

CLAIMS

What is claimed is the following:

1. A composition comprising:
 - a neutral surfactant or a reaction product thereof; and
 - a reaction product of a saccharide polymer and a fatty acid, the saccharide polymer comprising a dextran, a dextrin compound, or any combination thereof;wherein the reaction product of the saccharide polymer and the fatty acid is present at a concentration effective to lower a surface tension of the neutral surfactant.
2. The composition of claim 1, wherein the saccharide polymer comprises a dextrin compound and the dextrin compound comprises a maltodextrin.
3. The composition of claim 2, wherein the maltodextrin has a dextrose equivalent value of about 3 to about 25.
4. The composition of claim 2, wherein the maltodextrin has a dextrose equivalent value of about 4.5 to about 7.0.
5. The composition of claim 2, wherein the maltodextrin has a dextrose equivalent value of about 9.0 to about 12.0.
6. The composition of claim 1, wherein the fatty acid comprises about 4 to about 30 carbon atoms.
7. The composition of claim 1, wherein the fatty acid comprises at least one fatty acid selected from the group consisting of butyric acid, valeric acid, caproic acid, enanthic acid, caprylic acid, pelabonic acid, capric acid, undecylic acid, lauric acid, tridecylic acid, myristic acid, pentadecylic acid, palmitic acid, margaric acid, stearic acid, nonadecylic acid, arachidic acid, heneicosylic acid, behenic acid, trioscylic acid, lignoceric acid, pentacosylic acid, cerotic acid, carboceric acid, montanic acid, nonacosylic acid, melissic acid, crotonic acid, cervonic acid, linoleic acid, linolelaidic acid, linolenic acid, arachidonic acid, docosatetraenoic acid, myristoleic acid, palmitoleic acid, sappenic acid, vaccenic acid, paullinic acid, oleic acid,

pinolenic acid, stearidonic acid, eleostearic acid, elaidic acid, gondoic acid, gadoleic acid, erucic acid, eicosenoic acid, eicosadienoic acid, eicosatrienoic acid, eicosatetraenoic acid, docosadienoic acid, nervonic acid, mead acid, adrenic acid, and any combination thereof.

8. The composition of claim 1, wherein the neutral surfactant comprises cocamide diethanolamine or a reaction product thereof.
9. The composition of claim 1, wherein the reaction product of the saccharide polymer and the fatty acid is formed in the presence of the neutral surfactant.
10. The composition of claim 1, wherein a molar ratio of fatty acid to saccharide polymer in the reaction product is about 0.2 or above on a basis of moles_{fatty acid}:moles_{glucose monomers}.
11. The composition of claim 1, wherein a molar ratio of fatty acid to saccharide polymer in the reaction product is about 0.35 or above on a basis of moles_{fatty acid}:moles_{glucose monomers}.
12. The composition of claim 1, wherein the reaction product of the saccharide polymer is obtained in the presence of water and a hydroxide base.
13. The composition of claim 1, wherein the reaction product of the saccharide polymer comprises a fatty ester reaction product.
14. A foamable formulation comprising the composition of claim 1.
15. The foamable formulation of claim 14, wherein the foamable formulation comprises a soap.
16. A personal care product comprising the composition of claim 1.
17. A method comprising:
 - heating a saccharide polymer, a fatty acid, and a hydroxide base in water, the saccharide polymer comprising a dextran, a dextrin compound, or any combination thereof;
 - obtaining a reaction product of the saccharide polymer and the fatty acid in an aqueous phase; and
 - combining a neutral surfactant or a reaction product thereof with

the reaction product of the saccharide polymer and the fatty acid in the aqueous phase.

18. The method of claim 17, wherein the saccharide polymer comprises a dextrin compound, and the dextrin compound comprises a maltodextrin.
19. The method of claim 18, wherein the maltodextrin has a dextrose equivalent value of about 3 to about 25.
20. The method of claim 18, wherein the maltodextrin has a dextrose equivalent value of about 4.5 to about 7.0.
21. The method of claim 18, wherein the maltodextrin has a dextrose equivalent value of about 9.0 to about 12.0.
22. The method of claim 17, wherein the fatty acid comprises about 4 to about 30 carbon atoms.
23. The method of claim 17, wherein the fatty acid comprises at least one fatty acid selected from the group consisting of butyric acid, valeric acid, caproic acid, enanthic acid, caprylic acid, pelabonic acid, capric acid, undecylic acid, lauric acid, tridecylic acid, myristic acid, pentadecylic acid, palmitic acid, margaric acid, stearic acid, nonadecylic acid, arachidic acid, heneicosylic acid, behenic acid, trioscylic acid, lignoceric acid, pentacosylic acid, cerotic acid, carboceric acid, montanic acid, nonacosylic acid, melissic acid, crotonic acid, cervonic acid, linoleic acid, linolelaidic acid, linolenic acid, arachidonic acid, docosatetraenoic acid, myristoleic acid, palmitoleic acid, sappenic acid, vaccenic acid, paullinic acid, oleic acid, pinolenic acid, stearidonic acid, eleostearic acid, elaidic acid, gondoic acid, gadoleic acid, erucic acid, eicosenoic acid, eicosadienicoic acid, eicosatrienoic acid, eicosatetraenoic acid, docosadienoic acid, nervonic acid, mead acid, adrenic acid, and any combination thereof.
24. The method of claim 17, wherein the neutral surfactant comprises cocamide diethanolamine or a reaction product thereof.
25. The method of claim 17, wherein a molar ratio of fatty acid to saccharide polymer in the reaction product is about 0.2 or above on a basis of moles_{fatty acid}:moles_{glucose monomers}.

