral cavity upon use is effective to provide an antibacterial, antioxidant, and/or anti-inflammatory effect. In various embodiments, the components of extract of Garcinia mangostana L., are combined with natural extracts other than extracts of Garcinia mangostana L to provide enhanced activity.</td>
<td></td>
</tr>
<tr>
<td>US 2009 12 04</td>
<td>Oral compositions containing extracts of myristica fragrans and related methods</td>
<td>Described herein are compositions comprising a combination of extracts, and methods of preparing and using the same.</td>
</tr>
<tr>
<td>EP2689806 2014-01-29</td>
<td></td>
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<td></td>
<td>Extract from the application:</td>
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<tr>
<td></td>
<td>✓ The extract of Myristica fragrans, believed to contain varying amounts, inter alia, of one or more of camphenes, limonenes, [alpha]- and [beta]-pinenes, eugenol, methyl eugenol, iso eugenol, butyl benzoate, myristin, elemicin, [alpha]-terpineol, [beta]-phellandrene, myristic acid, butyl dodecanoate, [alpha]-caryophyllene alcohol, geranylacetone, and mixtures thereof, and other beneficial chemicals, can be added</td>
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</table>
to dentifrice compositions so that the amount delivered to the oral cavity upon use is effective to provide an antibacterial, antioxidant, and/or anti-inflammatory effect, as well as being effective to treat dry mouth (xerostomia). In various embodiments, the components of extract of Myristica fragrans, are combined with natural extracts other than Myristica fragrans, to provide enhanced activity.

<table>
<thead>
<tr>
<th>Patent/Document</th>
<th>Description</th>
</tr>
</thead>
</table>
- Extract from the application:  
  ✓ The extract of Zizyphus joazeiro, containing saponins, betulinic acid, ursolic acid, and other beneficial chemicals, can be added to dentifrice compositions so that the amount delivered to the oral cavity upon use is effective to provide an antibacterial, antioxidant, and/or anti-inflammatory effect, as well as an ability to reduce or ameliorate dry mouth (xerostomia). In various embodiments, the components of extract of Zizyphus joazeiro, are combined with natural extracts other than extracts of Zizyphus joazeiro to provide enhanced activity. |
| US2014065080 2014-03-06 | Oral care compositions. Described herein are oral compositions comprising an extract obtained from Arialaceae, Zingiberaceae, Lamiaceae, Fabaceae, Solanaceae, Punicaceae. Asteraceae or mixtures thereof; Their uses for alleviating dry mouth is also described. | - International Search report: 11 X-rated documents. |
| PCT/US 2012 08 10 | Mouthwash comprising peroxy compound, a first acid and a second acid. The invention provides mouthwash formulations having improved taste, coupled with good whitening efficacy, which comprise a whitening agent such as hydrogen peroxide together with a combination of a first acid such as citric acid and a second acid such as phosphoric acid. In further embodiments, the mouthwashes may comprise a sucralose and saccharin combination, an acidic polymer, one or more anticalculus agents, e.g., alkali pyrophosphate salts, copolymers of maleic anhydride and methyl vinyl ether and other ingredients. | - International Search report: 2 (X,Y) & Y-rated documents.  
- Extract from the application:  
  ✓ Citric acid has stronger acidic note relative to phosphoric acid, and the combination of two acids provides a more acceptable acidic taste in |
the final formulation compared to either of the two acids separately. In a further embodiment, the invention provides a use of sucralose and saccharin combination to provide a sweet taste with minimized bitter note, compared to a formulation with saccharin alone, which proves to have a strong bitter aftertaste.

EQUIPMENT, DEVICE...

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>US8651272B2</td>
<td>2014-02-18</td>
<td><strong>Powered Toothbrush Package</strong></td>
<td>An oral care implement demonstration assembly includes a powered oral care implement, a package housing and a plurality of demonstration elements. <strong>The oral care implement demonstration assembly is configured to produce a visual demonstration effect when relative movement is provided between a first demonstration element and a second demonstration element.</strong> Among the visual effects that may be utilized is a Moiré effect. Additionally, an associated method for demonstrating features of an oral care implement though one or more visual effects is described herein.</td>
</tr>
<tr>
<td>US2014038127</td>
<td>2014-02-06</td>
<td><strong>Oral care implement with air flossing system</strong></td>
<td>An oral care implement is disclosed comprising: an oral care region having cleaning elements; a body coupled to the oral care region; a gas outlet operably coupled to a gas source, the gas outlet disposed in the</td>
</tr>
</tbody>
</table>

- No European application. An other US patent US8397910B2 belonging to the same patents family was granted on 2013-03-19
oral care region; an oral care material source storing an oral care material; an oral care material outlet operably coupled to the oral care material source, the oral care material outlet disposed in the oral care region; and wherein the oral care material outlet is spaced apart from the gas outlet. **In another aspect, an oral care implement is disclosed comprising an oral care region having an elastomeric tooth cleaning element and an air outlet positioned adjacent the air outlet so that an air stream existing the air outlet causes a dynamic vibratory flexing action of at least a portion of the elastomeric tooth cleaning element.**

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>US8539630B2</td>
<td>2013-09-24</td>
<td>Oral care implement having fluid delivery system</td>
<td>An oral care implement has a head portion with tooth cleaning elements on one surface thereof and a reservoir containing at least one active agent. A capillary channel extends through at least a portion of the oral care implement to deliver active agent(s) to one or more outlets. In one aspect, a vibration-producing device is provided to vibrate at least a portion of the implement to enhance the function of tooth cleaning elements and the delivery of the active agent through capillary action. A variety of active agents can be administered for therapeutic, hygienic, and/or other benefits, such as fresh breath, tooth whitening, or producing sensations of heat, cool, or tingling.</td>
</tr>
<tr>
<td>US8517728(B2)</td>
<td>2013-08-27</td>
<td></td>
<td>- A US patent US8517728 (B2) belonging to the same patents family was granted on 2013-08-27. European application still pending.</td>
</tr>
<tr>
<td>Patent Number</td>
<td>Description</td>
<td>Details</td>
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<tr>
<td>EP2690984</td>
<td>Toothbrush having oral care fluid delivery</td>
<td>A fluid dispensing toothbrush (100). In one aspect, the toothbrush comprises a body (105) having a reservoir (135) containing an oral care fluid (136) therein, the oral care fluid being delivered to an applicator (132) via capillary action. The toothbrush comprises an actuator (130) for moving either the applicator and/or the reservoir between different positions.</td>
<td></td>
</tr>
<tr>
<td>US2014041140</td>
<td>Oral care implement having multi-component handle</td>
<td>An oral care implement having a multi-component handle, and method of manufacturing the same. The invention can be a method of forming a handle for an oral care implement comprising: a) forming a core structure of a first hard plastic; b) forming an elongated handle body of a second hard plastic that at least partially surrounds the core structure so that opposing lateral surfaces of the core structure remain exposed; and c) forming a grip cover of a resilient material over at least a portion of the elongated handle body.</td>
<td></td>
</tr>
</tbody>
</table>

- A US patent US8549691 (B2) belonging to the same patents family was granted on 2013-10-08. No PCT file.
<table>
<thead>
<tr>
<th>Patent No.</th>
<th>Application No.</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>US2014033453</td>
<td>PCT/US 2008 05 07</td>
<td>Interactive toothbrush and removable audio output module</td>
<td>An apparatus may include a connection component configured to connect the apparatus to any one of a plurality of different apparatuses. A toothbrush may include at least one measurement component configured to measure a parameter of use of an oral care region, and a processor configured to change output of a first audio signal of a plurality of audio signals to a second audio signal of the plurality of audio signals based on the measured parameter. Another toothbrush may include a processor configured to receive first data from an external source component and output second data corresponding to the received first data to at least one output device in response, and the at least output device configured to output the second data from the processor.</td>
</tr>
<tr>
<td>US8544132</td>
<td>- A US patent US8544132 (B2) belonging to the same patents family was granted on 2013-10-01. European application still pending.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Extracts from the application:</td>
<td>✓ [0005] Aspects of the invention enable a person to know when he/she has brushed his/her teeth for a period of time while enjoying an audio interlude.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US2014021070</td>
<td>PCT/CN 2011 04 27</td>
<td>Package of oral care implements</td>
<td>A package (1000) of oral care implements comprises an enclosure (100) having an internal cavity (110), a retainer (200), and a plurality of oral care implements (300) detachably mounted to the retainer (200) in a fixed orientation relative to one another. The retainer (200) and the oral care implements (300) are disposed within the internal cavity (110) of the enclosure (100).</td>
</tr>
</tbody>
</table>

Intelligence Newsletter Nr.33 - February/March 2013 O.C.M.T. Page 33 / 74
### Oral care kit including visible sticker panel

An oral care kit (1000) including an oral care product (200) and a sticker panel (300). In one aspect, the invention may be an oral care kit (1000) comprising: a package (100); a toothbrush (200) disposed within the package (100); and a sticker panel (300) disposed within the package (100), the sticker panel (300) comprising a plurality of detachable stickers (301), the sticker panel (300) forming a sleeve through which a portion of the toothbrush (200) extends, the plurality of stickers (301) visible from outside of the package (100) through a substantially transparent portion of the package (100).

