"ANTIPLAQUE DENTIFRICE HAVING IMPROVED FLAVOUR"

The present invention relates to the formulation of a quaternary ammonium-containing antiplaque dentifrice with improved taste, that is sweet, pleasant, cool and reduces the bitter taste of the quaternary ammonium compound.

According to the present invention an antiplaque dentifrice contains a flavouring agent consisting essentially of at least 15% by weight of anethol, up to 46% by weight of menthol and up to 39% by weight of peppermint, and a sweetening agent in the weight ratio of about 6:1 to 1.3:1, preferably 2.5:1, of flavouring agent to sweetening agent.

It has been found that a dentifrice flavour consisting essentially of specified amounts of anethol, menthol and peppermint significantly improves the taste of a quaternary ammonium based antiplaque dentifrice. It has additionally been found that the presence of said sweetening agent in aforesaid ratio synergistically improves the taste of the flavour in the dentifrice.

The ability of quaternary ammonium compounds to inhibit the formation of dental plaque is well documented. These compounds, however, are bitter, and this markedly reduces the consumer acceptability of antiplaque dentifrice containing quaternary ammonium compounds.

Accordingly, sweeteners such as sodium saccharin, and flavouring oils including oils of spearmint, peppermint, wintergreen, sassafras, clove, sage, eucalyptus, marjoram, cinnamon, lemon and orange, as well as methylsalicylate have been conventionally used in dentifrices to improve the flavour,

as shown in U.S. Patents No. 3,842,168; No. 3,843,779; No. 4,118,476 and No. 4,188,372. Despite the reduction of the bitterness of the quaternary ammonium compounds afforded by aforesaid flavours, the taste of these dentifrices lacks consumer appeal and may even be offensive, due to either insufficient masking of the bitterness or too strong a flavour. U.S. Patent No. 3,988,425 has solved the bitterness problem attributed to the presence of quaternary ammonium compounds in dentifrices by reacting dihydrochalcone glucosides with certain quaternary ammonium compounds to give the corresponding quaternary ammonium derivatives which have a sweet taste and are bactericidal in nature.

U.S. Patent No. 3,864,472 discloses a lemon flavoured mouthwash, containing a quaternary ammonium antibacterial compound and a lemon oil flavourant.

U.S. Patent No. 3,491,135 discloses that salts of (3-cyclohexyl-3-hydroxy-3-phenylpropyl) triethyl-ammonium ion and pamoic acid show little or none of the extremely bitter taste of the corresponding quaternary ammonium halide compound. The pamoates thereof are said to have unobjectionable flavours.

None of the above cited prior art discloses an antiplaque dentifrice having significantly improved taste, comprising a flavouring agent formulation which contains specified amounts of anethol, menthol and peppermint, which when added in amounts close to about 1% by weight (e.g. about 0.8-1.2%), to a quaternary ammonium-containing antiplaque dentifrice,

greatly reduce the bitterness of the said dentifrice, and improve the taste thereof.

It has now been found that the flavour of dental cream formulations containing antiplaque quaternary ammonium compounds can be significantly improved, and the bitter taste of the said quaternary ammonium compound substantially reduced by adding a flavouring agent formulation consisting essentially at least 15% by weight of anethol, up to 46% by weight of menthol and up to 39% by weight of peppermint, and a sweetening agent in the weight ratio of flavouring agent to sweetening agent of about 6:1 to 1.3:1, preferably about 2.5:1 respectively.

The present invention aims to provide a better tasting antiplaque dentifrice based on quaternary ammonium active ingredients, by the incorporating of a flavouring agent formulation containing anethol, menthol and peppermint in specified amounts.

The invention also aims to provide an antiplaque dentifrice with improved flavour also containing a sweetening agent which synergistically improves the flavour of the dentifrice.

According to the present invention an antiplaque dentifrice comprises as the essential ingredients, an effective amount of an antiplaque quaternary ammonium compound, a flavouring agent formulation consisting essentially of at least 15% by weight of anethol, up to 46% by weight of menthol and up to 39% by weight of peppermint, and a sweetening agent, the weight ratio of flavouring agent to sweetening agent being

about 6:1 to 1.3:1, preferably about 2.5:1, in a dental vehicle comprising a dental abrasive.

