associated with foaming hand cleansers with the enhanced cleaning performance provided by mechanical scrubbers. Nevertheless, the requirement remains for a suitable hand cleanser.

Thus, it would be very beneficial if a hand cleanser could be formulated that can suspend particulate mechanical scrubbers with particles sized from about 100 microns to about 800 microns that decreases in viscosity when exposed to high shear rates and is capable of being foamed through a non-aerosol, or unpressurized pump dispenser.

If the formulation is too thin, the mechanical scrubbers will fall out of suspension. If the product is too thick, the amount of force required to foam the formulation become too high resulting in excessive operating force for the dispenser user and poor quality foam.

Prior art does not capture the requirement of the formulation to generate foam when mixed and dispensed with air from a non-aerosol dispenser. The assumption from the prior art is since it is soap, it will naturally foam. While this may be true if mechanical manipulation is done (rubbing in the hand), if the formulation does not have the desired characteristics, it will not create an acceptable foam through a non aerosol pump.

SUMMARY

Provided herein are formulations for a gritty foam dispenser.

In one aspect, there is provided a foamable gritty composition, comprising:

a) constituents including

a solvent present in a range from about 0.5% w/w to about 30.0% w/w, said solvent including any one or combination of D'limonene and sunflower oil methyl ester;

a particulate scrubbing agent present in a range from about 1.0% w/w to about 8% w/w;

a surfactant present in a range from about 0.5% w/w to about 30.0% w/w;

skin conditioner present in a range from 0.01% w/w to about 5.00% w/w; and

a non-Newtonian thickening agent present in a range from about 0.05% w/w to about 10% w/w;

water; and

b) wherein the non-Newtonian thickening agent is selected to give the foamable gritty formulation a critical strain force greater than or equal to about 30 dynes/cm^2, and a viscosity in a range from about 500 cPoise to about 4000 cPoise such that said foamable gritty composition is dispensible as a foam from a non-aerosol foam dispenser.

An embodiment of a foamable gritty composition comprises constituents including a solvent present in a range from about 0.5% w/w to about 30.0% w/w, in which the solvent includes any one or combination of D'limonene and sunflower oil methyl ester. The formulations include a particulate scrubbing agent present in a range from about 1.0% w/w to about 8% w/w. Included is a surfactant present in a range from about 0.5% w/w to about 30.0% w/w, skin conditioner present in a range from 0.01% w/w to about 5.00% w/w, a non-Newtonian thickening agent present in a range from about 0.05% w/w to about 10% w/w, and water. The non-Newtonian thickening agent is selected to give the foamable gritty formulation a critical strain force greater than or equal to about 30 dynes/cm^2, and a viscosity in a range from about 500 cPoise to about 4000 cPoise such that the foamable gritty composition is dispensible as a foam from a non-aerosol foam dispenser.

In another aspect, ~~T~~the present disclosure also provides a method of producing and dispensing a gritty foam, the method comprising;

dispensing a foamable gritty composition from an unpressurized container having a dispenser pump configured to mix air with the foamable gritty composition under low pressure conditions during dispensing to form a gritty foam, the foamable gritty composition comprising

a) constituents including

a solvent present in a range from about 0.5% w/w to about 30.0% w/w, said solvent including any one or combination of D'limonene and sunflower oil methyl ester;

a particulate scrubbing agent present in a range from about 1.0% w/w to about 8% w/w;

a surfactant present in a range from about 0.5% w/w to about 30.0% w/w;

skin conditioner present in a range from 0.01% w/w to about 5.00% w/w; and

a non-Newtonian thickening agent present in a range from about 0.05% w/w to about 10% w/w;

water; and

b) wherein the non-Newtonian thickening agent is selected to give the foamable gritty composition a critical strain force greater than or equal to about 30 dynes/cm^2, and a viscosity in a range from about 500 cPoise to about 4000 cPoise such that said foamable gritty composition is dispensible as a foam from a an unpressurized foam dispenser.

A further understanding of the functional and advantageous ~~aspects~~ embodiments of the disclosure can be realized by reference to the following detailed description and drawings.