- The European application EP2694395 was published on 2014-02-12

### Oral care implement having one or more moving sections

An oral care implement is provided having a head frame and a cleaning elements assembly attached thereto with tooth cleaning elements extending from one or more carriers. **One or more central carriers can be suspended via a flexible bridge between a pair of support carriers attached to the head frame. The bridge may be formed from an elastomer and permit the one or more central carriers to move from an initial position toward the head frame during use.** The bridge may include rigid supports and flexible elastomeric supports. The carriers and the bridge can be formed as a unitary assembly attached to the head frame.
head frame, such as via mechanical connections. The mechanical connections could include snap-fit connections.

- A US patent US8281448B2 belonging to the same patents family was granted on 2012 10 09.

- Extracts from the application:
  ✓ Conventional toothbrushes therefore have great difficulty in contacting areas of the teeth located at a greater distance from the head, including interproximal spaces between teeth.
  ✓ [0008] The present invention pertains to an oral care implement that provides several advantages and that may be used for multiple functions. According to aspects of the invention, an oral care implement can be provided that has a plurality of cleaning elements extending from the head including cleaning elements attached to a carrier that is flexibly attached to the head. The cleaning elements can include forward angled cleaning elements and/or rearward angled cleaning elements.
### OTHER ORAL CARE PRODUCERS

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>APPLICATION NR. &amp; PUBLICATION DATE</th>
<th>PRIORITY (Country &amp; Date)</th>
<th>TITLE</th>
<th>ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNILEVER</td>
<td>EP2694020 2014 02 12</td>
<td>EP 2011 04 04</td>
<td>Oral care compositions</td>
<td>The invention provides an oral care composition comprising a coordination complex in which a metal cation is complexed to one or more ligands which are derived from one or more curcumin compounds. Such metal complexes have been found to be particularly effective in suppressing the activity of microbes found in the oral cavity.</td>
</tr>
</tbody>
</table>


- Extracts from the application:
  - A preferred class of coordination complex for use in the present invention may be described by the general formula (I):
    \[ [M(L)x(H2O)y] (I) \]
    - in which M is a metal cation;
    - \( x \) is 1, 2 or 3;
    - \( y \) is 0 or 1, and
    - \( L \) is a curcumin-compound-derived ligand of general formula (II):

![Diagram](image)
(II) in which R1 and R2 are each independently selected from -H and -OCH3.

In particularly preferred complexes of general formula (I), M is a divalent metal cation, most preferably Zn<2+>, x is 1 or 2 and y is 0 or 1. Mixtures of any of the above described materials may also be used.

- More on curcumin compounds:

### Oral care compositions

Oral care compositions suitable for whitening and remineralizing teeth are described. The oral care compositions comprise a phosphate source and regeneration-source calcium salt having a particle size of five (5) microns or less so that in-situ hydroxyapatite may be generated upon use.

- Extracts from the application:
  - Remineralization, as used herein, means in situ generation of hydroxyapatite on teeth (including layers on teeth from 10 nm to 6 microns, and preferably from 75 nm to 5 microns, and most preferably, from 150 nm to 4 microns thick including all ranges subsumed therein) to reduce the likelihood of tooth sensitivity, tooth decay, regenerate enamel and/or improve the appearance of teeth by whitening through the generation of such new hydroxyapatite.
  - Illustrative yet non-limiting examples of the types of calcium salt that may be used in this invention include those which are water insoluble like calcium carbonate, calcium silicate,... mixtures thereof or the like...Most preferably, the calcium salt is from 90 to 100 percent by weight calcium carbonate.
  - The phosphate source suitable for use in this invention is one which may be used in an oral care composition and able to provide phosphate to form in situ hydroxyapatite with the calcium supplied from the regeneration-source calcium salt used. Illustrative examples of the types of phosphate source suitable for use in this invention include sodium dihydrogen phosphate, disodium hydrogen phosphate, ...

### Methods and compositions for treating tooth hypersensitivity

The invention provides a composition containing particulate calcium carbonate composed of primary particles which are prismatic and which have an average size of 2 microns or less; for the treatment of hypersensitivity arising in natural human teeth by application of the composition thereto. The prismatic calcium carbonate particles are effective as dentinal tubule occluding agents. Furthermore they can provide a smooth and pleasant mouthfeel when formulated into products such as dentifrices. They may also play a dual role of desensitizer and gentle tooth
| UNILEVER | WO2014023465 | Methods and compositions for treating tooth hypersensitivity | The invention provides a composition containing particulate calcium carbonate composed of primary particles which are scalenohedral and which have an average size of 2 microns or less; for the treatment of hypersensitivity arising in natural human teeth by application of the composition thereto. The scalenohedral calcium carbonate particles are effective as dentinal tubule occluding agents. Furthermore they can provide a smooth and pleasant mouth-feel when formulated into products such as dentifrices. They may also play a dual role of desensitizer and gentle tooth whitener, when incorporated into a dentifrice product form. |
| | | | - Extracts from the application: |
| | | | ✓ For the purposes of the present invention, preferred scalenohedral calcium carbonate crystals are elongated with a ratio between the length and the width of the crystal (the so-called aspect ratio) of greater than 1:1, and typically from about 5:1 up to about 10:1 (length: width). |
| | | | ✓ For the purposes of the present invention, preferred scalenohedral calcium carbonate crystals have an average size which generally ranges from about 0.05 to about 1.5 microns, with a preferred size ranging from about 0.1 to about 1 micron, more preferably from about 0.15 to about 0.5 micron, most preferably from about 0.2 to 0.35 micron. |


- Extracts from the application:
  ✓ For the purposes of the present invention, preferred prismatic calcium carbonate crystals have an average size which generally ranges from about 0.1 to 2 microns, with a preferred size ranging from about 0.2 to about 1.5, more preferably from about 0.3 to about 1, most preferably from about 0.5 to 0.9 microns.
  ✓ A commercially available source of particulate calcium carbonate suitable for use in the invention is ViCALity(ALBADIL) Precipitated Calcium Carbonate (PCC), ex Specialty Minerals Inc., Bethlehem, Pa. 18017.

A commercially available source of particulate calcium carbonate suitable for use in the invention is SOCAL(R) S2E Precipitated Calcium Carbonate (PCC), ex Solvay S.A.

- More on Socal calcium carbonates from Solvay Chemicals:

### PROCTER & GAMBLE

<table>
<thead>
<tr>
<th>Application Number</th>
<th>Date</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>US2014037555</td>
<td>2014-02-06</td>
<td>Process for oral care material taste and/or odor improvement</td>
<td>Processes for improving the taste of oral care raw materials using solvent extraction, said process comprising the steps of: providing a solid oral care raw material composition in need of treatment wherein said oral care raw material composition comprises an orally acceptable raw material and one or more undesirable non-polar materials; contacting said oral care raw material composition with an extraction solvent to form an extraction mixture comprising a solid phase and a solvent phase; and separating the solid phase from the extraction mixture; wherein the extraction solvent is selected from solvents having individual Hansen solubility parameters of a dispersion force component (deltaD) ranging from about 15 to about 17 (MPa)(^{0.5}), a polar component (deltaP) ranging from 0 to about 9 (MPa)(^{0.5}) and a hydrogen bonding component (deltaH) ranging from 0 to about 11 (MPa)(^{0.5}).</td>
</tr>
</tbody>
</table>

- The PCT application WO2014021933 has been published the same day. International search report: Not yet published.

- Extracts from the application:
  - [0008] It has now surprisingly been found that solvent extraction processes utilizing solvents such as ethyl acetate may be useful to significantly reduce the occurrence of non-polar materials found in oral care raw material compositions and thereby improve the oral care raw material's odor and/or taste profile.
  - [0063] In one embodiment, the undesirable non-polar materials may be off-tasting components selected from impurities, unreacted starting materials, by-products and/or contaminants. Such undesirable non-polar materials may be described by consumers as soapy, bitter, metallic, earthy or dirty, and astringent. Soapy is typically characterized by the presence of dodecanal or dodecanol. Bitter taste may occur in the presence of alkyl amines or alcohols.
  - Examples of extraction of undesirable non-polar materials applied to different oral care raw materials are reported: sodium acid pyrophosphate, NaF, Zeodent silicas, zinc Lactate, carbopol & zn citrate.

### GLAXO-SMITHKLINE [GB]

<table>
<thead>
<tr>
<th>Application Number</th>
<th>Date</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>US2014023596</td>
<td>2014-01-23</td>
<td>Novel composition</td>
<td>An oral care composition which is a liquid at or below room temperature and which forms a two-phase cloudy system at body temperature and wherein the composition comprises a water-soluble non-ionic polymer, such as HPC, having a cloud point in the composition at a temperature</td>
</tr>
</tbody>
</table>
no higher than about 38 DEG C, for combating (i.e. helping to prevent, inhibit and/or treat) dentinal hypersensitivity.

- The corresponding European application EP2691067 was published during the period, on 2014-02-05. International Search Report: 1 X & 1 Y-rated documents.

