CLAIMS

1. A process for forming a composition of matter, comprising:

providing a mixture of alkylisethionates and isethionates at a molar ratio of alkylisethionates to isethionates between about 19:1 and about 1:19;

reacting the mixture with a fatty acid having a carbon chain length between about 4 carbon atoms and about 25 carbon atoms, alternatively between about 6 carbon atoms and about 18 carbon atoms; and

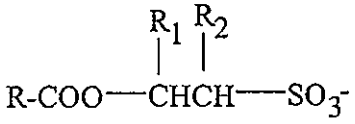
producing a water soluble composition of isethionate esters with at least 30% solubility, wherein the alkylisethionates are selected from the group consisting of sodium 2-methyl 2-hydroxyethane sulfonate, sodium 1-methyl 2-hydroxyethane sulfonate, sodium 2-ethyl 2-hydroxyethane sulfonate, sodium 1-ethyl 2-hydroxyethane sulfonate, and combinations thereof.

2. The process of claim 1, wherein the fatty acid is selected from the group of saturated fatty acids, unsaturated fatty acids, pure individual fatty acids, and combinations thereof.

3. The process of claim 1, wherein the fatty acid is selected from the group of consisting of coconut oil, tallow, palm kernel oil, butterfat, palm oil, olive oil, corn oil, linseed oil, peanut oil, fish oil, rapeseed oil, and combinations thereof.

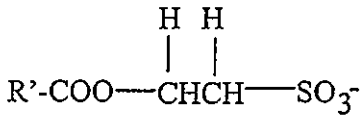
4. A composition comprising:

(i) a first ester anion having the structure:



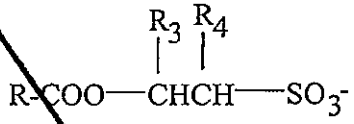
wherein R is a functional group having between about 4 and about 25 carbon atoms; wherein R_1 is a straight chain or branched C_1 to C_6 alkyl group and R_2 is a hydrogen atom; and

(ii) a second ester anion having the structure:



wherein R' is a hydrocarbon group having between about 4 and about 25 carbon atoms, and

(iii) a third ester anion having the structure:



wherein R is a functional group having between about 4 and about 25 carbon atoms; and wherein R_3 is a hydrogen atom and R_4 is a straight chain or branched C_1 to C_6 alkyl group.

5. The composition of claim 4, wherein the first ester anion comprises an acyl alkylisethionate ester anion, the second ester anion is an acylisethionate ester anion, and the third ester anion comprises an acyl alkylisethionate ester anion.

6. The composition of claim 4, wherein the composition comprises from about 70 wt% to about 95 wt% acyl alkylisethionate ester anions and from about 5 wt% to about 30 wt% acylisethionate ester anion, and wherein the composition is water soluble.

7. The composition of claim 4, wherein the acyl alkylisethionate ester anions are a sodium cocoyl alkylisethionate ester anions and the acylisethionate ester anion is a sodium cocoyl isethionate ester anion.

8. The composition of claim 4, wherein the melt temperature of the composition ranges from about 170°C to about 250°C.

9. The composition of claim 4, wherein the melt temperature of the composition ranges from about 180°C to about 200°C.

10. The composition of claim 4, wherein the first ester anion comprises a cocoyl alkylisethionate ester ion, the second ester anion is a cocoyl isethionate ester anion, and the third ester anion comprises a cocoyl alkylisethionate ester ion.

11. The composition of claim 4, wherein the first ester anion comprises a cocoyl methyl isethionate anion, the second ester ion comprises an cocoyl isethionate anion, and the third ester anion comprises a cocoyl ethyl isethionate anion.

12. The composition of claim 4, wherein a mixture of the first and second ester anion comprises between about 10 wt.% and about 90 wt.% of the composition.

13. The composition of claim 4, wherein R is selected from the group consisting of straight-chain hydrocarbon groups, branched hydrocarbon groups, saturated hydrocarbon groups, unsaturated hydrocarbon groups, and combinations thereof, and R' is selected from the group consisting of straight-chain hydrocarbon groups, branched hydrocarbon groups, saturated hydrocarbon groups, unsaturated hydrocarbon groups, and combinations thereof.

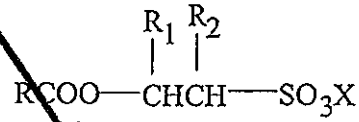
14. The composition of claim 4 further comprising:
between about 99.50 molar % and about 0.25 molar % of the first and second ester anions; and

one or more additives selected from the group consisting of: fatty acids, alkyl sulfates, an ethanolamine, an amine oxide, alkali carbonates, water, ethanol, isopropanol, pine oil, sodium chloride, sodium silicate, polymers, alcohol alkoxylates,

zeolites, perborate salts, alkali sulfates, enzymes, hydrotropes, dyes, fragrances, preservatives, brighteners, builders, polyacrylates, essential oils, alkali hydroxides, water-soluble branched alkylbenzene sulfonates, ether sulfates, alkylphenol alkoxylates, fatty acid amides, alpha olefin sulfonates, paraffin sulfonates, betaines, chelating agents, tallow amine ethoxylates, polyether amine ethoxylates, ethylene oxide/propylene oxide block copolymers, alcohol ethylene oxide/propylene oxide low foam surfactants, methyl ester sulfonates, alkyl polysaccharides, N-methyl glucamides, alkylated sulfonated biphenyl oxide, polyethylene glycol, and combinations thereof.