More specifically, the present invention relates to an antiplaque dentifrice formulation with improved flavour comprising an effective antimicrobial amount of a quaternary ammonium compound, about 0.8-1.2% by weight of a flavouring agent formulation which flavouring agent typically consists essentially of about 15-45% anethol, about 46-31% menthol and about 39-24% peppermint, and about 0.2-0.6% sweetening agent, the weight ratio of flavouring agent to sweetening agent being about 6:1 to 1.3:1, preferably about 2.5:1, in a dental vehicle comprising a dental abrasive. The present antiplaque dentifrice preferably contains about 1.5-5% by weight of a betaine surfactant, about 18-30% by weight of a humectant e.g. polyethylene glycol, sorbitol, or glycerin or mixtures thereof, 0.5-2% by weight of a nonionic gelling agent and about 0.05-2% by weight of a fluoride-providing compound in an aqueous vehicle containing about 35-65% by weight of a water-insoluble dental abrasive. All of the aforesaid preferred ingredients are compatible with the quaternary ammonium compound, the flavour formulation and the sweetening agent.

Cationic antibacterial materials are well known in the art. See, for instance the section on "Quaternary Ammonium and Related Compounds" in the article on "Antiseptics and Disinfectants" in Kirk-Othmer Encyclopedia of Chemical Technology, 2nd

edition (Vol. 2 pp.632-635). Cationic materials which possess antibacterial activity (i.e. are germicides) are used against bacteria and have been used in oral compositions to counter plaque formation caused by bacteria in the oral cavity.

Among the most common of these antibacterial antiplaque quaternary compounds is benzethonium chloride (BTC), also known as Hyamine 1622 or diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride, and cetyl pyridinium chloride. In an oral preparation this material is highly effective in promoting oral hygiene by reducing formation of dental plaque and calculus, which is generally accompanied by a reduction in periodontal diseases. Other cationic antibacterial agents of this type are those mentioned, for instance, in U.S. Patent Nos. 2,984,639, 3,325,402, 3,431,208 and 3,703,583, and British Patent No. 1,319,396.

Other antibacterial antiplaque quaternary ammonium compounds include those in which one or two of the substituents on the quaternary nitrogen has a carbon chain length (and is typically an alkyl group) of some 8 to 20, typically 10 to 18, carbon atoms while the remaining substituents have a lower number of carbon atoms (and are typically alkyl or benzyl groups), such as 1 to 7 carbon atoms, typically methyl or ethyl groups. Dodecyl trimethyl ammonium bromide, benzyl dimethyl stearyl ammonium chloride, cetyl pyridinium chloride and quaternized 5-amino-

1,3-bis (2-ethylhexyl)-5-methyl hexa hydro-pyrimidine are typical quaternary ammonium antibacterial agents.

The dentifrice formulation of the present invention contains an effective amount of the anti-plaque quaternary ammonium compound, preferably about 0.01-5%, and most preferably 0.025-1% by weight of the composition.

The ability of quaternary ammonium compounds to inhibit the formation of dental plaque is well known. However, the bitterness of these compounds is also well known. As a matter of fact, the bitterness of a BTC rinse is minimal to non-existent, while the bitterness of the BTC dentifrice is robust. This is so, even though the amount of BTC delivered to the mouth is greater from the rinse than from the dentifrice. Accordingly, the bitterness problem is specific to dentifrices containing BTC or other quaternary antiplaque agents.

It has now been found that the incorporation of the present novel flavouring agent formulation consisting essentially of specified amounts of anethol, menthol and peppermint into antiplaque dental formulations based on quaternary active ingredients in proper ratio to the sweetening agent, unexpectedly and significantly improves the taste of this dentifrice, and reduces the bitter taste of the quaternary ammonium-containing dentifrice. Dentifrices containing this novel flavouring agent formulation have a positive initial impact upon tasting, whereas dentifrices containing other

flavours presently on the market can be initially offensive, or have a medicinal flavour.

