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WO 2008/014375 A1

(54) Title: ORAL CARE COMPOSITIONS

(57) Abstract: In accordance with this invention, there is provided an oral care composition comprising a multimodal blend of copolymers of maleic acid or maleic anhydride and an alkyl vinyl ether and a non-cationic antibacterial agent. The compositions feature improved retention of the antibacterial agent on teeth.

ORAL CARE COMPOSITIONS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of U.S. Provisional Application Serial No. 60/833,517, filed on July 26, 2006, the disclosure of which is hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0002] This invention relates to oral care compositions, such as toothpaste compositions, and more particularly, to such compositions containing a copolymer of maleic acid or maleic anhydride and an alkyl vinyl ether, e.g. Gantrez® S-97, blended with one or more copolymers of maleic acid or maleic anhydride and an alkyl vinyl ether of different specific viscosity and a non-cationic antibacterial agent e.g., triclosan. The compositions provide a high retention of the antibacterial agenet on teeth.

BACKGROUND OF THE INVENTION

[0003] Oral care compositions of non-cationic antibacterial enhancing agents and unimodal maleic acid or maleic anhydride copolymers or other polycarboxylates, e.g., methylvinyl ether-maleic acid anhydride, are well known in the art. See U.S. Patents 6,692,725; 5,776,435; 5,686,064; 5,582,816; 5,538,715; 5,531,982; 5,334,375; 5,496,540; 5,472,685; 5,466,437; 5,453,265; 5,368,844; 5,356,615; 5,344,641; 5,312,618; 5,294,431; 5,292,526; 5,288,480; 5,279,813; 5,275,805; 5,273,741; 5,260,062; 5,256,401; 5,192,531; 5,192,530; 5,188,821; 5,180,578; 5,178,851; 5,167,951; 5,156,835; 5,135,738; 5,080,887; 5,037,637; 5,032,386; and 4,894,220.

[0004] However, it is desirable for improved dental health to provide oral care compositions with improved retention of an antibacterial enhancing agent on teeth. Accordingly, it is an object of this invention to improve the efficacy of oral care compositions containing a non-cationic antibacterial agent.

SUMMARY OF THE INVENTION

[0005] We have discovered that oral care compositions comprised of multimodal blends of copolymers of maleic acid or maleic anhydride and an alkyl vinyl ether and a non-cationic antibacterial agent exhibit unexpectedly high retention of the antibacterial agent on teeth.

[0006] In accordance with this invention, there is provided oral care compositions comprising a multimodal blend of copolymers of maleic acid or maleic anhydride and an alkyl vinyl ether and a non-cationic antibacterial agent. The oral care compositions exhibit unexpectedly high retention of the antibacterial agent on teeth.

[0007] In a preferred embodiment, the oral care composition comprises a bimodal blend of copolymers of maleic acid or maleic anhydride and an alkyl vinyl ether, the copolymers having specific viscosities in the ranges of 2-10 and 0.1-2 respectively and the copolymers being present in a weight ratio of 10:90 to 90:10.

[0008] In another embodiment, there is provided a method of improving retention of a non-cationic antibacterial agent on teeth, the method comprising delivering the non-cationic antibacterial agent to the teeth in combination with a multimodal blend of copolymers of maleic acid or maleic anhydride and an alkyl vinyl ether.

BRIEF DESCRIPTION OF THE FIGURES

[0009] FIG. 1 shows the procedure used for testing the efficacy of uptake/retention of the non-cationic antibacterial agent triclosan on mucin-coated HAP disks.

[0010] FIG. 2 is a graphical representation of retention of triclosan on disks treated with a composition containing a bimodal molecular weight maleic acid-methylvinyl ether copolymer (SV=2-4 and SV=0.1-1.5) vs. a control (unimodal molecular weight distribution copolymer).

DETAILED DESCRIPTION OF THE INVENTION

[0011] While the invention is described hereinafter with respect to preferred embodiments thereof, e.g., a bimodal distribution of maleic acid or maleic anhydride alkyl vinyl ether copolymers in combination with the non-cationic antibacterial agent triclosan, the invention can also be practiced in connection with any multimodal, e.g., trimodal distributions of maleic acid or maleic anhydride alkyl vinyl ether copolymers and other non-cationic antibacterial agents such as thymol, phenol and other phenolics.

[0012] As used herein, "specific viscosity" refers to the viscosity of the alkyl vinyl ether maleic anhydride copolymer in a suitable solvent divided by the viscosity of the solvent.

[0013] The oral care composition can take the form of any conventional oral care composition. In addition to toothpastes, the oral care composition can be in the form of a denture adhesive, a mouth wash, a lozenge, chewing gum and the like.