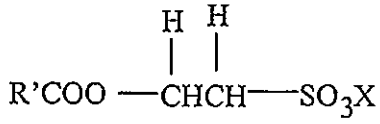
15. A personal care cleanser comprising:

(i) a first ester having the structure:



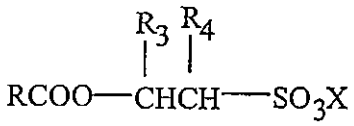
wherein R is a functional group having between about 4 and about 25 carbon atoms; wherein R_1 is a straight chain or branched C_1 to C_6 alkyl group and R_2 is a hydrogen atom; wherein X is selected from the group consisting of hydrogen, an alkali metal, an alkaline earth metal, zinc, aluminum, ammonium, ammonium ions substituted with one or more organic groups, and combinations thereof;

(ii) a second ester having the structure:



wherein R' is a hydrocarbon group having between about 4 and about 25 carbon atoms; wherein X is selected from the group consisting of hydrogen, an alkali metal, an alkaline earth metal, zinc, aluminum, ammonium, ammonium ions substituted with one or more organic groups, and combinations thereof; and

(iii) a third ester having the structure:



wherein R is a functional group having between about 4 and about 25 carbon atoms; wherein R_3 is a hydrogen atom and R_4 is a straight chain or branched C_1 to C_6 alkyl group; wherein X is selected from the group consisting of hydrogen, an alkali metal, an alkaline earth metal, zinc, aluminum, ammonium, ammonium ions substituted with one or more organic groups, and combinations thereof.

16. The personal care cleanser of claim 15, wherein the first ester is an acyl alkylisethionate ester and the second ester is an acylisethionate ester.

17. The personal care cleanser of claim 15, wherein the first ester is a sodium cocoyl alkylisethionate ester and the second ester is a sodium cocoyl isethionate ester.

18. The personal care cleanser of claim 15, wherein the first ester comprises sodium cocoyl methyl isethionate, sodium cocoyl ethyl isethionate, or combinations thereof, and the second ester comprises sodium cocoyl isethionate.

19. The personal care cleanser of claim 15, wherein the cleanser comprises between about 5 wt.% and about 70 wt.% of the first ester and second ester.

What is claimed is:

1. A process for forming a composition of matter, comprising:

providing a mixture of alkylisethionates and isethionates at a molar ratio of alkylisethionates to isethionates between about 19:1 and about 1:19;

reacting the mixture with a fatty acid having a carbon chain length between about 4 carbon atoms and about 25 carbon atoms, alternatively between about 6 carbon atoms and about 18 carbon atoms; and

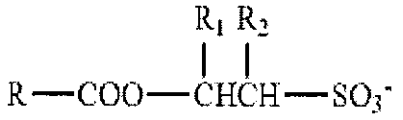
producing a water soluble composition of isethionate esters with at least 30% solubility, wherein the alkylisethionates are selected from the group consisting of sodium 2-methyl 2-hydroxyethane sulfonate, sodium 1-methyl 2-hydroxyethane sulfonate, sodium 2-ethyl 2-hydroxyethane sulfonate, sodium 1-ethyl 2-hydroxyethane sulfonate, and combinations thereof.

2. The process of claim 1, wherein the fatty acid is selected from the group of saturated fatty acids, unsaturated fatty acids, pure individual fatty acids, and combinations thereof.

3. The process of claim 1, wherein the fatty acid is selected from the group of consisting of coconut oil, tallow, palm kernel oil, butterfat, palm oil, olive oil, corn oil, linseed oil, peanut oil, fish oil, rapeseed oil, and combinations thereof.

4. A composition comprising:

(i) a first ester anion having the structure:



wherein R is a functional group having between about 4 and about 25 carbon atoms; wherein R_1 is a straight chain or branched C_1 to C_6 alkyl group and R_2 is a hydrogen atom; and

(ii) a second ester anion having the structure:



wherein R' is a hydrocarbon group having between about 4 and about 25 carbon atoms, and

(iii) a third ester anion having the structure:



wherein R is a functional group having between about 4 and about 25 carbon atoms; and wherein R_3 is a hydrogen atom and R_4 is a straight chain or branched C_1 to C_6 alkyl group.

5. The composition of claim **4**, wherein the first ester anion comprises an acyl alkylisethionate ester anion, the second ester anion is an acylisethionate ester anion, and the third ester anion comprises an acyl alkylisethionate ester anion.