BRIEF DESCRIPTION OF THE TABLES

Embodiments will now be described, by way of example only, with reference to the drawings, in which:

Table 1 shows a broad class of constituents that can be used to produce formulations for a gritty foam dispenser in accordance with the present invention;

THEREFORE WHAT IS CLAIMED IS:

1. A foamable gritty composition, comprising:

a) constituents including

a solvent present in a range from about 0.5% w/w to about 30.0% w/w, said solvent including any one or combination of D'limonene and sunflower oil methyl ester;

a particulate scrubbing agent present in a range from about 1.0% w/w to about 8% w/w;

a surfactant present in a range from about 0.5% w/w to about 30.0% w/w;

skin conditioner present in a range from 0.01% w/w to about 5.00% w/w; and

a non-Newtonian thickening agent present in a range from about 0.05% w/w to about 10% w/w;

water; and

b) wherein the non-Newtonian thickening agent is selected to give the foamable gritty formulation a critical strain force greater than or equal to about 30 dynes/cm², and a viscosity in a range from about 500 cPoise to about 4000 cPoise such that said foamable gritty composition is dispensible as a foam from a non-aerosol foam dispenser capable of dispensing hand cleansers with mechanical scrubber present therein.

2. The composition according to claim 1 wherein the surfactant includes any one or combination of

i) an anionic surfactant present in a range from about 1% w/w to about 20% w/w if present alone;

ii) an amphoteric surfactant present in a range from about 0.5% w/w to about 5.0% w/w if present alone;

iii) a non-ionic surfactant present in a range from about 0.5% w/w to about 20% w/w if present alone; and

wherein a total amount of surfactant of any combination of surfactants present is in a range from about 0.5% w/w to about 30.0% w/w.

3. The composition according to claim 2 wherein the anionic surfactant is selected from the group consisting of lauryl sulphates, lauryl ether sulphates, sulphosuccinates, carboxylates (i.e. sodium oleate), carboxylic acid esters (i.e. sodium dilaureth citrate), alkyl sulfate (i.e. sodium lauryl ether sulfate, ammonium alkyl sulfate, alkyl and alkyl-aryl sulfonates (i.e. sodium dodecyl benzene sulfonate), sulfosuccinates (i.e. disodium laurylether sulfosuccinate), isethionates (i.e. sodium cocoyl isethionate, ammonium cocoyl isethionate), taurates (i.e. sodium methyl cocoyl taurate, sodium methyl oleoyl taurate), acyl glutamates (i.e. sodium lauroyl glutamate, sodium cocoyl glutamate, disodium cocoyl glutamate), sarcosinate (i.e. cocoyl sarcosinate), alkylpolyglucosides (i.e. decyl glucoside, sodium lauryl glucose carboxylate, caprylyl/capryl glucoside).

4. The composition according to claim 2 wherein the amphoteric surfactant is any one or combination of betaines, acyl ethylene diamines, amino-acids derivates, imidazolines.

5. The composition according to claim 2 wherein the amphoteric surfactant is any one or combination of acylamphoacetate, acylamphodiacetate, acylamphodipropionate, sodium cocoglycinate, sodium alkyliminodipropionate, cocamidopropyl betaine, sodium cocoamphoacetate.

6. The composition according to claim 4 wherein said betaine is selected from the group consisting of coco betaine and cocamidopropyl betaine.

7. The composition according to claim 2 wherein the non-ionic surfactant is any one or combination of of glucosides, ethoxylated fatty alcohols, ethoxylated fatty acids, saccharose esters, sorbitan esters, alkanolamides, glycerol alkyl esters and polyoxyethylene glycol alkylphenol ethers.

8. The composition according to any one of claims 1 to 7 wherein the solvent further includes any one or combination of glycol ethers, esters, alcohols, terpenes other than D'Limonene, aromatic-free white spirit, and

wherein a total amount of solvent present is in said range from about 0.5% w/w to about 30.0% w/w.

9. The composition according to any one of claims 1 to 8 wherein the particulate scrubbing agent is any one or combination of a vegetable based scrubbing agent, a synthetic based scrubbing agent and a mineral based scrubbing agent, and wherein the scrubbing agent has a size in a range from about 100 microns to about 800 microns.