- Extracts from the application:
  ✓ [0013] It has now been found that dentine hypersensitivity may be alleviated by an aqueous solution of a non-ionic polymer wherein the polymer in the solution has a cloud point at or below a temperature encountered in the oral cavity. Whilst not being bound by any theory, it is believed that when the solution is introduced to the mouth, the non-ionic polymer precipitates and then occludes the dentinal tubules.

<table>
<thead>
<tr>
<th>GLAXO-SMITHKLINE [GB]</th>
<th>US2014037556 2014-02-06</th>
<th>GB 2008 12 09</th>
<th>Novel use</th>
<th>A oral care composition comprising a triple polymer system and a source of fluoride ions for combating (i.e. helping to prevent, inhibit and/or treat) dental erosion and/or tooth wear is described. Such compositions are also of use in combating dental caries.</th>
</tr>
</thead>
</table>


- Extracts from the application:
  ✓ [0011] The present invention is based on the discovery that the presence of a triple polymer system consisting of xanthan gum, carboxymethyl cellulose and copovidone in an oral care composition comprising a source of fluoride ions enhances the efficacy of the fluoride ions in combating dental erosion.
  ✓ [0031] The copovidone (which is a copolymer of vinylpyrrolidone and vinyl acetate, specifically a copolymer of 1-vinyl-2-pyrrolidone and vinyl acetate in a ratio of 3:2 by mass)...

| HENKEL [DE] | EP2700395 2014-02-26 | DE 2012 06 29 | Lactoperoxidase activating oral and tooth care and cleaning agents | German-English translation by EPO & Google: Mouth and tooth care and cleaning agents that, in each case based on their weight - 0.001 to 5 wt % niacinamide and / or nicotinic acid, 1 to 70 wt % sorbitol and / or glycerin and / or 1,2-propylene glycol and 0.01 to 5 weight % Fluorine compound (s) included, bring about the benefits of lactoperoxidase, without the need for enzymes in the mouth and tooth care and cleaning agents. |
Nicotinamide, also known as niacinamide or nicotinic amide, is the amide of nicotinic acid (vitamin B3 / niacin).


- Extracts from the document (EPO & Google translation):
  ✓ [0004] In addition to its function to moisten the oral cavity, human saliva forms by certain ingredients such as lysozyme, immunoglobulin A, ... an antibacterial defense system. One of the key components of this defense system is the Lactoperoxidase (LPO) ... which catalyzes the oxidation of thiocyanate (SCN⁻), which also occurs in saliva, by hydrogen peroxide to hypothiocyanate (OSCN⁻).
  ✓ [0005] The mild oxidant hypothiocyanate has significant antibacterial properties against Streptococcus mutans,...
  ✓ [0011] The inventive compositions comprise a first essential ingredient 0.001 to 5 wt-% niacinamide and / or nicotin...
  ✓ [0070] The results indicate that the activity of the lactoperoxidase can be significantly increased by the addition of 1% niacinamide compared to the untreated control.

SYLPHAR NV [BE]

EP2700396
2014-02-26

US 2012 06 20

Strip for the delivery of oral care compositions

The present invention relates to a strip (1), shaped for the application to the labile surface of the front teeth and/or gums of a subject, which strip is provided with at least one oral care composition for delivery to a pre-determined area of the teeth and/or gums of the subject. The present invention further relates to its use for delivery of compositions. It further relates to the use of the strip in combination with a dental device.


- Extracts from the document:
  ✓ [0009] One embodiment of the present invention is a strip comprising a chemically inert, flexible, hydrophilic material, shaped
for the application to the labile surface of the front teeth of a subject, which strip is provided with at least one oral care compositions for delivery to a pre-determined area of the teeth of the subject, said at least one oral care composition comprising a pharmaceutically acceptable multi-carboxylate salt in an amount in the range 1 to 10 wt. % of the at least one oral care composition, in particular an oxalate salt.

✓ [0010] The strip according to the present invention is particularly efficient in reducing dentinal hypersensitivity. Specifically, the strip according to the present invention allows reducing the flow into the dentin tubules of the teeth by occluding them. Due to the presence of oxalate, occlusions are formed on the dentinal tubuli.

✓ [0194] It was found that 3% potassium oxalate is an effective treatment for dentine hypersensitivity. The result of this study confirmed the results of the other studies with oxalate solution for the treatment of dentine hypersensitivity.

**JOHNSON & JOHNSON CONSUMER [US]**

**US** 2012 09 10

Mouth rinses and tooth sensitivity treatment compositions

The present invention relates to tooth sensitivity treatment compositions, including mouth rinses, comprising C2-C5 diacid, triacid or tetraacid salts and a tastemasking agent(s). Methods for using the compositions are also disclosed.

- Extracts from the document:
  ✓ In one embodiment, the present invention provides a composition for treating sensitive teeth comprising from about 0.1% to about 3% of at least one C2-C5 diacid, triacid or tetraacid salt; an effective taste masking amount of at least one vanilla flavor extract; from about 0.001% to about 0.25% of menthol and/or a derivative thereof and at least one orally acceptable solvent.
  ✓ [0015] The compositions of the present invention comprise at least one C2-C5 diacid, triacid, or tetraacid salt. Suitable C2-C5 diacid, triacid, or tetraacid salts include sodium or potassium salts of include, but are not limited to, oxalic, citric, and propane-1,2,3-tricarboxylic acid salts.

**KAO [JP]**

**Granted US8673271B2** 2014-03-18

Compositions for mouth containing an anionic surfactant having reduced astringency

The present invention relates to an oral care composition, which contains the following components (A), (B) and (C): (A) an inorganic acid and/or an organic acid, (B) an anionic surfactant, (C) at least one compound selected from polyglycerin fatty acid esters, sorbitan fatty acid esters, polyoxyethylene higher alcohol ethers having from 6 to 14 carbon atoms, polyoxyethylene fatty acid esters and polyoxyethylene polyoxypropylene copolymers. The oral care composition according to the present invention is significantly excellent in reducing astringency and bitterness inherent in anionic surfactants.
- The corresponding European patent EP1459733B1 was granted on 2013-05-22.

- Extracts from the document:
  ✓ The amount of the anionic surfactant which binds to the mucous membrane in the mouth varies depending on the pH of the oral care composition containing it. Particularly when an oral care composition has an acidic pH, the amount which binds to the mucous membrane in the mouth becomes considerably higher than that of a composition having an alkaline pH, leading to a strongly perceivable astringency or bitterness in the mouth even after rinsing with water.
  ✓ The present inventors succeeded in obtaining an oral care composition which leaves neither astringency nor bitterness in the mouth and has excellent feeling upon use, which contains in combination with a composition containing an inorganic acid and/or an organic acid and an anionic surfactant, at least one compound selected from polyglycerin fatty acid esters, sorbitan fatty acid esters, polyoxyethylene higher alcohol ethers, polyoxyethylene fatty acid esters and polyoxyethylene polyoxypropylene copolymers.

<table>
<thead>
<tr>
<th>KAO [JP]</th>
<th>JP20110408</th>
<th>Composition for oral cavity</th>
<th>Provided is an oral composition which is excellent in a gloss imparting effect on teeth. An oral composition, which comprises the following components (A) and (B): (A) 0.01 to 3% by mass of phytic acid or a salt thereof, and (B) 0.01 to 3% by mass of pyrophosphoric acid or a salt thereof, does not comprise a polyvalent cation or comprises a polyvalent cation in an amount of less than 0.1-fold mol relative to phytic acid, has pH 5.5 to 6.5 when diluted with water to 30% by mass, has the mass ratio (B/A) between the component (A) and the component (B) is 0.2 to 3.0, and does not comprise a fluoride or has the fluoride content of less than 500 ppm in terms of fluorine atoms.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EP2695601</td>
<td>2014 02 12</td>
<td></td>
</tr>
</tbody>
</table>

- This is the corresponding European application of the US’ one US2014017180 published in the previous Newsletter. International Search Report: No X or Y-rated document.

- Recall on Phytic acid:
Phytic acid
Also known as: Phytate, Fytic acid, Alkalover, Inositol hexaphosphate, myo-Inositol hexaphosphate, Phytine, inositol hexakisphosphate

- Extracts from the document:
  ✓ The present inventors further found that a composition, in which phytic acid and pyrophosphoric acid were used in combination, a polyvalent cation was not mixed, pH was in a range of 5.5 to 6.5 and the ratio between phytic acid and pyrophosphoric acid was in a certain range, had an effect of more rapidly removing minute solid matter formed on tooth surfaces and containing the organic substances and calcium phosphates in mix, and a gloss imparting effect was obtained by short term use.
  ✓ [0025] It is preferred that the oral composition of the present invention further comprises (C) erythritol.

