"COMPOSITIONS TO COUNTER BREATH ODOUR"

The present invention relates to novel oral formulations comprising a combination of a salt which provides zinc ions and an ionone ketone terpene derivative as an effective material against breath odour.

The prior art is replete with oral compositions containing zinc salts such as zinc chloride, zinc iodide, zinc fluoride, zinc phenol sulphonate and the like as antiseptic agents, and correctives of oral conditions such as pyorrhea. Zinc chloride has commonly been used in oral formulations for its astringency properties. Zinc phenol sulphonate has been utilized in the prior art dentifrice compositions as an anti-plaque and anti-calculus agent as well as an odour inhibitor of fermentation and putrefaction which occurs in the oral cavity. Compositions in which these soluble zinc salts have been used have had disadvantages such as leaving an unpleasant astringent taste in the mouth and/or having short-lived efficacy against plaque, and as an odour inhibitor.

Sparingly soluble zinc salts such as zinc citrate have been used in dentifrice formulations to prolong the anti-calculus and anti-plaque effectiveness of the zinc ions due to the slow dissolution of the zinc salts in the saliva.

The reaction product of a zinc compound and polymer has been described in U.S. Patent 4,138,477 as a compound which effectively controls mouth odour. Such control can last a few hours; but generally not overnight.

The use of a zinc complex of a specific diketone as an agent for combating tartar and tooth discolouration is also known, as set forth in German Patent No. 2,229,466. Thus, it is apparent that zinc compounds are generally known to have deodorizing properties as well as other properties desirable in oral hygiene.

Deodorant terpenes have been described in British Patent 1,311,060. Such terpenes include the ionone ketone terpenes, alpha-ionone and beta-ionone.

The present invention aims to provide a synergistic improvement in countering breath odour by incorporating into an oral composition a material comprising a compound which provides zinc ions and an ionone ketone terpene.

The present invention also aims to provide an oral composition which is synergistically effective in countering breath odour over a prolonged period of time.

In accordance with certain of its aspects, the present invention relates to an oral composition consisting essentially of a non-toxic zinc salt in amount which provides at least about 0.01 mg of zinc ions in 1 ml of water and an ionone ketone terpene derivative, the ratio of zinc ions to the said ionone ketone terpene derivative being about 1000:1 to 5:1 by weight.

Zinc compounds to be used to provide zinc ions for use in combination with ionone may be any physiologically acceptable zinc salt including the water soluble (including sparingly water soluble) organic

and inorganic zinc salts which provide at least about 0.01 mg of zinc ions per ml of water. The water-soluble zinc salts (at least 1% soluble) are preferred, especially the zinc halides and zinc acetate. Among sparingly soluble zinc salts, zinc citrate is preferred. Examples of suitable zinc salts that may be employed include: zinc fluoride, zinc acetate, zinc formate, zinc ammonium sulphate, zinc iodide, zinc bromide, zinc nitrate, zinc chloride, zinc phenol sulphonate, zinc chromate, zinc salicylate, zinc citrate, zinc sulphate, zinc dithionate, zinc gluconate, zinc fluosilicate, zinc succinate, zinc tartrate, and zinc glycerophosphate. Other zinc salts disclosed in U.S. Patent 4,138,477 having a solubility of at least about 0.01 mg of zinc ions per ml of water are incorporated herein by reference.

Such zinc salts include: zinc isovalerate, zinc acetylacetonate, zinc D-lactate, zinc DL-lactate, zinc benzoate, zinc laurate, zinc hexafluorosilicate, zinc beryllium orthosilicate, zinc methacrylate, zinc borate, zinc molybdate, zinc butylphthalate, zinc naphthenate, zinc butylxanthate, zinc octoate, zinc caprylate, zinc oleate, zinc carbonate, zinc orthos-phosphate, zinc chloroanilate, zinc chlorate, zinc pyridine-2-thiol-1-oxide, zinc pyrophosphate, zinc resinate, zinc cyclohexanebutyrate, zinc gallate, zinc selenide, zinc alpha-glucoheptonate, zinc stearate, zinc sulphanilate, zinc hydroxide, zinc tellurate, zinc 8-hydroxyquino-

line, zinc tungstate, zinc 12-hydroxystearate, zinc valerate, zinc vanadate, zinc acrylate, zinc tribromosalicylanilide, zinc oxide, zinc ricinoleate, and zinc propionate.