[0014] The non-cationic anti-bacterial agent can be present in an amount of about 0.01-5 wt%, preferably 0.1-4 wt% and more preferably 0.2-3 wt%.

[0015] The differing specific viscosities (SV) of the multimodal blends of maleic acid or maleic anhydride alkyl vinyl ether copolymers can be in the range of 0.1 to about 10. In the case of a bimodal blend of maleic acid or maleic anhydride alkyl vinyl ether copolymers, the differing specific viscosities can be in the ranges of 2-10 and 0.1-2 respectively, preferably 2-6 and 0.1-1.75 and more preferably 2-4 and 0.1-1.5.

[0016] The maleic acid or maleic anhydride alkyl vinyl ether copolymers can be present in a wt. ratio of 10:90 to 90:10, preferably 20:80 to 80:20 and more preferably 25:75 to 75:25.

[0017] The oral care compositions can contain up to about 10% by weight of the maleic acid or maleic anhydride alkyl vinyl ether copolymers. In toothpastes, the maleic acid or maleic anhydride alkyl vinyl ether copolymers can be present in an amount of 0.1-5% by weight, preferably 0.5-3%.

[0018] In a further embodiment, the invention can be practiced in conjunction with a surface active vegetable gum as described more fully in commonly assigned PCT International Application entitled "ORAL CARE COMPOSITIONS" filed on even date herewith, the disclosure of which is hereby incorporated by reference in its entirety.

[0019] The oral care composition of this invention can contain 0.001-5 wt% of a surface active vegetable gum such as gum arabic, hydroxypropylmethylcellulose or karaya gum.

[0020] In a particularly preferred embodiment, the non-cationic antibacterial agent is present in the presence of a known surface active agent such as sodium lauryl sulfate. Other surface active agents normally used in oral care compositions can also be used; an example is Poloxamers. A preferred is Poloxamer 407 available from BASF Corp.

EXAMPLE

Model Toothpaste Mixtures for Triclosan Uptake and Retention

Stock Toothpaste (T/P) Mixture without abrasive:

Add: 61.00 g Water

20.00 g 70% Sorbitol

13.00 g Propylene glycol

2.46 g Sodium lauryl sulfate

0.30 g Non-cationic antibacterial (triclosan)

1.00 g Ethanol

0.24 g NaF

2.00 g Maleic acid-methyl vinyl ether copolymer*

*suitably present in an amount of 0.01-5% by wt of the mixture.

TABLE: Bimodal Mixtures of Copolymer Anhydride in Weight Percent

Copolymer	Percentage by Wt.			SV
(A)	25	50	75	2-4
(B)	75	50	25	0.1-1.5

[0021] The results in FIG. 2 show the improved efficacy of non-cationic antibacterial agent retention in accordance with this invention of the bimodal copolymer over the control unimodal copolymer.

CLAIMS

What is claimed:

1. An oral care composition comprising:

a) a multimodal blend of copolymers of maleic acid or maleic anhydride and an alkyl vinyl ether; and

b) a non-cationic antibacterial agent.

2. The oral care composition of claim 1 wherein said multimodal blend is a bimodal blend.

3. The oral care composition of claim 2 wherein said bimodal blend of copolymers have specific viscosities in the ranges of 2-10 and 0.1-2 respectively.

4. The oral care composition of claim 3 wherein said bimodal blend of copolymers have specific viscosities in the ranges of 2-6 and 0.1-1.75 respectively.

5. The oral care composition of claim 4 wherein said bimodal blend of copolymers have specific viscosities in the ranges of 2-4 and 0.1-1.5 respectively.

6. The oral care composition of claim 1 wherein said non-cationic antibacterial agent is triclosan.

7. The oral care composition of claim 1 wherein said alkyl vinyl ether is methyl vinyl ether.

8. The oral care composition of claim 2 wherein said copolymers are present in a weight ratio of 10:90 to 90:10.

9. The oral care composition of claim 8 wherein said copolymers are present in a weight ratio of 20:80 to 80:20.

10. The oral care composition of claim 8 wherein said copolymers are present in a weight ratio of 20:80 to 80:20.

11. An oral care composition comprising

a) a bimodal blend of copolymers of maleic acid or maleic anhydride and an alkyl vinyl ether, said copolymers having specific viscosities in the ranges of 2-10 and 0.1-2 respectively and being present in a weight ratio of 10:90 to 90:10; and

b) a non-cationic antibacterial agent wherein said composition exhibits improved retention of said agent on teeth.

12. A method of improving retention of a non-cationic antibacterial agent on teeth, said method comprising delivering said non-cationic antibacterial agent to said teeth in combination with a multimodal blend of copolymers of maleic acid or maleic anhydride and an alkyl vinyl ether.