KAO [JP]

PCT/JP 2011 04 06

Dentifrice composition

Provided is a dentifrice composition which has excellent dental caries preventive effect by improving the uptake of fluoride ions into tooth enamel or dentin and improving acid resistance. A dentifrice composition comprising the following components (A), (B), (C) and (D): (A) from 0.002 to 5% by mass of a fluoride ion supplying compound in terms of fluorine, (B) from 25 to 65% by mass of a sugar alcohol, which is dissolved in an amount of 5 to 30 g in 100 g of an aqueous solution at 20 DEG C, (C) from 10 to 25% by mass of water, and (D) from 0.1 to 1.2% by mass of a binder, wherein the mass ratio of the component (B) to the component (C), the mass ratio (B/C), is more than 1 and 6 or less.


- Extracts from the document:
  ✓ [0010] Further investigations found that by using a fluoride ion supplying compound and a sugar alcohol having low solubility in water in combination and by adjusting the water amount within a certain range, the amount of fluoride ion uptake into tooth
enamel and dentin was remarkably improved and the acid resistance was improved, thereby being able to obtain a dentifrice composition having excellent dental caries preventive effect.

- Examples of the sugar alcohol (B) which is dissolved in an amount of from 5 to 30 g in 100 g of an aqueous solution at 20[deg.]C, used in the present invention include mannitol, [alpha]-D-glucopyranosyl-1,6-sorbitol, [alpha]-D-glucopyranosyl-1,6-mannitol, reduced palatinose which is a mixture of [alpha]-D-glucopyranosyl-1,6-sorbitol and [alpha]-D-glucopyranosyl-1,6-mannitol, and the like.

### SQUIGLE INC [US]

**US2014050675** | **US** | **Prevention and treatment of oral diseases** | **Granted**
---|---|---|---
**US8658139B1** | **2010 02 27** | This invention comprises a set of dental products and methods to prevent and treat dentinal hypersensitivity, prevent tooth decay, and heal incipient caries by means of Mouth Friendly TM dental products containing calcium carbonate, having a preferred particle size of 1 to 100 nanometers (nm), and a preferred weight range of 5 to 30%. Said products must contain 8 to 95 weight percent of xylitol, plus the surfactant system described in U.S. Pat. No. 5,496,541 (Mar. 5, 1996) and U.S. Pat. No. 5,900,230 (May 4, 1999). It is further required that all irritants and other mouth unfriendly ingredients be absent from the dental products of this invention. Additional features of this invention include prevention and treatment of aphthous ulcers, oral mucositis, periodontal disease, perioral dermatitis, halitosis, oral candida, chapped lips, and oral plaque and tartar. This invention also ameliorates the condition of those who suffer from xerostomia and cold sores.

- No European file.

- Extracts from the document:
  - Each embodiment contains 0.01 to 10% by weight of poloxamer, or a mixture of poloxamers, plus an anionic polysaccharide (AP), or a mixture of APs, plus a nonionic cellulose ether (NCE), or a mixture of NCEs...

- Comments:
  - In the reported examples, the nanosized CaCO3 tested is Multifex MM from Specialty Minerals, a Ultrafine/Nano Uncoated Precipitated Calcium Carbonate:
compositions for soft oral tissue and methods of formulation and use thereof between 0.0001% and 5.0% w/w antioxidant, wherein the antioxidant includes cinnamic acid derivative, tetrahydrocurcuminoids, or phloretin and an orally pharmaceutically acceptable carrier. The composition may have a pH of at least 5.0. According to still further embodiments, the composition may also include between 0.0001% and 5.0% w/w of one or two more additional antioxidants that include cinnamic acid derivative, tetrahydrocurcuminoids, phloretin, or a stilbene derivative. In more particular embodiments, the cinnamic acid derivative may include trans-ferulic acid, the tetrahydrocurcuminoids may include tetrahydrocurcuminoids CG(TM), or the stilbene derivative may include resveratrol. Other embodiments may relate to methods of treating or preventing an oral disease by applying topically an antioxidant composition as described above.


- Extracts from the document:
  ✓ In specific embodiments, the cinnamic acid derivative may be trans-ferulic acid, the stilbene derivative may be resveratrol, and the tetrahydrocurcuminoids may comprise between 75% to 90% w/w tetrahydrocurcumin, 15% to 20% w/w tetrahydrodemethoxycurcumin, and between 1% to 4% w/w tetrahydrobisdemethoxycurcumin.

- Formulas:

  ✓ Trans-ferulic acid

  ✓ Resveratrol

  ✓ Tetrahydrocurcumin
- PerioSciences LLC:
  ✓ PerioSciences researches, formulates, and markets topically applied, antioxidant-based oral care and oral hygiene products. Founded in 2008 and headquartered in Dallas, Texas, PerioSciences has established a new category of products – antioxidant-based oral care:
  [https://www.periosciences.com/control/aboutUs](https://www.periosciences.com/control/aboutUs)

| FRESH LLC DR [US] | US2014065078 2014-03-06 | Oral care composition for promoting and maintaining oral health and method of forming and using same | An oral care composition, a method of forming the oral care composition, and a method of using the oral care composition are disclosed. The oral care composition includes a plurality of enzymes to prevent formation of and/or facilitate the breakup of biofilm in an oral cavity and a metal ion management system to inhibit growth of gram negative bacteria. |


- Extracts from the document:
  ✓ [0007] In accordance with various exemplary embodiments of the present invention, a composition includes a plurality of enzymes to promote healthy flora in an oral cavity and a metal ion management formulation....The plurality of enzymes may include two or more enzymes selected from the group consisting of: lysozyme, serrapeptase (e.g., Peptizyme(R)-SP) or serratiopeptidase, papain, and optionally amylases, glycosidase, dextrinase, and/or amylogucosidase.
  ✓ [0008] In accordance with further exemplary aspects of these embodiments, the metal ion management formulation includes one or more compounds that bind with iron and other metal ions to inhibit growth of gram negative bacteria. Exemplary compounds suitable for inhibiting growth of gram negative bacteria include sodium EDTA, phytic acid, lactoferrin, and various combinations thereof.
  ✓ [0009] In accordance with further embodiments, a composition is configured for use by people with diabetes or prediabetes, such that none of the ingredients are contraindicated for diabetics or prediabetics. For example, the active ingredients, such as enzymes, may be selected such that the enzymes do not break down carbohydrates into sugars.
  ✓ [0021] Serrapeptase and serratiopeptidase are anti-inflammatory enzymes that reduce dental infections and can help reduce...
an amount of plaque on a surface within an oral cavity.

**Extracts from the document:**

- The Applicant has observed that the titanium dioxide commonly used has the limitation of having to be activated by UV light (wavelengths lower than 400 nm) and therefore it is not suitable for use in ambient light conditions (visible light). The Applicant has therefore set itself the problem of providing oral care and oral hygiene products having photocatalytic activity that allow to prevent and eliminate dental stains and plaque, even by visible light.

- Within the framework of the present description and in the subsequent claims, the term "aspect ratio (AR)" is used to indicate the length/width ratio of a particle.

- In a preferred embodiment of the invention, the calcium phosphate compound further comprises zinc ions.

- According to a preferred embodiment, the oral care and oral hygiene products according to the invention can be whitening professional products having whitening action with professional intervention by the dentist.

**The present invention refers to oral care and oral hygiene products having photocatalytic activity comprising particles of a calcium phosphate compound, superficially functionalised with TiO₂ nanoparticles in crystalline form, said TiO₂ nanoparticles having: a) a substantially lamellar morphology; b) an aspect ratio (AR) comprised between 5 and 30; c) a surface structure having face (001) as outermost face of the crystalline lattice; and d) wherein the TiO₂ is in the form of anatase, optionally mixed with rutile and/or brookite.**
Call for information on the safety of Silica (nano)
The Scientific Committee on Consumer Safety (SCCS) has received a request for a scientific opinion on the safety of Silica (nano) including:
- Silica (nano) CAS n.l 12945-52-5
- Hydrated Silica (nano) CAS n. 112926-00-8
- Silica Sylilate (nano) CAS n. 68909-20-6
- Silica Dimethyl Silylate (nano) CAS n. 68611-44-9
The call will run until 31 May 2014.


SCCS calls for nano silica safety information
By Michelle Yeomans+, 14-Feb-2014
The European Commission has called on the Scientific Committee on Consumer Safety (SCCS) for a full risk assessment on the safe use of the nano form of silica in cosmetic products.


Public consultation on fragrance allergens
The European Commission is launching today a public consultation on changes to the Cosmetics Regulation concerning fragrance allergens. The Consultation will run until 14 May 2014.
The Commission’s proposal, on which consultation is being sought, includes subjecting additional allergens to the obligation of individual labelling on the packaging. This will be achieved through adding more substances to Annex III of the Cosmetics Regulation.
The proposal also includes a prohibition of three allergens found to be unsafe: HICC, atranol and chloroatranol. These three substances will be added to Annex II, which lists substances prohibited in cosmetic products.

Final Opinion on Environmental risks and indirect health effects of mercury from dental amalgam (update 2014)

The European Commission and its non-food Scientific Committee on Health and Environmental Risks (SCHER) published the final opinion on Environmental risks and indirect health effects of mercury from dental amalgam, of which the aim was to update the 2008 SCHER Opinion on the same subject, taking into account evidence that has become available since 2008.