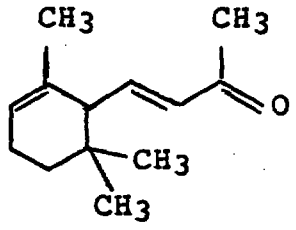
The zinc salt is present in amounts which provide about 0.01-5% by weight of zinc ions and preferably about 0.02-1% of zinc ions by weight of the oral compositions.

The solubility of the zinc salt used to provide zinc ions appears to be a factor in the activity against odour formation. However, the effect is synergistically improved when an ionone terpene ketone is present.

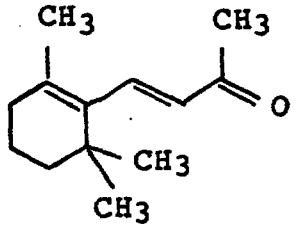
Ionone is an ionone ketone terpene derivative containing one ketonic carbonyl group. The basic ionone formula is

$$(CH_3)_3C_6H_6CH{=}CHCOCH_3.$$

It is available as alpha-ionone (b.p. 120°C) (formula I below) and beta-ionone (b.p. 135°) (formula II below), both of which are colourless liquids and slightly soluble in water.



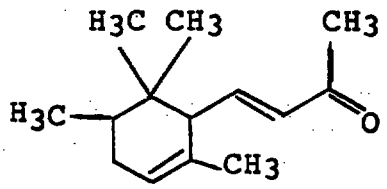
Formula I



Formula II

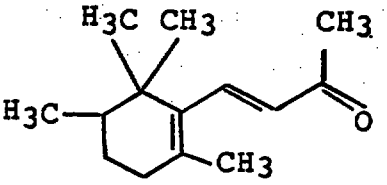
It is employed in oral compositions preferably in amounts such that the ratio of zinc ions to ionone is about 1,000:1 to 10:1 by weight, 50:1 to 500:1 or 50:1 to 250 e.g. 100:1 to 200:1. Other variants of ionone such as gamma-ionone dihydroionone and alphamethyl ionone may also be employed. Furthermore, as used herein, the term "an ionone ketone terpene derivative" includes isomeric forms of ionones, e.g. irone.

Irone occurs in alpha, beta and gamma forms. Alpha irone has a number of stereoisomers but can be represented generally by Formula III:



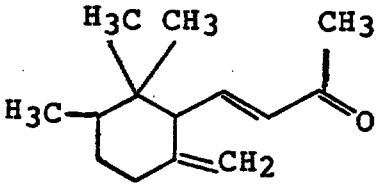
Formula III

Beta irone also has a number of stereoisomers but again can be represented generally by Formula IV:



Formula IV

Gamma irone also has a number of stereoisomers and again can be represented generally by Formula V:



Formula V

It is convenient to employ it in oral compositions in amounts of about 0.0005-1% by weight, preferably about 0.001-1% e.g. 0.005 to 1% by weight of the composition. Alpha-ionone is preferred.

In British Patent 1,311,060, it was theorized that amelioration of oral malodours by ionone may have occurred due either to an ability to block odour receptor sites in the olfactory epithelium or to low olfactory thresholds for the compound and possibly a combination of both. Regardless of the reason for the effect, however, it is not long-lasting. When reduction in breath odour is evaluated after an overnight sleep period, little, if any, reduction is found. On the other hand, when an ionone ketone terpene is used in combination with a salt which provides zinc ions, there are synergistic effects in countering breath odour for a prolonged period.

Aqueous solutions and dispersion of control, placebo and various zinc ion-ionone ketone terpene materials can be tested in an <u>in vitro</u> system and <u>in vivo</u>. In the <u>in vitro</u> test, whole human saliva with L-cysteine as substrate is incubated for 3 hours or overnight at 37°C in an airtight container. After incubation, the headspace volatile sulphur compound ("VSC", the main cause of offensive breath odour) formation is measured by an instrumental GC-flame photometric technique. Since breath odour has been attributed to the presence of VSC's such as hydrogen sulphide, methyl mercaptan and to a lesser extent, dimethyl sulphide, resulting from putrefactive processes

occurring in the oral cavity, the in vitro test provides results comparable to in vivo sensory evaluations.

In vivo tests are done on a panel of randomly chosen people equally divided into two groups, one of which uses a control mouthrinse whilst the other uses a test mouthrinse. Initially for one week, each group rinses with its respective mouthrinse for one minute each night before sleep. During the following week, each group rinses with the opposite product.