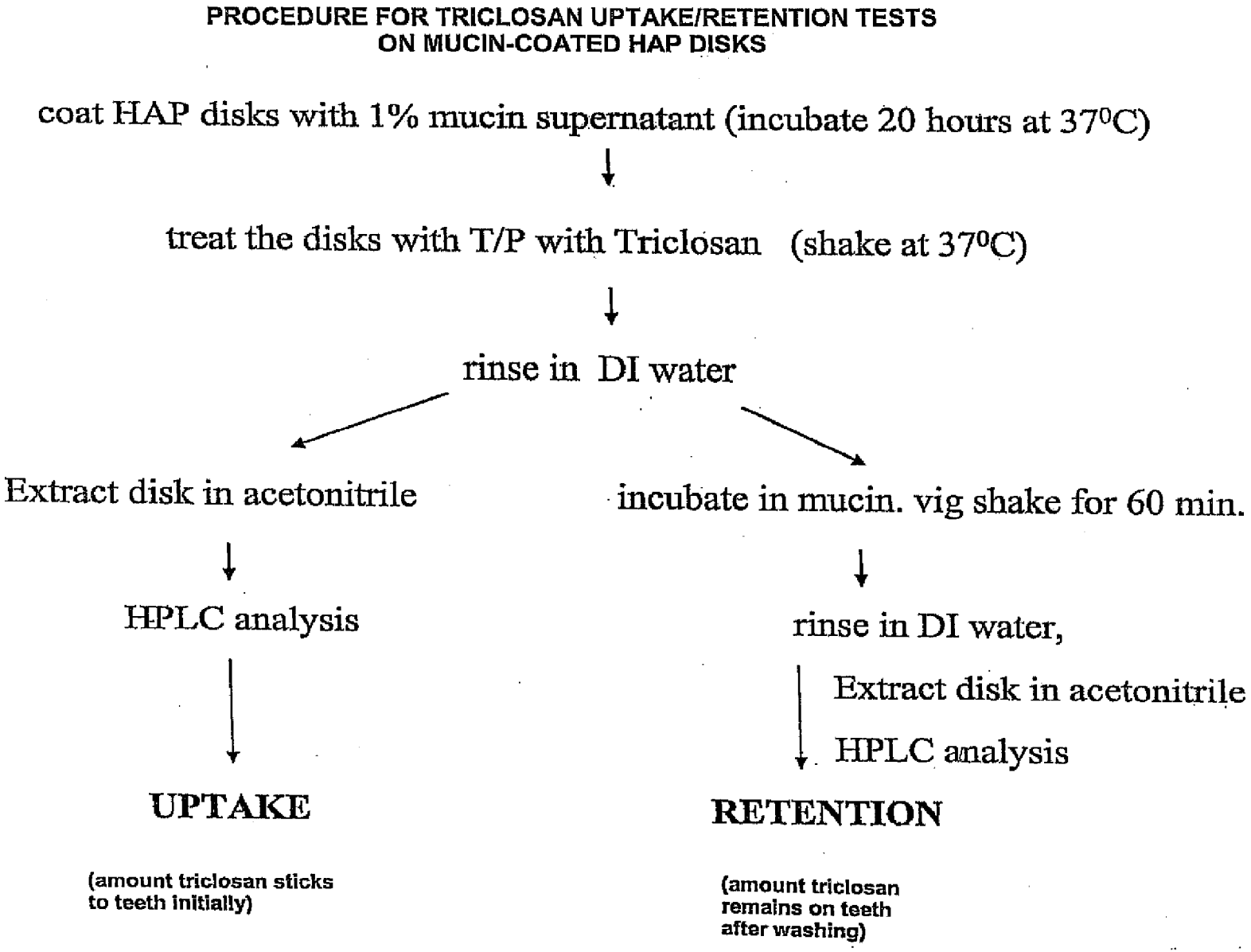

PROCEDURE FOR TRICLOSAN UPTAKE/RETENTION TESTS
ON MUCIN-COATED HAP DISKS
coat HAP disks with 1% mucin supernatant (incubate 20 hours at 37°C)
treat the disks with T/P with Triclosan (shake at 37°C)
rinse in DI water
Extract disk in acetonitrile
HPLC analysis
UPTAKE
(amount triclosan sticks to teeth initially)
incubate in mucin. vig shake for 60 min.
rinse in DI water,
Extract disk in acetonitrile
HPLC analysis
RETENTION
(amount triclosan remains on teeth after washing)