With regard to Hg-free alternatives for dental use, SCHER concluded that information available does not allow a sound environmental risk assessment to be performed.


Full opinion adopted by the SCHER (Scientific Committee on Health and Environmental Risks) on 10 March 2014:
http://ec.europa.eu/health/scientific_committees/environmental_risks/docs/scher_o_165.pdf

Germany BfR publishes risk assessment of cosmetics

By Michelle Yeomans+, 31-Jan-2014
The German Federal Institute for Risk Assessment (BfR) has dedicated a Q&A section on the risk assessment of hazardous substances in cosmetics.

More:
http://www.cosmeticsdesign-europe.com/Regulation-Safety/

REACH to make changes to its nano annex

By Michelle Yeomans+, 04-Feb-2014
The European Commission is finalising its impact assessment of six options for amending the annexes of REACH to better account for nanomaterials.

More:
http://www.cosmeticsdesign-europe.com/Regulation-Safety/

Safer science on the way as SEURAT-1 continues development

25-Feb-2014
Having passed the halfway stage of its duration, the SEURAT-1 initiative is on course to develop safer science for the research, development, and assessment of ingredients in the European cosmetics industry.

More:
http://www.cosmeticsdesign-europe.com/Regulation-Safety/

More on SEURAT-1:
The Research Initiative is a first step to addressing the long term strategic target of "Safety Evaluation Ultimately Replacing Animal Testing (SEURAT)". It is called "SEURAT-1", indicating that more steps have to be taken before the final goal will be reached. SEURAT-1 will develop knowledge and technology building blocks required for the development of solutions for the replacement of current repeated dose systemic toxicity testing in vivo used for the assessment of human safety. 
http://www.seurat-1.eu/

USA

Release 24th February 2014 - Cosmetics - U.S. Food & Drug Administration (FDA)
INTERNATIONAL COOPERATION ON COSMETICS REGULATION

Report of the ICCR Working Group: SAFETY APPROACHES TO NANOMATERIALS IN COSMETICS

Cf. Executive Summary pages 3 & 4.
Extract of the section related to oral and buccal exposure:
3.2 Routes of exposure relevant to cosmetic use of nanomaterials
3.2.4 Oral and buccal exposure
Oral exposure can also be a relevant route for some applications such as toothpastes or lipsticks and glosses. For toothpastes, there is an inherent assumption that a small portion of the toothpaste that is applied will be swallowed during brushing. Similarly, buccal absorption is also possible and is often considered along with oral. Yet another potential incidental oral exposure scenario is hand to mouth from residual cosmetic product remaining on the hands after application. This exposure scenario would likewise be expected to be limited. While oral and buccal exposures are normally limited with typical cosmetic uses, they may deserve more attention when considering nanomaterials because of the potential for increased rates of absorption relative to their larger sized counterparts.

Cf. the Annex 2: Regulatory considerations relating to nanomaterials in cosmetics

In USA:
The US legislative instrument of most relevance is the Federal Food, Drug and Cosmetic Act (the FD&C Act), which is administered by the Food and Drug Administration (FDA). The FD&C Act does not require cosmetic products and ingredients to be approved by FDA before they go on the market. As such, a pre-market evaluation is generally not required by the FDA, and there are no specific testing requirements for cosmetic ingredients/products. The industry is responsible for due diligence and safety evaluation for their ingredients and products. Cosmetics manufactured using nanotechnology are subject to the same legal requirements as any other cosmetic. The FDA has not to date established a regulatory definition of nanotechnology or related terms. In June 2011, FDA has issued a draft guidance “Considering Whether an FDA-Regulated Product Involves the Application of Nanotechnology” in which they have proposed certain points that industry should consider when at-
tempting to identify applications of nanotechnology in FDA-regulated products (see section 1.4). A draft guidance for industry on safety assessment of nanomaterials has recently been released for public consultation (See Section 4.0 and footnote 21).

In Europe:
At present, the EU’s Cosmetics Regulation (Regulation (EC) No 1223/2009) is the only framework which specifically covers the use of nanomaterials in cosmetics. The Regulation requires cosmetic products containing nanomaterials to be notified to the Commission six months prior to being placed on the market, and nanoscale ingredients to be labelled (name of nano ingredient, followed by ‘nano’ in brackets). If there are concerns over safety of a nanomaterial, the EC will refer it to the Scientific Committee on Consumer Safety (SCCS) for opinion. The SCCS assesses dossier based evaluations of safety of non-food consumer products - including certain cosmetic ingredients - under the Cosmetic Regulation. The Committee has adopted an Opinion on a nano-scale organic UV filter ETH50 (1,3,5-Triazine, 2,4,6-tris[1,1’-biphenyl]-4-yl-) and published another Opinion on nano zinc oxide which is currently undergoing public consultation.

For full report:  
http://www.fda.gov/downloads/Cosmetics/InternationalActivities/ConferencesMeetingsWorkshops/

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Release 24th February 2014 - Cosmetics - U.S. Food & Drug Administration (FDA)  
Report for International Cooperation On Cosmetics Regulation (ICCR)  
Inventory of Validated Alternatives to Animal Testing Applicable for Cosmetic Products and Their Ingredients in All ICCR Regions  
The inventory is based on the report issued bi-annually to ICCR by the International Cooperation on Alternatives to Animal Testing (ICATM) and is not necessarily exhaustive.  
5. CONCLUSION  
Valid(ated) alternative approaches can be routinely and successfully used in cosmetic regulatory safety assessments, e.g. in the area of  
Phototoxicity  
Dermal penetration  
Skin corrosivity/skin irritation  
Genotoxicity  
Eye irritation  
Skin sensitisation  
Acute toxicity  

For full report:  
http://www.fda.gov/downloads/Cosmetics/InternationalActivities/ConferencesMeetingsWorkshops/

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Press release Senomyx  
Senomyx Provides Additional Information Regarding Generally Recognized As Safe (GRAS) Determination for Sweetmyx S617  
On March 11, 2014 Senomyx, Inc. issued a press release announcing the Generally Recognized As Safe (GRAS) determination for its new Sweetmyx S617 flavor ingredient. The press release was accurate; however, one of
the statements in the release was misinterpreted by some members of the media, who reported that FDA made the GRAS determination and/or approved its use.

More:  
http://www.senomyx.com/flavor_programs/

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**ICMAD, PBA Respond to Letter from the FDA Regarding Cosmetics Regulation**  
Posted: March 10, 2014  
For more than a year, beauty industry organizations the Professional Beauty Association (PBA) and Independent Cosmetic Manufacturers And Distributors (ICMAD) have been working collaboratively with the U.S. Food and Drug Administration (FDA) to create much-needed modernized and comprehensive federal regulations of the cosmetics industry for the first time since the 1960s. On March 6, 2014, the FDA issued an unforeseen public letter criticizing these industry organizations and their ongoing efforts to create this challenging yet vital legislation.

More:  
http://www.gcimagazine.com/business/rd/regulatory/

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**Cosmetics research could be subject to IND requirements**  
By Lucy Whitehouse, 18-Feb-2014  
The Food and Drug Administration (FDA) has extended the comment period on guidance which could require cosmetics research to secure an Investigational New Drug (IND) before carrying out clinical trials.

More:  
http://www.cosmeticsdesign.com/Regulation-Safety/

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**Miscellaneous: Other certifications - Safety – Sustainability...**

ADA Press Release - January 27, 2014  
**ADA Paper Addresses Bringing Disease Prevention in Oral Health to Communities**  
The American Dental Association today published its latest paper on oral health disparities in underserved populations. Prior papers were published as “Breaking Down Barriers.” The brand has now been changed to comport with the Action for Dental Health campaign.

More:  
http://www.ada.org/9551.aspx
Scientists study effect of silver particles on algae
By Michelle Yeomans+, 26-Feb-2014
Scientists from the Aquatic Research Institute, Eawag have subjected algae to a range of silver concentrations to learn more about the cellular processes that occur in the cells.

More:
http://www.cosmeticsdesign-europe.com/Formulation-Science/

Research into nanosilver leads scientists to give warning
By Simon Pitman+, 07-Mar-2014
Nanosilver, found in certain cosmetics and other consumer goods, can penetrate the skin and cause damage, according to a scientific research project carried out in Denmark.

More:
http://www.cosmeticsdesign-europe.com/Formulation-Science/
C3 Jian Initiates Phase 2 Clinical Trial of Anti-Cavity Drug

By Locyan Chan

LOS ANGELES, Calif. — March 7, 2014 — C3 Jian, Inc., a private company focused on providing improved oral healthcare, announced today that the first Phase 2 Clinical Trial for its novel drug, C16G2, has begun under its U.S. Food and Drug Administration Investigational New Drug (IND) application. The Company’s drug targets the specific elimination of Streptococcus mutans, the bacterium believed to be a critical factor in the cause of dental caries or tooth decay. C3 Jian expects this Phase 2 study to be completed in late 2014.

C16G2 is a synthetic peptide derived from C3 Jian’s proprietary, pheromone signaling platform technology referred to as STAMPs (Specifically Targeted Antimicrobial Peptides). C16G2 selectively targets Streptococcus mutans, a cavity-causing organism.