Baseline breath samples are obtained from each subject in order to evaluate breath during the morning after awakening but without prior brushing, rinsing, eating and drinking. Two breath samples are taken from each subject ten minutes apart during which time the subjects keep their mouths closed.

Aqueous dispersions or solutions of zinc salt-ionone ketone terpene material may be produced by separately adding the zinc salt in a dilute solution, a paste or in the dry state, and the ionone ketone terpene to water. The ionone ketone terpene may be conveniently and preferably included as a component added to a flavouring oil, such as oil of peppermint.

While particularly good results in terms of countering breath odour are obtained by simply applying the aqueous solutions or dispersions of the zinc salt-ionone ketone terpene material, it is to be understood that it is within the broader aspect of the present invention to incorporate zinc salt and ionone ketone terpene material into oral compositions generally, such as clear or

cloudy mouth rinses, mouth sprays and toothpastes, which contain an aqueous oral or dental vehicle, or powders which can be readily dispersed or dissolved in an aqueous vehicle. When the oral composition is a simple solution or a mouth rinse or mouth spray the zinc salt and ionone ketone terpene material is typically dissolved in water and a non-toxic alcohol.

The vehicle in a toothpaste, often referred to as a dental vehicle contains liquids and solids. In general, the liquid comprises water and often a humectant such as glycerine, sorbitol, propylene glycol or polyethylene glycol 400 or suitable mixtures thereof. It is usually advantageous to use a mixture of both water and one or two humectants. The total liquid content is generally about 20-90% by weight of the vehicle. The liquid content of the toothpaste generally includes about 5-40% of water. The preferred humectants are glycerine and sorbitol, for instance in amounts of about 10-50% by weight.

When the oral composition is a toothpaste, as mentioned above, the dental vehicle also contains, as a solid portion, a gelling agent. The gelling agent may be an alkali metal carboxymethyl cellulose, a carrageenan such as viscarin and i-carrageenan, gelatin, starch, glucose, sucrose, polyvinyl pyrollidone, polyvinyl alcohol, gums such as gum tragacanth and gum karaya, hydroxypropyl cellulose, methyl cellulose, carboxyethyl cellulose, sodium alginate, Laponite CP or SP, which are each synthetic inorganic complex silicate clays sold under trademark by

Laporte Industries Ltd., and magnesium aluminium silicate gel as well as mixtures thereof. The solid portion or gelling agent of the vehicle is typically present in an amount of about 0.25-10% by weight of the toothpaste and preferably about 0.5-5% by weight. Alkali metal carboxymethyl cellulose may be used as the lithium, sodium and potassium salts. Sodium carboxymethyl cellulose is preferred.

Any suitable substantially water-insoluble polishing agent may be added to the dental vehicle of a toothpaste. There is a relatively large number of such materials known in the art. Representative materials include, for example, dicalcium phosphate, tricalcium phosphate, insoluble sodium metaphosphate, silica, sodium aluminosilicate (silica containing combined alumina), aluminium hydroxide, magnesium carbonate, calcium carbonate, calcium pyrophosphate, calcium sulphate, bentonite, and suitable mixtures thereof. It is preferred to use the water-insoluble phosphate, sodium metaphosphate and/or a calcium phosphate, such as dicalcium phosphate dihydrate. In general, these polishing agents will comprise a major proportion by weight of the solid ingredients. The polishing agent content is variable, but will generally be up to about 75% by weight of the total composition, generally about 20-75%; although, even lower amounts of polishing agent can be employed.

Any suitable or compatible surface-active or detersive material may be incorporated in the dental vehicle. Such compatible materials are desirable to

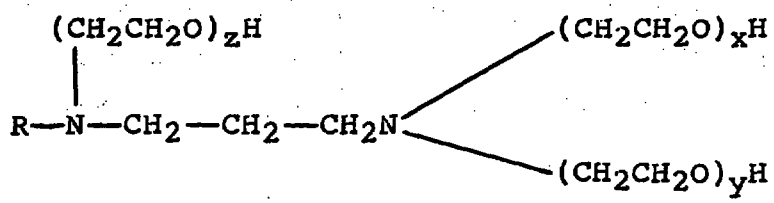
provide additional detersive, foaming and antibacterial properties depending upon the specific type of surface-active material and are appropriately selected. These detergents are usually water-soluble organic compounds, and may be anionic, nonionic, or cationic in nature. It is preferred usually to use the water-soluble non-soap or synthetic organic detergents. Suitable detersive materials are known and include, for example, the water-soluble salts of higher fatty acid monoglyceride monosulphate detergents (e.g. sodium coconut fatty acid monoglyceride monosulphate), higher alkyl sulphates (e.g. sodium lauryl sulphate), alkyl aryl sulphonate (e.g. sodium dodecyl benzene sulphonate), methylcocoyl taurate, higher fatty acid esters of 1,2-dihydroxypropanesulphonate) and mixtures thereof.