10. The composition according to claim 9 wherein the vegetable based scrubbing agent is any one or combination of cornmeal, olive stone, walnut shells, ground fruit stones, ground corn meal, ground fruit shells.

11. The composition according to claim 9 wherein the synthetic based scrubbing agent is any one or combination of polyethylene and polypropylene.

12. The composition according to claim 9 wherein the mineral based scrubbing agent is any one or combination of ground shellfish, pumice, and silica.

13. The composition according to any one of claims 1 to 12 wherein said skin conditioner is any one or combination of a polyol, an anionic surfactant, a non-ionic surfactant, a cationic surfactant, an amphoteric surfactant, a cationic polymer, a quaternised gum, and a polyol.

14. The composition according to claim 13 wherein said polyol is any one or combination of glycerine and polyglycerin-6, propylene glycol, sorbitol, mannitol, erythritol, xylitol, arabitol, ribitol, dulcitol, lactitol, and maltitol.

15. The composition according to any one of claims 1 to 14 wherein said thickening agent is any one or combination of synthetic polymers and natural thickeners.

16. The composition according to claim 15 wherein said synthetic polymer is selected from the group consisting of acrylate copolymers.

17. The composition according to claim 15 wherein said synthetic polymer is selected from the group consisting of acrylates/C10-30 alkyl acrylate crosspolymer, carbomers, and combinations thereof.

18. The composition according to claim 15 wherein said natural thickener is selected from the group consisting of xanthan gum, guar gum, quaternised guar gum, alginate, bentonite and fumed silica.

19. The composition according to any one of claims 1 to 18 including an antioxidant present in a range from about 0.01 to about 1.0% w/w.

20. The composition according to claim 19 wherein said antioxidant is any one or combination of butylhydroxytoluene (BHT), butylhydroxyanizole, 1,2-dihydroxybenzene, p-coumarine acid, caffeic acid, sodium sulfite, sodium metasulfite, ferrulic acid, tyrosol, quercetin, chlorogenic acid, oleuropein hydroxytyrosol, ascorbic acid, phenolic acid, propyl gallate, α-tocopherol, β-tocopherol, γ-tocopherol, δ-tocopherol, and tetradibutyl-pentaerithrityl hydroxyhydrocinnamate.

21. A method of producing and dispensing a gritty foam, the method comprising;

dispensing a foamable gritty composition from an unpressurized container having a dispenser pump configured to mix air with the foamable gritty composition under low pressure conditions during dispensing to form a gritty foam, the foamable gritty composition comprising

a) constituents including

a solvent present in a range from about 0.5% w/w to about 30.0% w/w, said solvent including any one or combination of D'limonene and sunflower oil methyl ester;

a particulate scrubbing agent present in a range from about 1.0% w/w to about 8% w/w;

a surfactant present in a range from about 0.5% w/w to about 30.0% w/w;

skin conditioner present in a range from 0.01% w/w to about 5.00% w/w; and

a non-Newtonian thickening agent present in a range from about 0.05% w/w to about 10% w/w;

water; and

b) wherein the non-Newtonian thickening agent is selected to give the foamable gritty composition a critical strain force greater than or equal to about 30 dynes/cm^2, and a viscosity in a range from about 500 cPoise to about 4000 cPoise such that said foamable gritty composition is dispensible as a foam from a an unpressurized foam dispenser.

22. The method of claim 21 including

introducing a predetermined quantity of air under pressure to a first side of a microporous air sparging element located upstream from an outlet;

introducing, concurrently with the introduction of the air, a predetermined amount of said foamable gritty composition under pressure to a foamable gritty composition inlet of a mixing chamber located on a second side of the microporous air sparging element that is located upstream from said outlet, such that a ratio of air to foamable gritty composition has a greater proportion of air to foamable gritty composition;

forcing the air through the microporous sparging element into the mixing chamber to form a plurality of bubbles;

mixing the plurality of bubbles and the foamable gritty composition in the mixing chamber thereby creating a gritty foam; and

dispensing the gritty foam to a user in shots through said outlet from the mixing chamber.