More on C3 Jian, Inc, a recent biotechnology company established to develop and commercialize UCLA (University of California Los Angeles) inventions

http://www.c3-jian.com/technologies/sm-stamp-therapeutic/

One of the corresponding relevant scientific articles:

ADR September 2012 vol. 24 no. 2 94-97

Targeted Antimicrobial Treatment to Re-establish a Healthy Microbial Flora for Long-term Protection

R. Eckert¹ R. Sullivan² W. Shi¹,³
¹C3 Jian Inc., Inglewood, CA, USA
²Colgate-Palmolive Technology Center, Piscataway, NJ, USA
³School of Dentistry, University of California, 10833 Le Conte Avenue, Los Angeles, CA 90095, USA

Abstract:

A subsequent pilot human study found that a single application of C16G2 in the oral cavity (formulated in a mouthrinse vehicle) was associated with a reduction in plaque and salivary S. mutans, lactic acid production, and enamel demineralization during the entire 4-day testing period. C16G2 is now being developed as a new anticaries drug.

For full abstract & purchase of the article:

http://dx.doi.org/10.1177%2F0022034512453725
Corresponding patents family with the US patent US8609608B2 granted on 2013-12-17 with C3 JIAN INC & the University of California as assignees:

Title:
Antimicrobial peptides

Abstract:
This invention provides novel antimicrobial peptides that are effective to inhibit growth and/or proliferation of various gram positive bacteria. In particular, the peptides are effective against Streptococcus mutans a common oral pathogen and the causative agent of dental caries.

Contact: Mr. Todd R. Patrick tpatrick@c3-jian.com President & CEO C3 Jian, Inc.
4503 Glencoe Avenue Marina del Rey, CA 90292
(310) 665-2928 x242

Medical News Today

**New shrinking gel steers tooth tissue formation**
Friday 7 March 2014
A bit of pressure from a new shrinking, sponge-like gel is all it takes to turn transplanted unspecialized cells into cells that lay down minerals and begin to form teeth.

More:

Corresponding scientific article:
**Developmentally-Inspired Shrink-Wrap Polymers for Mechanical Induction of Tissue Differentiation.**
Basma Hashmi, Lauren D. Zarzar, Tadanori Mamamoto, Akiko Mamamoto, Amanda Jiang, Joanna Aizenberg, and Donald E. Ingber,
1 Wyss Institute for Biologically Inspired Engineering, Harvard University, Boston, MA, USA
2 Harvard School of Engineering and Applied Sciences, Cambridge, MA, USA
3 Vascular Biology Program, Boston Children's Hospital and Harvard Medical School, Boston, MA, USA
4 Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA, USA

For abstract and purchase of the article:
http://dx.doi.org/10.1002/adma.201304995

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*International Journal of PharmTech Research*
Vol.6, No.1, pp 06-10, Jan-March 2014

**Formulation and Characterization of Buccal Mucoadhesive Patch of Chlorhexidine Gluconate**

Deepak S. Bhosale, Yogesh S. Thorat, Adhikrao V. Yadav

1 DSTSM’s College of Pharmacy, Solapur, Maharashtra- 413004, India.
2 Gourishankar Institute of Pharmacy Education And Research, Satara, Maharashtra- 415004, India.
New Products / New Technologies / New Services

Press release Ortek Therapeutics, Inc. February 6, 2014

Ortek Announces Launch of BasicBites™
Breakthrough Sugar Free Soft Chews Help Maintain Healthy Teeth
Roslyn Heights, NY –
...
BasicBites coat the teeth with a patented blend of vital and natural nutrients that were discovered to be present in healthy saliva (AlkaGen Technology™)... The AlkaGen Technology contained in BasicBites was developed by the Department of Oral Biology and Pathology at Stony Brook University and was licensed to Ortek...
...
The proprietary and natural blend of nutrients found in BasicBites consists of arginine bicarbonate and calcium carbonate.

More:

More on BasicBites:
http://www.basicbites.com/

News Calcivis - Feb 12, 2014
Calcivis® Caries Activity Imaging System Granted CE Mark
New medical device and consumable combination for the assessment and management of tooth decay
Edinburgh, 12 February 2014 -...
The Calcivis® Caries Activity Imaging System is a sophisticated medical device and consumable combination designed to transform the assessment and management of dental caries (tooth decay). It involves a unique, proprietary bioluminescence approach combined with a specialised imaging device which allows accurate detection and visualisation of demineralisation by imaging free calcium ions at the tooth surface;...

More:

Mission Pharmacal Expands Into Long-Term Care Market
Another new Mission product, Aquoral®, is a unique and effective prescription oral spray that moistens and lubricates the mouth for up to four hours with no known side effects.

More:  

The major component within Aquoral Protective Oral Spray is based on OGT (Oxidized Glycerol Triester):  
http://www.aquoral.com/page/about-ogt

To be noticed that Oxygenated Glycerol Triesters D biofunctional product (INCI Name: Oxidized Corn Oil) is commercialized by Ashland Co:  

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**Introducing Colgate® Optic White™ Toothbrush + Whitening Pen**

New toothbrush system delivers a simple way to achieve high-impact whitening

NEW YORK, Feb. 24, 2014 /PRNewswire/ -- ... 

The new Colgate® Optic White™ Toothbrush + Whitening Pen provides a convenient, affordable way to achieve high-impact teeth whitening at home, with whiter teeth in just two days.*

More:  

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For gums to be proud of

The clinically proven iQ+ ActiveOxi Technology with activated stabilised chlorine dioxide helps to prevent plaque biofilm, inhibits its re-growth and instantly eliminates bad breath compounds for at least 12 hours.

More:  
http://dx.doi.org/10.1038/sj.bdj.2014.166

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At the speed of white

Colgate has re-launched the Colgate MaxWhite One Professional take-home whitening system, providing visibly whiter teeth in just three days, in as little as 30 minutes a day.

More:  
http://dx.doi.org/10.1038/sj.bdj.2014.161
Experiential Purchases Behind New Crest Be Toothpaste Line
Posted: January 28, 2014
Crest introduced Be, a new line of toothpastes that combines unexpected flavors with cleansing benefits. The line features three new, bold flavors, including Mint Chocolate Trek, Vanilla Mint Spark and Lime Spearmint Zest.

More: http://www.gcimagazine.com/marketstrends/segments/oralcare/

Marketing

Firefly® And Oral Health America® Join Forces
Partnership Helps Improve Oral Care For At-Risk Kids
BUENA PARK, Calif., Feb. 4, 2014 /PRNewswire/ -- Dr. Fresh® LLC today announced a partnership between its Firefly® kids toothbrush brand and Oral Health America (OHA). The partnership will promote regular toothbrushing through accessibility and fun while benefitting OHA's Smiles Across America® (SAA) program.


Colgate-Palmolive and Children's Health Fund Partner for Black History Month to Inspire Americans to Honor Their Past and Treasure Their Health by Sharing Healthy Smiles to Support Children's Health and Wellness
NEW YORK, NY - For the second straight year, in honor of Black History Month, Colgate-Palmolive will partner with Children's Health Fund to inspire Americans through its Honor Your Past, Treasure Your Health campaign.


The LISTERINE® Brand Supports the FDI World Dental Federation In 2014 Global Oral Health Initiative
World Oral Health Day 2014 Will Focus On Importance of Oral Care By Celebrating Healthy Smiles
20 MARCH 2014 – UK – LISTERINE® brand Mouthwash, part of the Johnson & Johnson Family of Consumer Companies, today announces its support of the 2014 World Oral Health Day, to be held March 20 with celebrations expected across the world from dental associations, schools and organisations.

More:
http://www.ggcommunications.co.uk/the-listerine

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**Colgate Partners With Champions For Kids' SIMPLE Giving Program To Help Create Healthy Smiles Among Children**

Donations of Colgate® Products at Participating Walmart Stores to be Given to Local Communities This Spring

NEW YORK, March 21, 2014 /PRNewswire/ -- ... To help children achieve healthy smiles and avoid missing school days, Colgate has teamed up with Champions for Kids and Walmart for their SIMPLE Giving™ campaign.

More:

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**Euromonitor Infographic Tracks Beauty Industry Growth Trends**

Posted: March 24, 2014...

“Beauty Industry Robust Despite Slowdown” includes information on how beauty and personal care staples such as deodorants and oral care have grown,...

More:
http://www.gcimagazine.com/marketstrends/

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**News**

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**PVMA (Pennsylvania Veterinary Medical Association): Preventive Care is Key in Protecting Pets from Periodontal Disease**

HUMMELSTOWN, Pa., Feb. 4, 2014 /PRNewswire-USNewswire/ -- Periodontal disease is the most common illness veterinarians find among companion animals, yet it’s completely preventable. Untreated oral disease can lead to infection of your pet’s heart, lungs, and kidneys.

More:
Unilever Selects Go Global Digital Marketing Partners
Posted: March 17, 2014
Unilever announced it has selected the seven winning companies that will take part in Go Global, a program that aims to partner innovative digital companies that are ready for international expansion, with seven of Unilever’s global flagship brands.