Further detersive materials include the substantially saturated higher aliphatic acyl amides of lower aliphatic amino carboxylic acid compounds, such as those having 12 to 16 carbons in the acyl radical. The amino acid portion is derived generally from the lower aliphatic saturated monoamino carboxylic acids having about 2 to 6 carbons, usually the monocarboxylic acid compounds. Suitable compounds are the fatty acid amides of glycine, sarcosine, alanine, 3-aminopropanoic acid and valine having about 12 to 16 carbons in the acyl group. It is preferred to use the N-lauroyl, myristoyl and palmitoyl sarcoside compounds, however, for optimum effects.

The amide compounds may be employed in the form

of the free acid or preferably as the water-soluble salts thereof, such as the alkali metal, ammonium, amine and alkylolamine salts. Specific examples thereof are sodium and potassium N-lauroyl, myristoyl and palmitoyl sarcosides, ammonium or ethanolamine, N-lauroyl sarcoside or N-lauroyl sarcosine, and sodium N-lauroyl glycine and alanine. For convenience herein, reference to "amino carboxylic acid compound", "sarcoside", and the like refers to such compounds having a free carboxylic group or the water-soluble carboxylate salts.

Other particularly suitable surface-active materials include nonionic agents such as condensates of sorbitan monostearate with approximately 20 moles of ethylene oxide, condensates of ethylene oxide with propylene glycol ("Pluronics" (Registered Trade Mark) and castor oil ester (e.g. Cremopher EL) and amphoteric agents such as quaternized imidazole derivatives, which are available under the trade mark MIRANOL (Registered Trade Mark) such as MIRANOL C2M. Cationic surface active germicides and anti-bacterial compounds such as diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride, tertiary amines having one fatty alkyl group (of from 12-18 carbon atoms) and two (poly)oxyethylene groups attached to the nitrogen (typically containing a total of from 20 to 50 ethanoxy groups per molecule) and salts thereof with acids, and compounds of the structure:



wherein R represents a fatty alkyl group typically containing from 12 to 18 carbon atoms, and x, y and z total 3 or higher, as well as salts thereof with mineral or organic acids, may also be used.

The various surface-active materials may be used in any suitable amount, generally from about 0.05 to about 10% by weight, and preferably from about 0.5 to 5% by weight of the dentifrice composition.

Various other materials may be incorporated in the vehicles for compositions in accordance with the present invention. Examples thereof are preservatives, silicones, chlorophyll compounds, ammoniated materials such as urea, diammonium phosphate and mixtures thereof, materials which can increase contrast with the particles, such as zinc oxide or titanium dioxide and other constituents. These adjuvants are incorporated in the compositions of the present invention in amounts which do not substantially adversely affect the properties and characteristics and are suitably selected and used in proper amount depending upon the particular type of preparation involved.

Antibacterial agents may also be employed in the vehicles for compositions in accordance with the present invention. Typical antibacterial agents include:

N^1-(4-chlorobenzyl)-N^5-(2,4-dichlorobenzyl) biguanide;

p-chlorophenyl biguanide;

4-chlorobenzhydryl biguanide;

4-chlorobenzhydrylguanylurea;
N-3-lauroxypropyl-N-p-chlorobenzylbiguanide;
1,6-di-p-chlorophenylbiguanide hexane;
1-(lauryldimethylammonium)-8-(p-chlorobenzyl-dimethyl ammonium) octane dichloride;
5,6-dichloro-2-guanidinobenzimidazole;
N^1-p-chlorophenyl-N^5-laurylbiguanide;
5-amino-1,3-bis(2-ethylhexyl)-3-methylhexahydro pyrimidine;

and their non-toxic acid addition salts.

The antibacterial agent, when present, is employed in amounts of about 0.1-5% by weight, preferably about 0.05-5% by weight of the composition.