6. The composition of claim **4**, wherein the composition comprises from about 70 wt % to about 95 wt % acyl alkylisethionate ester anions and from about 5 wt % to about 30 wt % acylisethionate ester anion, and wherein the composition is water soluble.

7. The composition of claim **4**, wherein the acyl alkylisethionate ester anions are a sodium cocoyl alkylisethionate ester anions and the acylisethionate ester anion is a sodium cocoyl isethionate ester anion.

8. The composition of claim 4, wherein the melt temperature of the composition ranges from about 170° C. to about 250° C.

9. The composition of claim 4, wherein the melt temperature of the composition ranges from about 180° C. to about 200° C.

10. The composition of claim 4, wherein the first ester anion comprises a cocoyl alkylisethionate ester ion, the second ester anion is a cocoyl isethionate ester anion, and the third ester anion comprises a cocoyl alkylisethionate ester ion.

11. The composition of claim 4, wherein the first ester anion comprises a cocoyl methyl isethionate anion, the second ester ion comprises an cocoyl isethionate anion, and the third ester anion comprises a cocoyl ethyl isethionate anion.

12. The composition of claim 4, wherein a mixture of the first and second ester anion comprises between about 10 wt. % and about 90 wt. % of the composition.

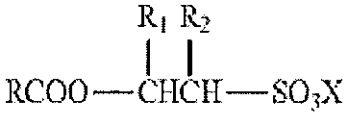
13. The composition of claim 4, wherein R is selected from the group consisting of straight-chain hydrocarbon groups, branched hydrocarbon groups, saturated hydrocarbon groups, unsaturated hydrocarbon groups, and combinations thereof, and R' is selected from the group consisting of straight-chain hydrocarbon groups, branched hydrocarbon groups, saturated hydrocarbon groups, unsaturated hydrocarbon groups, and combinations thereof.

14. The composition of claim 4 further comprising:

between about 99.50 molar % and about 0.25 molar % of the first and second ester anions; and

one or more additives selected from the group consisting of: fatty acids, alkyl sulfates, an ethanolamine, an amine oxide, alkali carbonates, water, ethanol, isopropanol, pine oil, sodium chloride, sodium silicate, polymers, alcohol alkoxylates, zeolites, perborate salts, alkali sulfates, enzymes, hydrotropes, dyes, fragrances, preservatives, brighteners, builders, polyacrylates, essential oils, alkali hydroxides, water-soluble branched alkylbenzene sulfonates, ether sulfates, alkylphenol alkoxylates, fatty acid amides, alpha olefin sulfonates, paraffin sulfonates, betaines, chelating agents, tallow amine ethoxylates, polyether amine ethoxylates, ethylene oxide/propylene oxide block copolymers, alcohol ethylene oxide/propylene oxide low foam surfactants, methyl ester sulfonates, alkyl polysaccharides, N-methyl glucamides, alkylated sulfonated biphenyl oxide, polyethylene glycol, and combinations thereof.

15. A personal care cleanser comprising:
(i) a first ester having the structure:



wherein R is a functional group having between about 4 and about 25 carbon atoms; wherein R_1 is a straight chain or branched C_1 to C_6 alkyl group and R_2 is a hydrogen atom; wherein X is selected from the group consisting of hydrogen, an alkali metal, an alkaline earth metal, zinc, aluminum, ammonium, ammonium ions substituted with one or more organic groups, and combinations thereof; and

(ii) a second ester having the structure:



wherein R' is a hydrocarbon group having between about 4 and about 25 carbon atoms; wherein X is selected from the group consisting of hydrogen, an alkali metal, an alkaline earth metal, zinc, aluminum, ammonium, ammonium ions substituted with one or more organic groups, and combinations thereof; and

(iii) a third ester having the structure:



wherein R is a functional group having between about 4 and about 25 carbon atoms; wherein R_3 is a hydrogen atom and R_4 is a straight chain or branched C_1 to C_6 alkyl group; wherein X is selected from the group consisting of hydrogen, an alkali metal, an alkaline earth metal, zinc, aluminum, ammonium, ammonium ions substituted with one or more organic groups, and combinations thereof.

16. The personal care cleanser of claim **15**, wherein the first ester is an acyl alkylisethionate ester and the second ester is an acylisethionate ester.

17. The personal care cleanser of claim **15**, wherein the first ester is a sodium cocoyl alkylisethionate ester and the second ester is a sodium cocoyl isethionate ester.

18. The personal care cleanser of claim **15**, wherein the first ester comprises sodium cocoyl methyl isethionate, sodium cocoyl ethyl isethionate, or combinations thereof, and the second ester comprises sodium cocoyl isethionate.

19. The personal care cleanser of claim **15**, wherein the cleanser comprises between about 5 wt. % and about 70 wt. % of the first ester and second ester.