More: http://www.gcimagazine.com/business/marketing/

L’Oréal steps up its biotech business with Evolva collaboration
By Andrew McDougall+, 11-Feb-2014
French cosmetics maker L’Oréal has upped its biotechnology efforts by announcing it has signed a collaboration agreement with Evolva Holding for the co-development of novel biosynthetic production routes for an undisclosed ingredient with broad applications in the cosmetics industry.


EU Parliament adopts new ABS biodiversity rules in ‘landmark vote’
By Lucy Whitehouse, 13-Mar-2014
The European Parliament has announced that it intends to fall into line with the rising global commitment to responsible sourcing of biological materials for research and development.

More: http://www.cosmeticsdesign-europe.com/Formulation-Science/

Going green: Unilever issues its first ever ‘green bond’
By Lucy Whitehouse, 20-Mar-2014
Unilever, global consumer goods giant, has issued a ‘green bond’ for £250m (€300m), with which it will finance projects to further the company’s sustainability.

News release Amyris  
Feb 25, 2014

**IFF and Amyris Advance Innovative Collaboration to Develop Ingredients for the Flavors and Fragrances Market**

In April 2013, IFF and Amyris agreed to develop a sustainable, cost-effective and reliable source of key fragrance ingredients. The parties have agreed to pursue the second phase of development.

More:  
http://amyris.com/News/367/

**IFF and Amyris Advance to collaborate on renewable fragrance ingredients**
By Simon Pitman+, 03-Mar-2014

Fragrance and flavors giant IFF has announced a collaborative venture with Amyris Advance to bring a new generation of renewable fragrance ingredients to the market.

More:  
http://www.cosmeticsdesign.com/Formulation-Science/

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**Ingredients/Raw materials**

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Press release

**TEGO® Solve 61 – Naturally derived solubilizer for lipophilic & natural oils**  
Essen, March 14, 2014

Evonik launches a new PEG-free solubilizer for the effective solubilization of natural oils and lipophilic emollients.

TEGO® Solve 61, a high performance solubilizer optimized for the incorporation of lipophilic components into water-based formulations, is based on polyglyceryl esters and made from 100% renewable raw materials.

More:  

**Evonik launches solubilizer for natural and lipophilic oils**
By Katie Nichol, 28-Mar-2014

German speciality chemicals firm Evonik has launched TEGO Solve 61, a PEG-free solubilizer designed to incorporate natural oils and lipophilic emollients into a variety of cosmetics formulations.

More:  
http://www.cosmeticsdesign-europe.com/Formulation-Science/

TEGO Solve 61 would be as efficient as the key historic benchmark solubilizer PEG 40 Hydrogenated Castor Oil (Cremophor RH 40 – BASF).
Selected articles from Scientific and Medical data bases which allow to have access to hundreds of scientific publications mainly Ingentaconnect, BioMed Central and PubMed developed by the National Center for Biotechnology Information (NCBI) at the US National Library of Medicine (MLN).

Examples of reviews investigated during the period:

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**Publications on Antiplaque/Antimicrobial**


**Evaluation of the stability and antimicrobial activity of an ethanolic extract of Libidibia ferrea.**

de Oliveira Marreiro R, Bandeira MF, de Souza TP, de Almeida MC, Bendaham K, Venâncio GN, Rodrigues IC, Coelho CN, Milério PS, de Oliveira GP, de Oliveira Conde NC.

Federal University of Amazonas, Manaus, Amazonas, Brazil.

**Systematic Screening of Plant Extracts from the Brazilian Pantanal with Antimicrobial Activity against Bacteria with Cariogenic Relevance.**
Brighenti FL1, Salvador MJ, Delbem AC, Delbem AC, Oliveira MA, Soares CP, Freitas LS, Koga-Ito CY.
Department of Biosciences and Oral Diagnosis, Universidade Estadual Paulista (UNESP), São José dos Campos, Brazil.

For abstract & purchase of the article:
http://www.karger.com/Article/FullText/357225


**Honey - a potential agent against Porphyromonas gingivalis: an in vitro study.**
Sigrun Eick1, Gesine Schäfer2, Jakub Kwiecinski3, Julia Atrott4, Thomas Henle4 and Wolfgang Pfister2
1 Department of Periodontology, Laboratory of Oral Microbiology, Dental School, University of Bern, Freiburgstrasse 7, CH-3010 Bern, Switzerland
2 Medical University Laboratories, Institute of Medical Microbiology, University Hospital of Jena, Jena, Germany
3 Department of Rheumatology and Inflammation Research, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden
4 Institute of Food Chemistry, Technische Universität Dresden, Dresden, Germany

For abstract & free article:

Publications on Bleaching


**Evaluation of the effects of conventional versus laser bleaching techniques on enamel microroughness.**
Anaraki SN1, Shahabi S, Chiniforush N, Nokhbatolfogahaei H, Assadian H, Yousefi B.
Operative Department, Dental Branch of Tehran Azad University, Tehran, Iran.

For abstract & purchase of the article:
http://dx.doi.org/10.1007/s10103-014-1523-6
Publications on cavity protection, fluoride bioavailability, remineralization...

Medical News Today

The safety, efficacy and value of water fluoridation in oral health care
Tuesday 25 March 2014

During the 43rd Annual Meeting & Exhibition of the American Association for Dental Research, held in conjunction with the 38th Annual Meeting of the Canadian Association for Dental Research, a symposium titled "Water Fluoridation: Safety Efficacy and Value in Oral Health Care" took place.

More:
http://www.medicalnewstoday.com/releases/274438.php


Biochemical indicators of dental caries in saliva: an in vivo study.
Hegde MN, Hegde ND, Ashok A, Shetty S.

Department of Conservative Dentistry and Endodontics, A.B. Shetty Memorial Institute of Dental Sciences, Nitte University, Mangalore, India.

For abstract & purchase of the article:
http://dx.doi.org/10.1159/000355580

More on Superoxide dismutase (SOD) which protects oxygen-metabolizing cells against harmful effects of superoxide free-radicals:
http://www.worthington-biochem.com/sodbe/default.html


Ion release from calcium and fluoride containing dental varnishes.
Cochrane NJ, Shen P, Yuan Y, Reynolds EC.
Oral Health CRC, Melbourne Dental School, Bio21 Institute, The University of Melbourne, Victoria.

For abstract & purchase of the article:
http://dx.doi.org/10.1111/adj.12144
Evaluating the effectiveness of structural and metabolic tooth enamel reparation by magnesium-calcium remineralizing complex
Anatoly A Kunin¹, Irina A Belenova¹ and Tatyana V Kupets²
¹ Professors, Dr. Med. Sc., Voronezh N.N. Burdenko State Medical Academy, Therapeutic Dentistry Department, Voronezh, Russia
² DRC-group, Moscow, Russian-Switzerland company, Russia

For abstract & purchase of the article:
http://dx.doi.org/10.1186/1878-5085-5-S1-A122

Calcium lactate pre-rinse increased fluoride protection against enamel erosion in a randomized controlled in situ trial.
Turssi CP¹, Hara AT², Amaral FL³, França FM², Basting RT².
¹Division of Cariology and Restorative Dentistry, São Leopoldo Mandic Institute and Dental Research Center, Campinas, SP, Brazil. Electronic address: cecilia.turssi@gmail.com.
²Oral Health Research Institute, Indiana University School of Dentistry, Indianapolis, IN, USA.

For abstract & purchase of the article:
http://dx.doi.org/10.1016/j.jdent.2014.02.012

Effect of fluoride gels supplemented with sodium trimetaphosphate on enamel erosion and abrasion: in vitro study.
Pancote LP, Manarelli MM, Danelon M, Delbem AC.
Faculdade de Odontologia, UNESP - Univ Estadual Paulista, Araçatuba, São Paulo, Brazil.

For abstract & purchase of the article:
http://dx.doi.org/10.1016/j.archoralbio.2013.12.007

Publications on dental erosion (prevention)
**Prevention of dental erosion of a sports drink by nano-sized hydroxyapatite in situ study**

Ji Hyun Min, Ho Keun Kwon and Baek Il Kim

Department of Preventive Dentistry and Public Oral Health, Oral Science Research Institute, BK 21 Plus Project, Yonsei University College of Dentistry, Seoul, South Korea

For abstract & purchase of the article:
[http://dx.doi.org/10.1111/ipd.12101](http://dx.doi.org/10.1111/ipd.12101)

**Publications on Methods (Measurements)**

J Dent. 2014 Mar 19

**Monitoring the maturation process of a dental microcosm biofilm using the Quantitative Light-induced Fluorescence-Digital (QLF-D).**

im YS, Lee ES, Kwon HK, Kim BI.


For abstract & purchase of the article:
[http://dx.doi.org/10.1016/j.jdent.2014.03.006](http://dx.doi.org/10.1016/j.jdent.2014.03.006)

**Publications on Microbiology**

**Medical News Today**

**In healthy mouths good fungi keep bad ones in check**

Saturday 15 March 2014

Human mouths contain a balanced mix of microbes which, when disrupted, can lead to oral diseases.