Any suitable flavouring or sweetening materials may be employed in supplementing the ionone ketone terpene component in compositions according to the present invention. It is preferable to include the ionone ketone terpene as an additive to flavouring oil; the presence of flavouring oil improves the taste of the zinc-containing product. Examples of suitable supplemental flavouring oils include oils of spearmint, peppermint, wintergreen, sassafras, clove, sage, eucalyptus, marjoram, cinnamon, lemon and orange, as well as methylsalicylate. A mint oil such as oil of peppermint is most preferred. Suitable sweetening agents include sucrose, lactose, maltose, sorbitol, sodium cyclamate, saccharine, acetosulpham, N-alpha-alpha-aspartyl-alpha-phenylaniline-methyl ester ("aspartame"), xylitol and chalcone materials. Suitably, flavour and sweetening agent may together

comprise from about 0.01 to 5% by weight or more of the compositions of the present invention, each typically being about 0.005-2.5%. In a typical modification of a flavouring oil such as oil of peppermint which contains about 75% peppermint and the remainder anethole, menthol and/or carvone, about 0.5-1.5% ionone is added thereto. Similar modifications may be made to other flavouring oils.

A fluorine-containing compound having a beneficial effect on the care and hygiene of the oral cavity, e.g. diminution of enamel solubility in acid and protection of the teeth against decay may also be incorporated in the vehicle. Examples thereof include sodium fluoride, stannous fluoride, potassium fluoride, potassium stannous fluoride (SnF_2-KF), sodium hexafluorostannate, stannous chlorofluoride, sodium fluorozirconate, and sodium monofluorophosphate. These materials, which disassociate or release fluorine-containing ions in water, suitably may be present in an effective but non-toxic amount, usually within the range of about 0.01 to 1% by weight of the composition based on the water-soluble fluorine content thereof.

When the oral preparation is a liquid such as a mouth rinse or mouth spray which typically contains 20-99% by weight of an aqueous vehicle comprising non-toxic lower aliphatic alcohol, preferably having about 1-30% by weight alcohol such as ethanol, n-propyl, or isopropyl alcohol with the remainder water. Flavour and/or sweetener and surface active agent are also generally present. Mouth sprays also

contain a suitable amount of an orally acceptable propellant material such as a fluorocarbon, e.g. Freon or isobutane to propel the spray from a pressurized container.

The oral preparations are typically applied by brushing the teeth with dispersion assisted by saliva in the oral cavity or by rinsing to disperse in the oral cavity for 30-90 seconds at least once daily.

The oral preparations should have a pH practicable for use. The pH range of about 4-9, preferably about 5-7.5, is considered the most practicable for use.

The invention may be carried out in various ways and a number of specific embodiments will be described to illustrate the invention with reference to the accompanying examples. All amounts and proportions set forth in the specification are by weight, unless otherwise indicated.

EXAMPLES 1A to 1D

Groups of panelists are formed for comparative VSC breath analysis by gas chromatography in combination with a flame photometric detection system according to the procedure described by Solis-Gaffar, Journal of Dental Research, Vol. 54, No. 2, pages 351-357, 1975.

Rinses having formulations as set out in Table 1 below are made up.

TABLE 1

Example		1A	1C
	Ingredients	%	%
	Ethanol	10.000	10.000
5.	Pluronic 108	1.000	1.000
	Sodium saccharin	0.045	0.045
	Glycerin	8.000	8.000
	Zinc chloride	0.250	0.250
	Flavour	0.218	
10.	(Peppermint oil)		
	Flavour	-	0.218
	(Peppermint oil including 1% alpha-ionone)		
	Water	80.487	80.487
15.	(deionized/distilled)		
		100.000	100.000

		1D	1B
	Ethanol	10.000	10.000
20.	Pluronic 108	1.000	1.000
	Sodium saccharin	0.045	0.045
	Glycerin	8.000	8.000
	Zinc chloride	-	-
	Flavour	0.218	
25.	(Peppermint oil)		
	Flavour	-	0.218
	(Peppermint oil including 1% alpha-ionone)		
	Water	80.737	80.737
30.	(deionized/distilled)		
		100.000	100.000

Example 1A is a zinc chloride mouthrinse, Example 1B is a high mint alpha-ionone mouth rinse without zinc, Example 1C is a high mint alpha-ionone mouthrinse with zinc, Example 1D is a placebo mouthrinse. Example 1C is in accordance with the present invention; 1A, 1B and 1D are comparison examples.