23. A method as claimed in claim 22 wherein the air is introduced a predetermined quantity and the foamable gritty composition is introduced in a predetermined quantity.

WHAT IS CLAIMED IS:

1. A foamable gritty composition, comprising:

a) constituents including

a solvent present in a range from about 0.5% w/w to about 30.0% w/w, said solvent including any one or combination of D'limonene and sunflower oil methyl ester;

a particulate scrubbing agent present in a range from about 1.0% w/w to about 8% w/w;

a surfactant present in a range from about 0.5% w/w to about 30.0% w/w;

skin conditioner present in a range from 0.01% w/w to about 5.00% w/w; and

a non-Newtonian thickening agent present in a range from about 0.05% w/w to about 10% w/w;

water; and

b) wherein the non-Newtonian thickening agent is selected to give the foamable gritty formulation a critical strain force greater than or equal to about 30 dynes/cm^2, and a viscosity in a range from about 500 cPoise to about 4000 cPoise such that said foamable gritty composition is dispensible as a foam from a non-aerosol foam dispenser.

2. The composition according to claim 1 wherein the surfactant includes any one or combination of

i) an anionic surfactant present in a range from about 1% w/w to about 20% w/w if present alone;

ii) an amphoteric surfactant present in a range from about 0.5% w/w to about 5.0% w/w if present alone;

iii) a non-ionic surfactant present in a range from about 0.5% w/w to about 20% w/w if present alone; and

wherein a total amount of surfactant of any combination of surfactants present is in a range from about 0.5% w/w to about 30.0% w/w.

3. The composition according to claim 1 or claim 2 wherein the solvent further includes any one or combination of glycol ethers, esters, alcohols, terpenes other than D'Limonene, aromatic-free white spirit, and wherein a total amount of solvent present is in said range from about 0.5% w/w to about 30.0% w/w.

4. The composition according to any one of claims 1 to 3 wherein the particulate scrubbing agent is any one or combination of a vegetable based scrubbing agent, a synthetic based scrubbing agent and a mineral based scrubbing agent, and wherein the scrubbing agent has a size in a range from about 100 microns to about 800 microns.

5. The composition according to claim 4 wherein the vegetable based scrubbing agent is any one or combination of cornmeal, olive stone, walnut shells, ground fruit stones, ground corn meal, ground fruit shells.

6. The composition according to claim 4 wherein the synthetic based scrubbing agent is any one or combination of polyethylene and polypropylene.

7. The composition according to claim 4 wherein the mineral based scrubbing agent is any one or combination of ground shellfish, pumice, and silica.

8. The composition according to any one of claims 2 to 7 wherein the anionic surfactant is selected from the group consisting of lauryl sulphates, lauryl ether sulphates, sulphosuccinates, carboxylates (i.e. sodium oleate), carboxylic acid esters (i.e. sodium dilaureth citrate), alkyl sulfate (i.e. sodium lauryl ether sulfate, ammonium alkyl sulfate, alkyl and alkyl-aryl sulfonates (i.e. sodium dodecyl benzene sulfonate), sulfosuccinates (i.e. disodium laurylether sulfosuccinate), isethionates (i.e. sodium cocoyl isethionate, ammonium cocoyl isethionate), taurates (i.e. sodium methyl cocoyl taurate, sodium methyl oleoyl taurate), acyl glutamates (i.e. sodium lauroyl glutamate, sodium cocoyl glutamate, disodium cocoyl glutamate), sarcosinate (i.e. cocoyl

sarcosinate), alkylpolyglucosides (i.e. decyl glucoside, sodium lauryl glucose carboxylate, caprylyl/capryl glucoside).

9. The composition according to any one of claims 2 to 7 wherein the amphoteric surfactant is any one or combination of betaines, acyl ethylene diamines, amino-acids derivates, imidazolines.

10. The composition according to any one of claims 2 to 7 wherein the amphoteric surfactant is any one or combination of acylamphoacetate, acylamphodiacetate, acylamphodipropionate, sodium cocoglycinate, sodium alkyliminodipropionate, cocamidopropyl betaine, sodium cocoamphoacetate.