The selected components of the flavouring agent formulation in accordance with the present invention typically consist essentially of a mixture of:

1. about 15-45% and preferably 25-45% by weight of anethol, $MeO.C_6H_4.CH:CHMe$, a sweet aromatic semi-liquid;

2. about 46-31% and preferably 41-31% by weight of menthol, 3-hydroxymenthane, cool tasting colourless crystals; and

3. about 39-24% and preferably 34-24% by weight of peppermint in the form of dried leaves, a fluid extract or an oil, usually a colourless liquid of a strong agreeable odour. The aforedefined three components are mixed together and the mixture is added to the dentifrice. This mixture in combination with a sweetening agent effectively masks the bitter taste of the quaternary compound.

Specific flavouring agent formulations utilized herein are:

	A(%)	B(%)	C(%)	D(%)
Anethol	25	15	35	45
Menthol	41	46	36	31
Peppermint	34	39	29	24

It has been found that reducing the anethol content below 15%, and increasing the menthol content above 46%, and the peppermint content above 39% provides poor coverage of the bitterness due to the quat BTC (benzethonium chloride); whereas the flavouring agent

formulations A-D inclusive in proper ratio to sweetening agent provide good coverage of the BTC bitterness in the dentifrice.

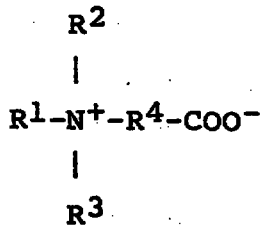
The amount of the flavouring agent formulation effective in masking the bitterness of the quat, and yield a non-medicinal, pleasant tasting flavour, is typically about 0.8 to 1.2% by weight of the dentifrice composition. Greater amounts of flavour produce a strong flavour and lesser amounts yield a weak flavour.

Another essential ingredient in the formulation according to the present invention is the sweetening agent in the weight ratio of about 6:1 to 1.3:1, and preferably about 2.5:1 of flavouring agent to sweetening agent. The sweetening agent which is desirably at least as sweet as sucrose, includes sucrose, lactose, maltose, stevioside, perillartine, acetosulpham, sodium cyclamate and sodium saccharin. The sweetening agent coacts with the flavouring agent in the production of a sweet, cool pleasant taste which masks or covers the bitterness of the quaternary compound. The amount of sweetening agent effective in assisting the present novel flavour formulation in masking the bitterness of the quat and sweetening the dentifrice is typically about 0.2-0.6% and preferably about 0.4% by weight of the dentifrice composition. Less than 0.2% does not sufficiently cover the bitterness of the quat and greater than 0.6% produces a dentifrice having a strong sweet taste.

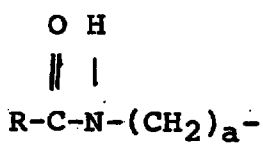
The present antiplaque dentifrice preferably

contains a surfactant to promote foaming. It is preferable to employ betaine surfactants because these improve the foaming of these formulations without deactivating the quaternary antibacterial agents.

The preferred betaine component of the present dentifrice composition has the general formula:



wherein R^1 represents an alkyl group having 10 to about 20 carbon atoms, preferably 12 to 16 carbon atoms or the amido radical:



wherein R represents an alkyl group having about 10 to 20 carbon atoms and a is the integer 1 to 3; R^2 and R^3 each represent alkyl groups having 1 to 3 carbons and preferably 1 carbon; R^4 represents an alkylene or hydroxyalkylene group having from 1 to 4 carbon atoms and, optionally, one hydroxyl group. Tyical alkyldimethyl betaines include decyl betaine or 2-(N-decyl-N,N-dimethylammonio) acetate, coco betaine or 2-(N-coco-N,N-dimethylammonio) acetate, myristyl betaine, palmityl betaine, lauryl betaine,

cetyl betaine, and stearyl betaine. The amido-betaines similarly include cocoamidoethyl betaine, cocoamidopropyl betaine, and lauramidopropyl betaine.