It will be appreciated that the contents of alpha-ionone in Examples 1B and 1C are 0.218 x 1/100 = 0.00218%.

These studies are designed as two compartment, single blind and randomized with a cross-over phase. The subjects in each study are randomly assigned to use either the test or placebo rinse. During the cross-over phase each subject switches to the opposite rinse. Each phase consists of two treatments with either the test (Examples 1A, 1B and 1C) or placebo (Example 1D) rinse. Breath samples are taken the following morning prior to brushing, rinsing, eating and drinking, two samples being taken ten minutes apart. During the period the subjects keep their mouths closed.

The results are summarized in the following Tables 2A and 2B. (Beta-ionone gives similar results to alpha-ionone with and without the presence of zinc): VSC levels are the headspace amounts of the volatile sulphur compounds hydrogen sulphide (H_2S), methyl mercaptan (CH_3SH) and dimethyl sulphide $(CH_3)_2S$ in incubated putrescent saliva systems measured after overnight incubation in an airtight

container by an instrumental GC-flame photometric technique.

The VSC from the mouth air samples have been identified as H_2S, CH_3SH, and $(CH_3)_2S$. H_2S and CH_3SH account for 90% of the total sulphur volatiles detected instrumentally. Both these compounds have an objectionable putrid odour and the efficacy of the experimental rinse can be measured by its influence on the reduction of these volatiles in the oral cavity. The $(CH_3)_2S$ appeared in small amounts and was not included in the calculations.

TABLE 2A

Study	Treatment Rinse		No. of Subjects	Duration of Effects
1.A.	Zn/Cl_2	Ex.1A	12	3 hours
D.	Placebo	Ex.1D	12	3 hours
2.B.	High Mint/ alpha-ionone (without zinc)	Ex.1B	15	overnight
C.	High Mint/Zn/ alpha-ionone	Ex.1C	15	overnight
3.C.	High Mint/Zn/ alpha-ionone	Ex.1C	19	overnight
D.	Placebo	Ex.1D	19	overnight.

TABLE 2B

			VSC			
Study	Treatment Rinse		Initial	Final	% Reduction	Significance
1.A.	Zn/Cl_2	Ex.1A	13.60	10.30	-24	0.05
D.	Placebo	Ex.1D	13.50	11.70	-13	N.S.[1]
2.B.	High Mint/ alpha-ionone (without zinc)	Ex.1B	14.58	15.12	--	N.S.[1]
C.	High Mint/ Zn/alph-ionone	Ex.1C	15.69	7.34	-53	0.001
3.C.	High Mint/ Zn/alpha-ionone	Ex.1C	16.98	9.03	-46	0.001
D.	Placebo	Ex.1D	16.45	15.95	2.57	N.S.[1]

Note on TABLE 2B:

1 Not significant.

The clinical studies reported in Tables 2A and 2B indicate that (1) Zinc is effective up to 3 hours (study 1A); (2) Zinc/high peppermint/alpha-ionone flavour is effective overnight; high peppermint/alpha-ionone without zinc is not effective overnight (studies 2C and 3C); and (3) Zinc/high peppermint/alpha-ionone is significantly more effective than placebo (study 3). The combination of (Zn/high mint/alpha-ionone) is significantly and synergistically more effective than either one (Zn) or (high mint/alpha-ionone) by itself.

EXAMPLE 2

The following mouthrinse as set out in Table 3 is prepared for countering breath odours for overnight periods when used immediately before sleep without additional rinsing:

TABLE 3

Ingredients	PARTS
Ethyl alcohol (95%)	15
Flavour (high peppermint)[2]	0.22
Zinc Acetate, dihydrate	0.40
Sodium saccharin[1]	0.03
Polyoxyethylene (20) sorbitan Monoisostearate	2.00
Glycerine	8.00
Water	Q.S. to 100

Notes on Table 3:

1 Sodium cyclamate may replace sodium saccharin

2 Flavour composition is as in table 4 below.

TABLE 4

Ingredient	PARTS
Peppermint	74.75
Anethole	9.75
Menthol	9.75
Carvone	4.75
Alpha-ionone[1]	1.00

Note on Table 4:

[1] Each of beta-ionone, dihydroionone and alpha-methyl ionone may replace alpha-ionone.

