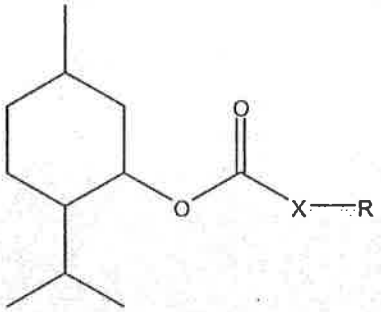
CLAIMS

What is claimed:

1. A method for providing enhanced oral and systemic health care benefits comprising providing at least one menthol-derivative compound conforming to **Formula 1**:



Formula 1

wherein,

X is an oxygen atom or an NH radical; and

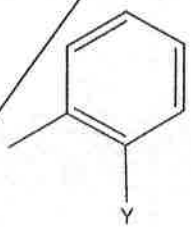
R is an unsubstituted or substituted aryl or aliphatic radical.

2. The method of claim 1, wherein the menthol derivative compound provides multiple benefits including one or more of the following: biofilm anti-attachment, anti-inflammation, anti-oxidant, anti-bone loss, and anti-microbial effects.

3. The method of claim 1, wherein X is an NH radical.

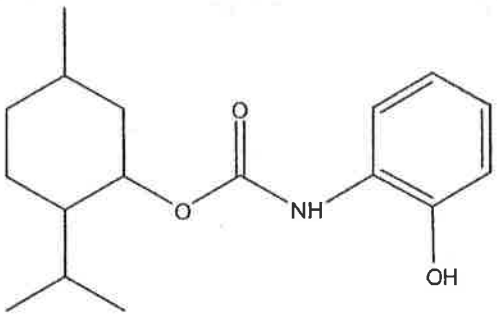
4. The method of claim 3, wherein R is a substituted aryl radical.

5. The method of claim 4, wherein R is:



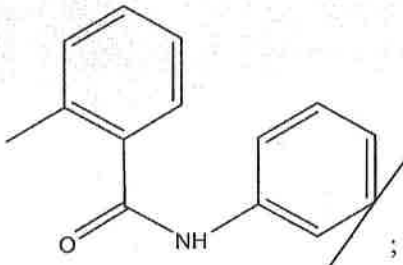
and wherein Y is a hydroxyl or cyano radical.

6. The method of claim 5, wherein the compound is:



7. The method of claim 1, wherein X is an oxygen atom.

8. The method of claim 7, wherein R is at least one member chosen from:



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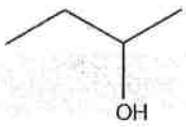

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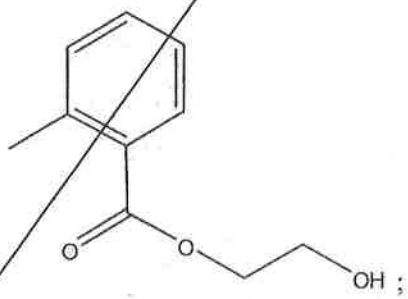

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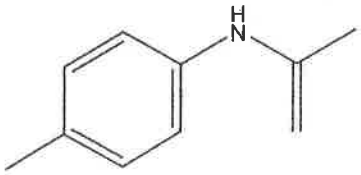

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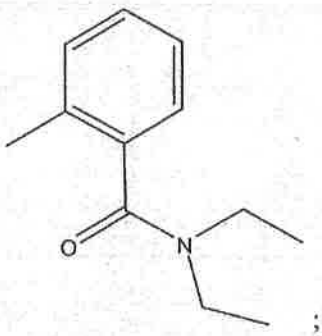

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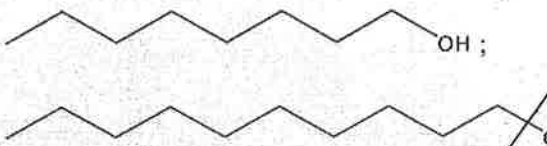
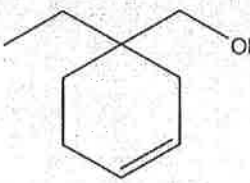
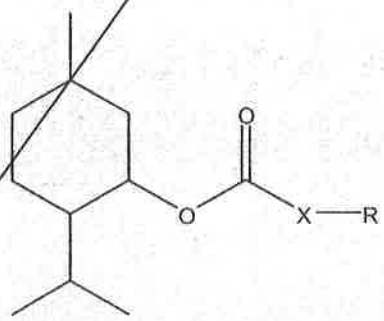