The betaines, which are zwitterionic materials, function as a foaming agent in the quaternary-containing dentifrice compositions. They act cationically over a wide pH range, but do not deactivate the quaternary compounds antimicrobial activity.

In addition to the non-interference exhibited by the betaines with the quaternary compounds activity, laboratory foam tests have shown that formulations containing both the quaternary ammonium compound (quat) and the betaine, foam 2-3 times better than nonionic/quat formulations.

The zwitterionic betaines are completely compatible with the quaternary antimicrobial antiplaque agents, the novel flavour formulation containing specified amounts of anethol, menthol and peppermint, and the sweetening agents, and impart detersive and improved foaming properties to the quaternary-containing dentifrice composition without deactivating the antimicrobial properties thereof. The amount of betaine effective in the production of improved foaming may be varied from about 1.5-5% by weight of the total formulation.

Cosmetic problems of stability are incurred with all zwitterionic-containing dentifrices, such as crimp leakage of flavour. The flavour oozes and is not solubilized in the zwitterionic surfactant.

However, stability evaluations of antiplaque dentifrices according to the present invention containing glycerin and/or sorbitol humectant indicate satisfactory flavour stability for nine weeks aging at 49°C.

In a toothpaste, the dental vehicle is preferably a liquid vehicle comprising water, and a humectant selected from the group consisting of glycerin, sorbitol, polyethylene glycol and mixtures thereof. The humectant system may constitute about 18-30% by weight of the total composition.

Another preferable ingredient in dentifrice formulations according to the present invention is a gelling agent which is a nonionic gum, in an amount up to 5% by weight and preferably about 0.5-2%. It has been found that large organic anionic molecules such as carboxymethylcellulose have the potential to deactivate the quaternary antibacterial activity. Accordingly, hydroxyethylcellulose, which is a nonionic small organic molecule, and produces a stable pituitous gel in the betaine-quat system of the present invention, is the preferred gelling agent. Other nonionic gelling agents may be used such as hydroxymethylcellulose, and the like.

The fluoride-providing compounds, which are preferably additional ingredients in dentifrices according to the present invention are characterised by their ability to release fluoride ions in water and by substantial freedom from reaction with other compounds of the dentifrice. Among these materials

are inorganic fluoride salts, such as soluble alkali metal, alkaline earth metal and heavy metal salts, for example, sodium fluoride, potassium fluoride, ammonium fluoride, lead fluoride, a copper fluoride such as cuprous fluoride, zinc fluoride, a tin fluoride such as stannic fluoride or stannous chlorofluoride, barium fluoride, sodium fluorosilicate, ammonium fluorosilicate, sodium fluorozirconate, sodium monofluorophosphate, aluminium mono- and difluorophosphate, and fluorinated sodium calcium pyrophosphate. Alkali metal and tin fluorides, such as sodium and stannous fluorides, sodium monofluorophosphate and mixtures thereof, are preferred.

The amount of the fluoride-providing compound is dependent to some extent, upon the type of compound, its solubility, and the dentifrice, but it must be a nontoxic amount. In a solid oral preparation, such as a toothpaste or dental cream, an amount of such compound which releases a maximum of 1% by weight of the preparation is considered satisfactory. Any suitable minimum amount of such compound may be used, but it is preferable to employ sufficient compound to release from 0.005% to 1%, and preferably about 0.1% of fluoride ion. Typically, in the cases of alkali metal fluorides and stannous fluoride, this component is present in an amount up to 2% by weight, based on the weight of the preparation. In the case of sodium monofluorophosphate, the compound may be present in an amount up to 7.6% by weight, more typically 0.76%.

The dentifrice prepared in accordance with the

present invention, contains dental abrasive e.g. conventional water-insoluble polishing materials or dental abrasives, generally in amounts from 35-65% by weight of the total formulation. Suitable examples of dental abrasives or polishing materials include sodium metaphosphate, potassium metaphosphate, tricalcium phosphate, dihydrated calcium phosphate, anhydrous dicalcium phosphate, calcium pyrophosphate, magnesium orthophosphate, trimagnesium phosphate, calcium carbonate, zirconium silicates, bentonite, and mixtures thereof. The preferred abrasives are alumina-containing abrasives such as calcined alumina and hydrated alumina and mixtures thereof.