EXAMPLES 3A and 3B

The following toothpastes as set out in Table 5 are prepared for countering breath odours for over-night periods when brushed on teeth and dispersed in the oral cavity immediately before sleep:

TABLE 5

Examples	3A	3B
Ingredients	PARTS	PARTS
Glycerine	25	25
Sodium carboxymethyl cellulose	1.3	-
Hydroxyethyl cellulose	-	1.0
Sodium benzoate	0.50	0.50
Sodium saccharin	0.20	0.20
Titanium dioxide	0.40	0.40
Zinc chloride	-	1.00
Zinc acetate	1.00	-
Sodium fluoride	-	0.22
Zeo 49 (Davison)[1]	29.00	29.00
Sodium laurylsulphate	1.50	-
Sodium methyl cocyl taurate	-	1.50
Flavour[2]	1.00	1.00
Water	Q.S. to 100	Q.S. to 100

Notes on Table 5:

1 Zeo 49 is a sodium aluminosilicate composed of silica containing about 1% of combined alumina.

2 High peppermint plus alpha-ionone as in Example 1; namely containing 1.00% alpha-ionone.

EXAMPLE 4

The following mouth spray dispenser as set out in Table 6 is freon propellant is prepared countering breath odours for overnight periods when sprayed into the oral cavity immediately before sleep from a isobutane pressurized container:

TABLE 6

	PARTS
Sodium Sacharin	0.20
Castor oil ester (Cremophor El)	0.50
Zinc Chloride	1.00
Alpha-ionone	0.01
Ethanol	15.00
Water	Q.S. to 100

Although this invention has been described with reference to specific examples, it will be apparent to one skilled in the art that various modifications may be made thereto which fall within its scope.

CLAIMS

1. An oral composition of a non-toxic zinc salt in amount which provides at least about 0.01 mg of zinc ions in 1 ml of water and an ionone ketone terpene derivative, the ratio of zinc ions to the said ionone ketone terpene derivative being about 1000:1 to 5:1 by weight.

2. An oral composition comprising an aqueous vehicle and a zinc salt which provides about 0.01-5% by weight based on the weight of the composition of zinc ions and about 0.0005-1% by weight based on the weight of the composition of ionone ketone terpene derivative, the ratio of zinc ions to ionone ketone terpene being about 1000:1 to 5:1 by weight.

3. An oral composition as claimed in Claim 1 or Claim 2 in which the said zinc salt and the said ionone ketone terpene derivative are in an aqueous vehicle, the said zinc salt is present in an amount of about 0.01-5% by weight of zinc ion based on the weight of the composition, and the said ionone ketone terpene derivative is present in an amount of about 0.0005-1% by weight based on the weight of the composition.

4. An oral composition as claimed in Claim 1, 2 or 3 in which the said zinc salt is present in an amount which provides about 0.02-1% by weight of zinc ion and the said ionone ketone terpene derivative is present in an amount of about 0.001-1% by weight.

5. An oral composition as claimed in Claim 1, 2, 3 or 4 in which the said ionone terpene ketone is alpha-ionone, beta-ionone, gamma-ionone, dihydro-ionone, alpha-methylionone or irone or mixtures thereof.

6. An oral composition as claimed in any one of Claims 1 to 5 in which the said zinc salt is zinc chloride or zinc acetate or mixtures thereof.

7. An oral composition as claimed in any one of Claims 3 to 6 in which the said vehicle is a dental vehicle containing a liquid portion comprising a gelling agent and the said oral composition is a toothpaste.

8. An oral composition as claimed in any one of Claims 1 to 7 in which the said ionone ketone terpene derivative is present as a component of a flavouring oil in an amount of about 0.5-1% by weight of the said flavouring oil.

9. An oral composition as claimed in Claim 8 in which the said flavouring oil is oil of peppermint which oil of peppermint is present in the said oral composition in an amount of about 0.005-2% by weight.

10. An oral composition as claimed in Claim 2 or any one of Claims 4 to 9 when appendant to Claim 3 in which the said vehicle is an aqueous alcohol vehicle and the said alcohol is a non-toxic lower aliphatic alcohol and the said oral preparation is a mouthrinse.

11. An oral composition as claimed in Claim 1 substantially as specifically described herein with reference to any one of Examples 1C, 2, 3A, 3B, or 4.

12. A method of countering breath odour which consists essentially of dispersing in the oral cavity an oral preparation as claimed in any one of Claims 1 to 11.