26. The method of claim 17, wherein a molar ratio of fatty acid to saccharide polymer in the reaction product is about 0.35 or above on a basis of $\text{moles}_{\text{fatty acid}} : \text{moles}_{\text{glucose monomers}}$.
27. The method of claim 17, wherein the reaction product of the saccharide polymer and the fatty acid is formed in the presence of the neutral surfactant.
28. The method of claim 27, further comprising:
 - combining the fatty acid, the hydroxide base, and the neutral surfactant in the water to form a mixture;
 - heating the mixture until the fatty acid dissolves and a homogeneous mixture forms; and
 - combining the saccharide polymer with the homogeneous mixture.
29. The method of claim 17, further comprising:
 - agitating the aqueous phase to form a foam.
30. The method of claim 17, wherein the reaction product of the saccharide polymer and the fatty acid is present at a concentration effective to lower a surface tension of the neutral surfactant.
31. A method comprising:
 - providing a treatment fluid comprising the composition of claim 1;
 - and
 - introducing the treatment fluid into a subterranean formation.
32. The method of claim 31, wherein the saccharide polymer comprises a dextrin compound and the dextrin compound comprises a maltodextrin.
33. The method of claim 32, wherein the maltodextrin has a dextrose equivalent value of about 3 to about 25.
34. The method of claim 32, wherein the maltodextrin has a dextrose equivalent value of about 4.5 to about 7.0.
35. The method of claim 32, wherein the maltodextrin has a dextrose equivalent value of about 9.0 to about 12.0.
36. The method of claim 31, wherein the fatty acid comprises about 4 to about 30 carbon atoms.

37. The method of claim 31, wherein the fatty acid comprises at least one fatty acid selected from the group consisting of butyric acid, valeric acid, caproic acid, enanthic acid, caprylic acid, pelabonic acid, capric acid, undecylic acid, lauric acid, tridecylic acid, myristic acid, pentadecylic acid, palmitic acid, margaric acid, stearic acid, nonadecylic acid, arachidic acid, heneicosylic acid, behenic acid, trioscylic acid, lignoceric acid, pentacosylic acid, cerotic acid, carboceric acid, montanic acid, nonacosylic acid, melissic acid, crotonic acid, cervonic acid, linoleic acid, linolelaidic acid, linolenic acid, arachidonic acid, docosatetraenoic acid, myristoleic acid, palmitoleic acid, sappenic acid, vaccenic acid, paullinic acid, oleic acid, pinolenic acid, stearidonic acid, eleostearic acid, elaidic acid, gondoic acid, gadoleic acid, erucic acid, eicosenoic acid, eicosadienicoic acid, eicosatrienoic acid, eicosatetraenoic acid, docosadienoic acid, nervonic acid, mead acid, adrenic acid, and any combination thereof.
38. The method of claim 31, wherein the neutral surfactant comprises cocamide diethanolamine or a reaction product thereof.
39. The method of claim 31, wherein a molar ratio of fatty acid to saccharide polymer in the reaction product is about 0.2 or above on a basis of $\text{moles}_{\text{fatty acid}}:\text{moles}_{\text{glucose monomers}}$.
40. The method of claim 31, wherein a molar ratio of fatty acid to saccharide polymer in the reaction product is about 0.35 or above on a basis of $\text{moles}_{\text{fatty acid}}:\text{moles}_{\text{glucose monomers}}$.
41. The method of claim 31, wherein the treatment fluid is emulsified when introduced into the subterranean formation or becomes emulsified within the subterranean formation.
42. The method of claim 41, wherein the treatment fluid comprises a water-in-oil emulsion.
43. The method of claim 41, wherein the treatment fluid comprises an oil-in-water emulsion.
44. The method of claim 41, wherein the treatment fluid comprises a microemulsion when introduced to the subterranean formation.

45. The method of claim 31, wherein the treatment fluid promotes enhanced oil recovery within the subterranean formation.
46. The method of claim 31, wherein the treatment fluid is foamed.
47. A treatment fluid comprising the composition of claim 1.
48. A method comprising:
 - providing an aqueous fluid comprising the composition of claim 1;
 - and
 - inducing foam formation in the aqueous fluid.
49. The method of claim 48, wherein inducing foam formation comprises agitating the aqueous fluid to introduce gas thereto as a plurality of bubbles.
50. A foamed formulation comprising:
 - a gas; and
 - an aqueous fluid comprising the composition of claim 1 admixed together with the gas as a plurality of bubbles.
51. A composition comprising:
 - a neutral surfactant;
 - a hydroxide base;
 - a saccharide polymer, the saccharide polymer comprising a dextran, a dextrin compound, or any combination thereof; and
 - a fatty acid.
52. The composition of claim 51, wherein the neutral surfactant comprises cocamide diethanolamine.