The dentifrices of the present invention may also contain conventional additional ingredients such as colouring or whitening agents, and preservatives. These additional ingredients may each be added to the dentifrice in minimal amounts of up to 5% by weight, and preferably up to 1%, provided they do not interfere with the foaming, antiplaque and compatibility properties of the finished product.

The dentifrice of the present invention may be prepared by conventional methods of making toothpaste and/or dental creams. More specifically, a toothpaste may be prepared by forming a gel with the nonionic gelling agent and water, adding sequentially thereto with mixing the powdered materials including the fluoride compound, the quaternary ammonium compound and sweetening agent, and humectant, followed by the addition with mixing of polishing agent and the

betaine and flavour, then inserting the final mixture in tubes.

Another method of preparing the dentifrice of the present invention is specifically set forth and claimed in our copending patent application No. 8522158, Serial No. 2164255, and comprises the preparation of two separate gel phases, an oil gel phase of the active quaternary ingredient solubilized in the betaine surfactant and the flavour, a water gel phase of water, humectant, nonionic gelling agent, the fluoride salt and the sweetening agent, combining these two gel phases into a single gel, and adding a dental abrasive thereto as a final step, or adding the said abrasive to the water gel phase prior to the addition of the oil gel phase.

In the practice of the present invention to promote oral hygiene, the dentifrice according to this invention is applied regularly to dental enamel by brushing the teeth for 30-90 seconds at least once daily.

The invention may be put into practice in various ways and a number of specific embodiments will be described to illustrate the invention with reference to the accompanying examples. The compositions are prepared in the usual manner and all amounts and proportions referred to herein and in the appended claims are by weight unless otherwise indicated.

EXAMPLE 1

A glycerin humectant antiplaque dentifrice is made up using the ingredients and proportions given in Table 1 below:

Table 1

Ingredients	%
Water (Deionized)	19.34
Sodium saccharin	0.30
Sodium Monofluorphosphate	0.76
Hydroxyethylcellulose	1.10
Glycerin	20.00
Benzethonium Chloride	0.50
Flavour Formulation[1]	1.00
Cocoamidopropyl Betaine	5.00
Calcined Alumina	10.00
Hydrated Alumina	42.00

Note on Table 1

1) 25% anethol, 41% menthol and 34% peppermint.

The benzethonium chloride is dispersed in the flavour and this dispersion is mixed into the betaine to form an oil gel. The sodium saccharin and sodium monofluorophosphate (MFP) are dissolved in the water. Hydroxyethylcellulose is dispersed in the glycerin, and this mixture is added to the water-saccharin-MFP solution with stirring to form a water gel. The oil and water gels are mixed to form a stable parent gel. The calcined alumina and hydrated alumina are admixed with the parent gel to produce

the finished antiplaque dentifrice having a sweet, cool, pleasant flavour and good BTC (bitterness) coverage, and a positive initial impact upon tasting, and possesses excellent chemical and cosmetic stability and sufficient foaming properties. This dentifrice is prepared at room temperature.

EXAMPLE 2

Example 1 is repeated except that 20% sorbitol is substituted for the 20% glycerin. The resultant product is equally effective against plaque related bacteria and also has a sweet, cool, pleasant taste and good BTC coverage, and a positive initial impact upon tasting, and possesses excellent chemical and cosmetic stability and sufficient foaming properties.

EXAMPLES 3 to 6

Example 1 is repeated except that the level of sodium saccharin is varied from 0.2% to 0.6% and the water content is adjusted accordingly. Table 2 below compares the properties of these various formulations.

Table 2

Ex.	Saccharin (%)	Taste Evaluation
3	0.2	Covers BTC, fair
1	0.3	Covers BTC, Fair to Good
4	0.4	Good, Ideal
5	0.5	Good, Sweet
6	0.6	Good, Very Sweet

EXAMPLES 7 to 10

Example 4 is repeated except that the level of the flavour is varied from 0.6% to 1.4% and the water content is adjusted accordingly.