; and



9. A composition for providing enhanced oral and systemic health care benefits comprising:

a) at least one menthol-derivative compound conforming to **Formula 1**:



Formula 1

wherein,

X is an oxygen atom or an NH radical; and

R is an unsubstituted or substituted aryl or aliphatic radical;

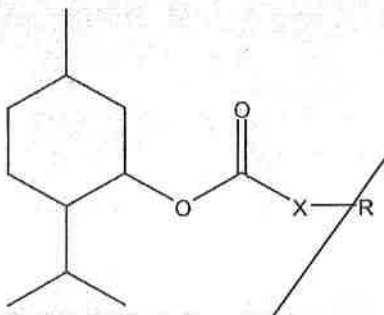
and;

b) at least one excipient;

wherein the composition provides multiple benefits including biofilm anti-attachment, anti-inflammation, anti-oxidant, anti-bone loss, and anti-microbial effects.

10. The composition of claim 9, wherein at least one excipient is a member chosen from: surfactants, desensitizing agents, whitening agents, tartar control agents, antibacterial agents, abrasives including silica, binders and thickening agents, detergents, adhesion agents, foam modulators, pH modifying agents, mouth-feel agents, sweeteners, flavorants, colorants, preservatives, combinations thereof, and the like.

11. A method for up-regulating or down-regulating periodontal disease metabolites comprising providing at least one menthol-derivative compound conforming to **Formula 1**:



Formula 1

wherein,

X is an oxygen atom or an NH radical; and

R is an unsubstituted or substituted aryl or aliphatic radical;

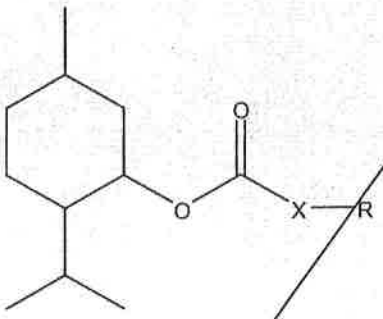
and wherein the menthol-derivative compound up-regulates or down-regulates at least one member chosen from: a compound generated by amino acid metabolism; a compound generated in the urea cycle; a compound generated in glutathion conversion; a compound generated in lipid metabolism; a compound generated in carbohydrate metabolism; a compound generated by nucleic acid metabolism; vitamins; and co-factors.

12. The method of claim 11 wherein the menthol derivative compound up-regulates at least one metabolite chosen from: uric acid, reduced glutathione, oxidized glutathion, ascorbic acid, and glutamine.

13. The method of claim 11 wherein the menthol derivative compound down-regulates at least one metabolite chosen from: inosine, hypoxanthine, guanosine, guanine, leucine, isoleucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, phenylacetic acid, α-hydroxyioscaproic acid, 5-amino valeric acid, choline, glycerol-3-phosphate, and N-acetylneuraminic acid.

14. A composition for up-regulating or down-regulating periodontal disease metabolites comprising:

a) at least one menthol-derivative compound conforming to **Formula 1**:



Formula 1

wherein,

X is an oxygen atom or an NH radical; and

R is an unsubstituted or substituted aryl or aliphatic radical;

and;

b) at least one excipient;

wherein the menthol-derivative compound up-regulates or down-regulates at least one member chosen from: a compound generated by amino acid metabolism; a compound generated in the urea cycle; a compound generated in glutathion conversion; a compound generated in lipid metabolism; a compound generated in carbohydrate metabolism; a compound generated by nucleic acid metabolism; vitamins; and co-factors.