11. The composition according to claim 9 wherein said betaine is selected from the group consisting of coco betaine and cocamidopropyl betaine.

12. The composition according to any one of claims 2 to 7 wherein the non-ionic surfactant is any one or combination of glucosides, ethoxylated fatty alcohols, ethoxylated fatty acids, saccharose esters, sorbitan esters, alkanolamides, glycerol alkyl esters and polyoxyethylene glycol alkylphenol ethers.

13. The composition according to claim 1 wherein said skin conditioner is any one or combination of a polyol, an anionic surfactant, a non-ionic surfactant, a cationic surfactant, an amphoteric surfactant, a cationic polymer, a quaternised gum, and a polyol.

14. The composition according to claim 13 wherein said polyol is any one or combination of glycerine and polyglycerin-6, propylene glycol, sorbitol, mannitol, erythritol, xylitol, arabitol, ribitol, dulcitol, lactitol, and maltitol.

15. The composition according to any one of claims 1 to 14 wherein said thickening agent is any one or combination of synthetic polymers and natural thickeners.

16. The composition according to claim 15 wherein said synthetic polymer is selected from the group consisting of acrylate copolymers.

17. The composition according to claim 15 wherein said synthetic polymer is selected from the group consisting of acrylates/C10-30 alkyl acrylate crosspolymer, carbomers, and combinations thereof.

18. The composition according to claim 15 wherein said natural thickener is selected from the group consisting of xanthan gum, guar gum, quaternised guar gum, alginate, bentonite and fumed silica.

19. The composition according to any one of claims 1 to 18 including an antioxidant present in a range from about 0.01 to about 1.0% w/w.

20. The composition according to claim 19 wherein said antioxidant is any one or combination of butylhydroxytoluene (BHT), butylhydroxyanizole, 1,2-dihydroxybenzene, p-coumarine acid, caffeic acid, sodium sulfite, sodium metasulfite, ferrulic acid, tyrosol, quercetin, chlorogenic acid, oleuropein hydroxytyrosol, ascorbic acid, phenolic acid, propyl gallate, α-tocopherol, β-tocopherol, γ-tocopherol, δ-tocopherol, and tetradibutyl-pentaerithrityl hydroxyhydrocinnamate.

21. A method of producing and dispensing a gritty foam, the method comprising;

dispensing a foamable gritty composition from an unpressurized container having a dispenser pump configured to mix air with the foamable gritty composition under low pressure conditions during dispensing to form a gritty foam, the foamable gritty composition comprising

a) constituents including

a solvent present in a range from about 0.5% w/w to about 30.0% w/w, said solvent including any one or combination of D'limonene and sunflower oil methyl ester;

a particulate scrubbing agent present in a range from about 1.0% w/w to about 8% w/w;

a surfactant present in a range from about 0.5% w/w to about 30.0% w/w;

skin conditioner present in a range from 0.01% w/w to about 5.00% w/w; and

a non-Newtonian thickening agent present in a range from about 0.05% w/w to about 10% w/w;

water; and

b) wherein the non-Newtonian thickening agent is selected to give the foamable gritty composition a critical strain force greater than or equal to about 30 dynes/cm^2, and a viscosity in a range from about 500 cPoise to about 4000 cPoise such that said foamable gritty composition is dispensible as a foam from an unpressurized foam dispenser.

22. The method of claim 21 including

introducing a predetermined quantity of air under pressure to a first side of a microporous air sparging element located upstream from an outlet;

introducing, concurrently with the introduction of the air, a predetermined amount of said foamable gritty composition under pressure to a foamable gritty composition inlet of a mixing chamber located on a second side of the microporous air sparging element that is located upstream from said outlet, such that a ratio of air to foamable gritty composition has a greater proportion of air to foamable gritty composition;

forcing the air through the microporous sparging element into the mixing chamber to form a plurality of bubbles;

mixing the plurality of bubbles and the foamable gritty composition in the mixing chamber thereby creating a gritty foam; and

dispensing the gritty foam to a user in shots through said outlet from the mixing chamber.

23. A method as claimed in claim 22 wherein the air is introduced a predetermined quantity and the foamable gritty composition is introduced in a predetermined quantity.