Ex.	Flavour (%)	Taste Evaluation
7	0.6	Flavour weak, BTC coverage Fair
8	0.8	Flavour O.K., BTC coverage Fair to Good
4	1.0	Flavour O.K., BTC coverage Good
9	1.2	Flavour Strong, BTC coverage Good
10	1.4	Flavour too Strong, BTC coverage Good

EXAMPLE 11

Example 4 is repeated except that the flavour formulation contains 15% anethol, 46% menthol and 39% peppermint. The finished product has good BTC coverage.

EXAMPLE 12

Example 4 is repeated except that the flavour formulation contains 35% anethol, 36% menthol and 29% peppermint. The finished product has good BTC coverage.

EXAMPLE 13

Example 4 is repeated except that the flavour formulation contains 45% anethol, 31% menthol and 24% peppermint. The finished product has good BTC coverage.

EXAMPLE 14

A dentifrice is made up using the ingredients and proportions given in Table 3 below.

Table 3

Ingredients	%
Hydroxyethylcellulose	1.0
Carbowax 600[1]	20.0
Na Saccharin	0.2
MFP[2]	0.76
CAB[3] (35% A.I.)	3.5
Dicalcium Phosphate	49.0
BTC[4]	0.5
D.I. H_2O	24.04
Flavour Formulation[5]	1.0

Notes on Table 3

1) Polyethylene glycol, mol. weight 600
2) Sodium monofluorphosphate
3) Cocoamidopropyl betaine
4) Benzethonium chloride
5) 25% anethol, 41% Menthol and 34% Peppermint.

The hydroxyethylcellulose and water are premixed for 10 minutes to form a gel. The powdered materials MFP, BTC and saccharin, and the Carboxwax humectant is added to the gel and mixed for 10 to 20 minutes. The gelled mixture is added to dicalcium phosphate and mixed for 20 minutes at speed 8 in a Ross agitator. The betaine and flavour is added to the mixture and mixed for 5 minutes at speed 6 in a Ross agitator. The resultant dental cream which is cosmetically attractive is tubed.

The resultant antiplaque product has a very

pleasant, sweet, cool taste and the bitterness of the quat compound is completely masked or covered.

EXAMPLE 15

A dentifrice is made up using the ingredients and proportions given in Table 4 below.

Table 4

Ingredients	%
Hydroxyethylcellulose	1.1
Na Saccharin	0.3
BTC	0.5
MFP	0.76
Carbowax 600	10.0
Sorbitol (70%)	10.0
H_2O Deionized	19.34
Hydrated Alumina	10.0
Calcined Alumina	42.0
Flavour Formulation[1]	1.0
CAB (30% A.I.)	5.0

Note on Table 4

1) 25% anethol, 41% menthol and 34% peppermint.

The resultant antiplaque dentifrice has a good flavour when initially tasting as well as during the entire period of its use.

EXAMPLE 16

A dentifrice is made up using the ingredients and proportions given in Table 5 below

Table 5

Ingredients	%
Polyethylene Glycol (Carbowax 600)	15
Glycerin	5
Hydroxyethylcellulose	1.10
Sodium Monofluorophosphate	0.76
Sodium Saccharin	0.30
Benzethonium chloride (BTC)	0.50
Hydrated Alumina	10
CAB (30% A.I.)	5
Flavour Formulation[1]	1
Water	19.34
Fl^- content[2]	0.07

Notes on Table 5

1) 25% anethol, 41% menthol and 34% peppermint

2) Chemical stability of the above formulation after accelerated aging for 12 weeks at 37.8°C as determined by the percentage of Fl^- content.

This antiplaque dentifrice has a sweet, pleasant, cool flavour and is free of the bitter taste of the BTC antiplaque agent.

Variations in the above formulations may be made. For example, other betaines such as lauramidopropyl betaine, cocobetaine and the like may be substituted for the cocoamidopropyl betaine in the examples. Similarly, other abrasives may be substituted for the specific abrasives in the examples. Likewise, other fluoride-containing

compounds such as sodium fluoride, or potassium fluoride, may be substituted for the sodium monofluorophosphate in the specific examples. Likewise, cetyl pyridinium chloride or other quaternary ammonium antiplaque agents may be substituted for the benzethonium chloride. Also, sodium cyclamate may replace sodium saccharin.