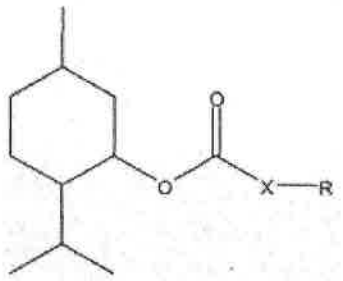
15. The composition of claim 14, wherein at least one excipient is chosen from: surfactants, desensitizing agents, whitening agents, tartar control agents, antibacterial agents, abrasives including silica, binders and thickening agents, detergents, adhesion

agents, foam modulators, pH modifying agents, mouth-feel agents, sweeteners, flavorants, colorants, preservatives, combinations thereof, and the like.

CLAIMS

What is claimed:

1. Use of at least one menthol-derivative compound conforming to Formula 1:



Formula 1

wherein,

X is an oxygen atom or an NH radical; and

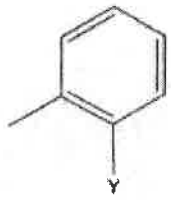
R is an unsubstituted or substituted aryl or aliphatic radical,

and wherein the menthol derivative compound provides multiple benefits including one or more of the following: biofilm anti-attachment, anti- inflammation, anti-oxidant, anti-bone loss, and anti-microbial effects, in the manufacture of a medicament for providing enhanced oral and systematic health care benefits.

2. The use of claim 1, wherein X is an NH radical.

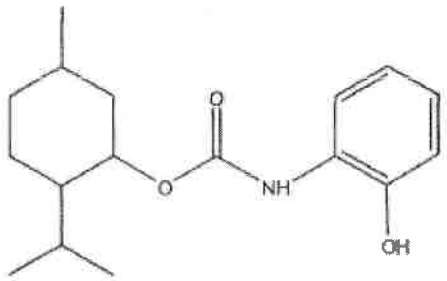
3. The use of claim 2, wherein R is a substituted aryl radical.

4. The use of claim 3, wherein R is:



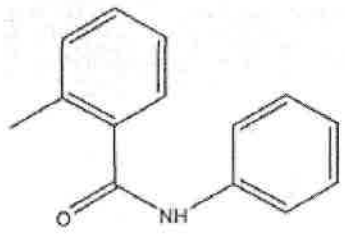
and wherein Y is a hydroxyl or cyano radical.

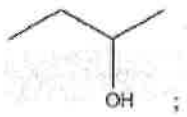
5. The use of claim 4, wherein the compound is:



6. The use of claim 1 , wherein X is an oxygen atom.

7. The use of claim 6, wherein R is at least one member chosen from:





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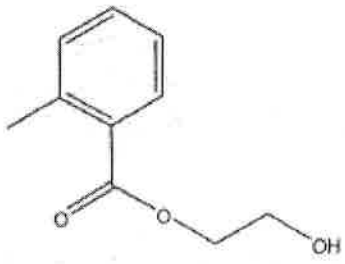

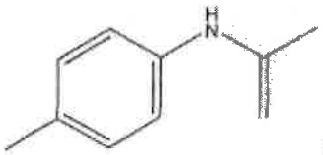

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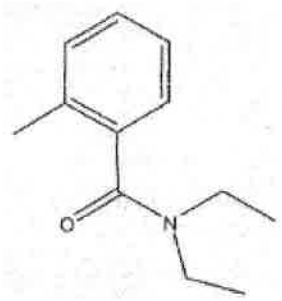
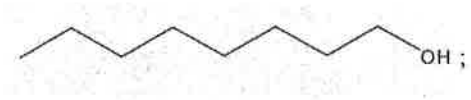
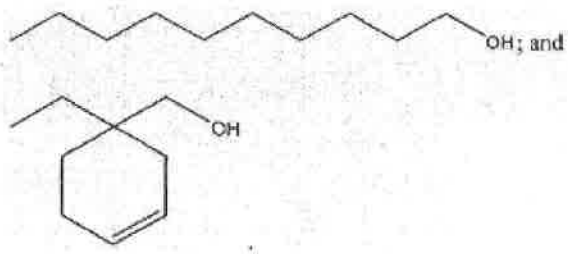
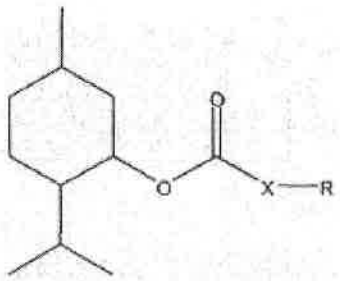