More:

Corresponding scientific article:
**Oral Mycobiome Analysis of HIV-Infected Patients: Identification of Pichia as an Antagonist of Opportunistic Fungi.**

For abstract and free article: [10.1371/journal.ppat.1003996](http://10.1371/journal.ppat.1003996)

**Symbiotic relationship between Streptococcus mutans and Candida albicans synergizes the virulence of plaque-biofilms in vivo**
Megan L. Falsetta, Marlise I. Klein, Punsiri M. Colonne, Kathleen Scott-Anne, Stacy Gregoire, Chia-Hua Pai, Mireya Gonzalez, Gene Watson, Damian Krysan, William H. Bowen, Hyun Koo

1 Center for Oral Biology
2 Department of Microbiology and Immunology
3 Department of Pediatrics
University of Rochester Medical Center, Rochester, NY, USA
4 Biofilm Research Laboratory, School of Dental Medicine, University of Pennsylvania, Philadelphia, PA, USA.

For abstract and free article: [http://dx.doi.org/10.1128/IAI.00087-14](http://dx.doi.org/10.1128/IAI.00087-14)

**Innocent until proven guilty: mechanisms and roles of Streptococcus–Candida interactions in oral health and disease.**
H. Xu, H.F. Jenkinson, and A. Dongari-Bagtzoglou

1 Division of Periodontology, School of Dental Medicine, University of Connecticut, Farmington, CT, USA
2 School of Oral and Dental Sciences, University of Bristol, Bristol, UK

For abstract and free article: [http://dx.doi.org/10.1111/omi.12049](http://dx.doi.org/10.1111/omi.12049)

**Adhesion forces and composition of planktonic and adhering oral microbiomes.**
Wessel SW, Chen Y, Maitra A, van den Heuvel ER, Slomp AM, Busscher HJ, van der Mei HC.
University of Groningen and University Medical Center Groningen, Department of Biomedical Engineering, Antonius Deusinglaan 1, 9713 AV Groningen, The Netherlands.

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*In Vitro Comparison of Commercial Oral Rinses on Bacterial Adhesion and Their Detachment from Biofilm Formed on Hydroxyapatite Disks.*

Babu JP, Garcia-Godoy F.
College of Dentistry, University of Tennessee USA

For abstract and purchase of the article:
http://dx.doi.org/10.3290/j.ohpd.a31674.

Oral Health Prev Dent. 2014 Mar 11

*Antibacterial Effect of Iranian Green Tea Containing Mouthrinse vs Chlorhexidine 0.2%: An In Vitro Study.*

Ardakani MR, Golmohammadi S, Ayremlou S, Taheri S, Daneshvar S, Meimandi M.
Dental Research Center and Dental School, Shahid Behshti University of Medical Sciences, Daneshjo BLVD, Evin Square, Tehran, Iran.

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http://dx.doi.org/10.3290/j.ohpd.a31663.

Publications on oils (essential oils)

Allergy, Asthma & Clinical Immunology 2014, 10:6

*A case of anaphylaxis to peppermint*

Roian Bayat¹ and Rozita Borici-Mazi²

¹ Division of Respiratory Medicine Department of Medicine, Queen’s University, Kingston, ON, Canada
² Department of Medicine and Pediatrics Division of Allergy and Immunology, Queen’s University, 166 Brock Street, Kingston, ON K7L 5G2, Canada

For abstract and free article:
http://dx.doi.org/10.1186/1710-1492-10-6
Publications on periodontal/gingival therapy

Medical News Today

**Classifying gum disease genetically could help earlier diagnosis and treatment**
Monday 24 March 2014
A study published in the Journal of Dental Research suggests a new system for classifying periodontal disease that may allow for earlier detection and personalized treatment before the disease becomes severe.

More:

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**Salivary biomarkers of gingivitis: Information important for personalized decision-making**
Alexandria, Va., USA — …
Salivary biomarkers have been studied to help determine the presence, risk, and progression of periodontal disease. However, clinical translation of salivary biomarkers from bench to chairside requires studies that identify biomarkers associated with the continuum of phases between health and periodontal disease. Thus, the objective of this study was to identify salivary biomarkers associated with gingivitis.

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**Inhibition of oral biofilm and cell-cell communication using natural-products derivatives**
Alexandria, Va., USA — …
Many plant metabolites and structurally similar derivatives have been identified as inhibitors of bacterial biofilm formation and quorum sensing (QS). Previously, the researchers of this study demonstrated biofilm and QS inhibition using modified cysteines, similar to those produced by the tropical plant Petiveria alliacea. In this study the researchers expanded their compound library to examine structure-activity relationships for biofilm and QS inhibition.

More:
Identification of Quercitrin as Potential Therapeutic Agent for Periodontal Applications.
Gómez-Florit M1, Monjo M, Ramis JM.
Group of Cell Therapy and Tissue Engineering, Research Institute on Health Sciences (IUNICS). University of Balearic Islands, Palma de Mallorca, Spain.

For abstract and purchase of the article:
http://dx.doi.org/10.1902/jop.2014.130438

More on Quercitrin:

Xylitol, an Anti-caries Agent, Exhibits Potent Inhibition of Inflammatory Responses in Human THP-1-derived Macrophages Infected With Porphyromonas Gingivalis.
Eunjoo Park, MS*; Hee Sam Na, MD, PhD*; Sheon Min Kim, MS*; Shannon Wallet, PhD†; Seunghee Cha, DDS, PhD‡; Jin Chung, DDS, PhD*  
*Department of Oral Microbiology, School of Dentistry, Pusan National University, Yangsan 626-870, South Korea.  
†Department of Periodontology, College of Dentistry, University of Florida, Gainesville, Florida 32610, USA.  
‡Department of Oral and Maxillofacial Diagnostic Sciences, College of Dentistry, University of Florida, Gainesville, Florida 32610, USA.

For abstract and purchase of the article:
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Publications on Relationship oral diseases – other diseases

Medical News Today

**Byproducts from bacteria-causing gum disease incite deadly oral cancer growth**

Thursday 27 February 2014

Researchers from Case Western Reserve University have discovered how byproducts in the form of small fatty acids from two bacteria prevalent in gum disease incite the growth of deadly Kaposi’s sarcoma-related (KS) lesions and tumors in the mouth.

More:
http://www.medicalnewstoday.com/releases/273228

Corresponding scientific article:

*Journal of Virology, Published ahead of print 5 February 2014,*

**Short Chain Fatty Acids From Periodontal Pathogens Suppress HDACs, EZH2, and SUV39H1 to Promote Kaposi’s Sarcoma-Associated Herpesvirus Replication**

Xiaolan Yu, Abdel-Malek Shahir, Jingfeng Sha, Zhimin Feng, Betty Eapen, Stanley Nithianantham, Biswajit Das, Jonathan Karn, Aaron Weinberg, Nabil F. Bissada and Fengchun Ye

Case Western Reserve University, 10900 Euclid Avenue, Cleveland, Ohio 44106. USA

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http://dx.doi.org/10.1128/JVI.03326-13

Publications on Toothbrushes


**Influence of different toothpaste abrasives on the bristle end-rounding quality of toothbrushes.**

de Oliveira G1, de Aveiro J, Pavone C, Marcantonio R.

Foar-UNESP, School of Dentistry of Araraquara, São Paulo State University, Araraquara, Brazil.

For abstract & purchase of the article:
http://dx.doi.org/10.1111/idh.12073.
Comparison of Total Antioxidant Capacity in Saliva of Children with Severe Early Childhood Caries and Caries-Free Children.
Mahjoub S, Ghasempour M, Gharage A, Bijani A, Masrourroudsari J.
Department of Biochemistry and Biophysics, Faculty of Medicine, Babol University of Medical Sciences, Babol, Iran.

For abstract & purchase of the article:
http://www.karger.com/Article/FullText/355581

Effects of sugar-free chewing gum sweetened with xylitol or maltitol on the development of gingivitis and plaque: a randomized clinical trial.
Keukenmeester R, Slot D, Rosema N, Van Loveren C, Van der Weijden G.
Department of Periodontology, Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and VU University, Amsterdam, the Netherlands.

For abstract & purchase of the article:
http://dx.doi.org/10.1111/idh.12071

Antibacterial efficacy of photosensitizer functionalized biopolymeric nanoparticles in the presence of tissue inhibitors in root canal.
Shrestha A, Kishen A.
Department of Endodontics, University of Toronto, Toronto, Ontario, Canada.

For abstract & purchase of the article:
http://dx.doi.org/10.1016/j.joen.2013.09.013

Composition of Enamel Pellicle from Dental Erosion Patients.
Carpenter G.a · Cotroneo E.d · Moazzez R.b · Rojas-Serrano M.b · Donaldson N. · Austin R.b · Zaidel L.e · Bartlett D.b · Proctor G.a
a · Salivary Research Unit,
b · Prosthodontic Department and
c · Biostatistics Department, King’s College London Dental Institute, and
d · Department of Experimental Medicine and Toxicology, Imperial College London, London, UK;
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