CLAIMS

1. An antiplaque dentifrice comprising as the essential ingredients, an effective amount of an antiplaque quaternary ammonium compound, a flavouring agent formulation consisting essentially of at least 15% by weight of anethol, up to 46% by weight of menthol and up to 39% by weight of peppermint, and a sweetening agent, the weight ratio of flavouring agent to sweetening agent being about 6:1 to 1.3:1, in a dental vehicle comprising a dental abrasive.

2. A dentifrice as claimed in Claim 1, in which the flavouring agent formulation constitutes about 0.8-1.2% by weight of the formulation, and the sweetening agent constitutes about 0.2-0.6% by weight of the formulation.

3. A dentifrice as claimed in Claim 1 or Claim 2 in which the said sweetening agent is at least as sweet as sucrose.

4. A dentifrice as claimed in Claim 3, in which the said sweetening agent is sucrose, lactose, maltose, stevioside, perillartine, acetosulpham, sodium cyclamate, sodium saccharin or a mixture thereof.

5. A dentifrice as claimed in any one of Claims 1 to 3 in which the said sweetening agent is sodium saccharin.

6. A dentifrice as claimed in any one of Claims 1 to 5, in which the flavouring agent formulation consists essentially of about 15-45% anethol, about 46-31% menthol and about 39-24% peppermint.

7. A dentifrice as claimed in Claim 6, in which the flavour formulation contains 25% anethol, 41% menthol and 34% peppermint.

8. A dentifrice as claimed in Claim 6, in which the flavour formulation contains 15% anethol, 46% menthol and 39% peppermint.

9. A dentifrice as claimed in Claim 6, in which the flavour formulation contains 35% anethol, 36% menthol and 29% peppermint.

10. A dentifrice as claimed in Claim 6, in which the flavour formulation contains 45% anethol, 31% menthol and 24% peppermint.

11. A dentifrice as claimed in any one of Claims 1 to 10, containing about 1.5-5% by weight of betaine surfactant.

12. A dentifrice as claimed in Claim 11, in which the betaine is cocoamidopropyl betaine.

13. A dentifrice as claimed in any one of Claims 1 to 12, containing about 18-30% of a humectant system

selected from the group consisting of polyethylene glycol, sorbitol, glycerin and mixtures thereof.

14. A dentifrice as claimed in any one of Claims 1 to 13, containing about 0.5-2% by weight of a nonionic gelling agent.

15. A dentifrice as claimed in Claim 13, in which the nonionic gelling agent is hydroxyethyl-cellulose.

16. A dentifrice as claimed in any one of Claims 1 to 15, containing a fluoride-providing compound in amount which releases about 0.005-1% by weight of fluoride ion.

17. A dentifrice as claimed in Claim 16, in which the fluoride-providing compound is sodium monofluorophosphate.

18. A dentifrice as claimed in any one of Claims 1 to 17, containing about 35-65% by weight of a water-insoluble dental abrasive.

19. A dentifrice as claimed in Claim 18, in which the dental abrasive is an alumina-containing abrasive.

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20. A dentifrice as claimed in Claim 19, in which the dental abrasive is a mixture of calcined alumina and hydrated alumina.

21. A dentifrice as claimed in any one of Claims 1 to 20, in which the antiplaque agent is benzethonium chloride in an amount of about 0.01-5% by weight of the dentifrice.

22. A dentifrice as claimed in any one of Claims 1 to 21, in which the ratio of flavouring agent to sweetening agent is about 2.5:1 by weight.

23. A dentifrice as claimed in any one of Claims 1 to 22, in which the dental vehicle is a liquid vehicle comprising water and a humectant selected from the group consisting of glycerin, sorbitol, polyethylene glycol and mixtures thereof.

24. A dentifrice as claimed in Claim 1 substantially as specifically described herein with reference to the examples.