FIG. 1

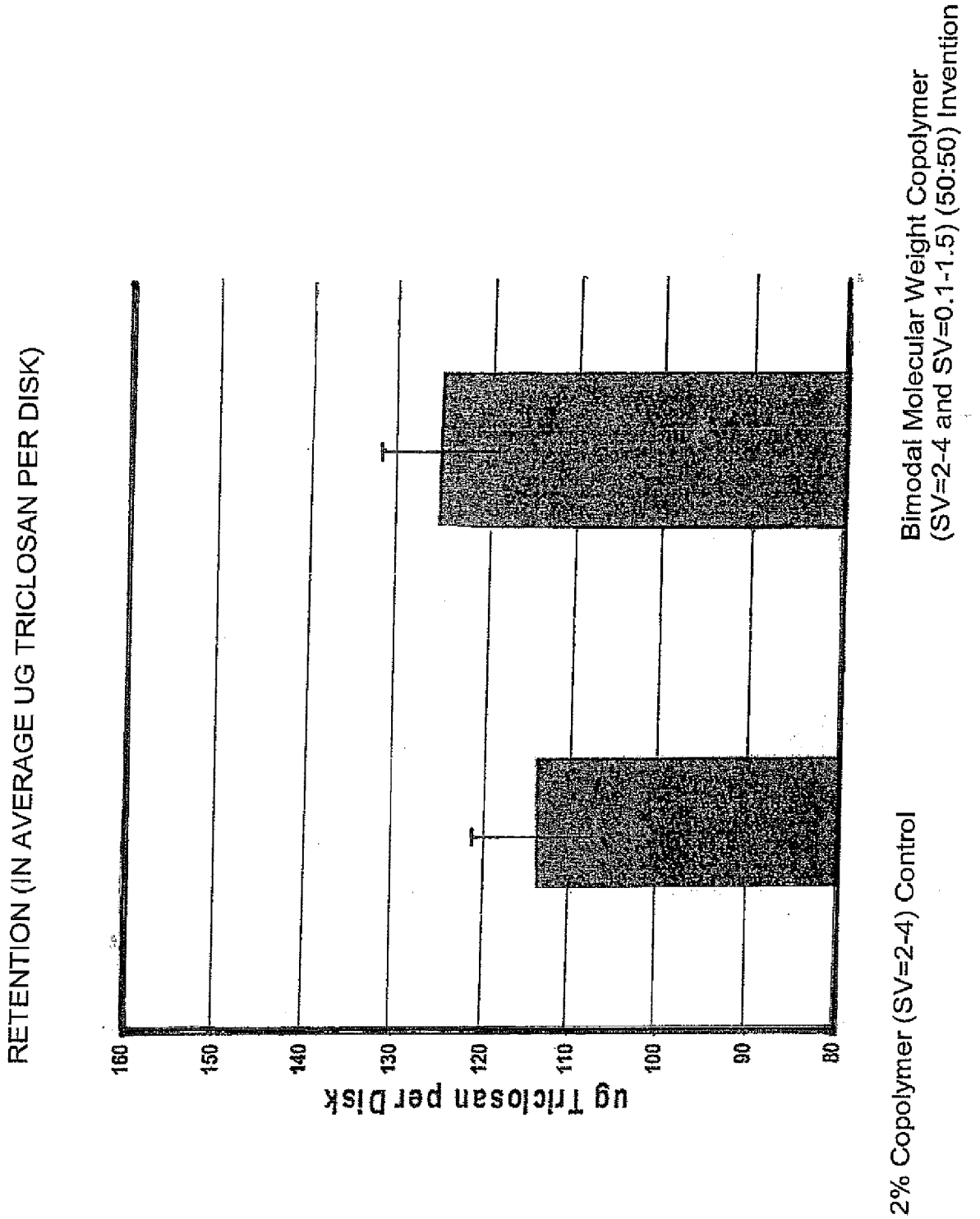

RETENTION (IN AVERAGE UG TRICLOSAN PER DISK)
ug Triclosan per Disk
160
150
140
130
120
110
100
90
80
2% Copolymer (SV=2-4) Control
Bimodal Molecular Weight Copolymer
(SV=2-4 and SV=0.1-1.5) (50:50) Invention

FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US07/74424

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **A61K 8/00**(2006.01);**A61Q 11/00**(2006.01)

USPC: 424/49,54,58
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 424/49, 54, 58

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,692,725 B2 (ENDO) 17 February 2004 (17.02.2004), see the entire document.	1-12

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

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

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"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

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INTERNATIONAL SEARCH REPORT

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Continuation of B. FIELDS SEARCHED Item 3:
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search terms: Gantrez, triclosan, (multimodal or polymodal or bimodal)