8. A composition when used for providing enhanced oral and systemic health care benefits comprising:

a) at least one menthol-derivative compound conforming to Formula 1:



Formula 1

wherein,

X is an oxygen atom or an NH radical; and

R is an unsubstituted or substituted aryl or aliphatic radical; and;

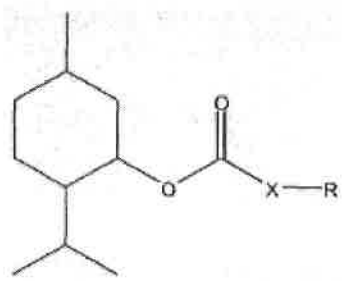
b) at least one excipient;

wherein the composition provides multiple benefits including biofilm anti -attachment, anti-inflammation, anti-oxidant, anti-bone loss, and anti-microbial effects.

9. The composition of claim 8, wherein at least one excipient is a member chosen from: surfactants, desensitizing agents, whitening agents, tartar control agents, antibacterial agents, abrasives including silica, binders and thickening agents, detergents, adhesion agents, foam

modulators, pH modifying agents, mouth-feel agents, sweeteners, fllavorants, colorants, preservatives, combinations thereof, and the like.

10. Use of at least one menthol-derivative compound conforming to **Formula 1**:



Formula 1

wherein,

X is an oxygen atom or an NH radical; and

R is an unsubstituted or substituted aryl or aliphatic radical;

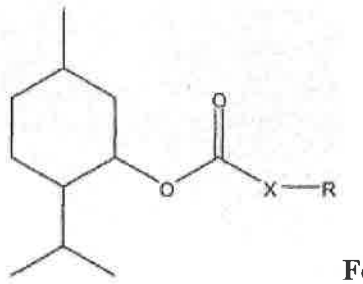
and wherein the menthol-derivative compound up-regulates or down-regulates at least one member chosen from: a compound generated by amino acid metabolism; a compound generated in the urea cycle; a compound generated in glutathion conversion; a compound generated in lipid metabolism; a compound generated in carbohydrate metabolism; a compound generated by nucleic acid metabolism; vitamins; and co-factors, in the manufacture of a medicament for up-regulating or down-regulating periodontal disease metabolites.

11. The use of claim 10 wherein the menthol derivative compound up-regulates at least one metabolite chosen from: uric acid, reduced glutathione, oxidized glutathion, ascorbic acid, and glutamine.

12. The use of claim 10 wherein the menthol derivative compound down-regulates at least one metabolite chosen from: inosine, hypoxanthine, guanosine, guanine, leucine, isoleucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, phenylacetic acid, α-hydroxyioscaproic acid, 5-amino valeric acid, choline, glycerol-3 - phosphate, and N-acetylneuraminic acid.

13. A composition for up-regulating or down-regulating periodontal disease metabolites comprising:

a) at least one menthol-derivative compound conforming to Formula 1:



Formula 1

wherein,

X is an oxygen atom or an NH radical; and

R is an unsubstituted or substituted aryl or aliphatic radical; and;

b) at least one excipient;

wherein the menthol-derivative compound up-regulates or down-regulates at least one member chosen from: a compound generated by amino acid metabolism; a compound generated in the urea cycle; a compound generated in glutathion conversion; a compound generated in lipid metabolism; a compound generated in carbohydrate metabolism; a compound generated by nucleic acid metabolism; vitamins; and co- factors.

14. The composition of claim 13, wherein at least one excipient is chosen from: surfactants, desensitizing agents, whitening agents, tartar control agents, antibacterial agents, abrasives including silica, binders and thickening agents, detergents, adhesion agents, foam modulators, pH modifying agents, mouth-feel agents, sweeteners, flavorants, colorants, preservatives, combinations thereof, and the like.