Claims

1. A method of selecting a polyether polysiloxane surfactant to optimise an alcohol and water containing foaming cleansing composition comprising:

   (i) selecting an amount of alcohol to be used in the final composition; and

   (ii) selecting the degree of polymerisation of the backbone of the siloxane (PDMS) of the polyether polysiloxane surfactant and the degree of polymerisation of polyether side groups of the polyether polysiloxane surfactant for that amount of alcohol from a predetermined optimisation calibration, wherein:

   the alcohol is a C1 to C4 straight or branched chain alcohol, the polysiloxane backbone is polydimethylsiloxane (PDMS) and the polyether is selected from a polyethylene oxide (PEO), polypropylene oxide (PPO) or a mixed PEO/PPO polyether, wherein
   when a) the amount of alcohol is from 50% to less than 70% volume:

   (i) the polyether comprises 6-10 monomers, per polyether arm; and
   (ii) the $PDMS_{DP}$ of the polysiloxane chain is 8-16, more preferably wherein the polyether contains 6- 8 monomers and the $PDMS_{DP}$ is 10-12, most preferably wherein the polyether contains 8 monomers and the $PDMS_{DP}$ is 10; and

   when b) the amount of alcohol is 70-90% volume:

   (i) the polyether comprises at least 10 monomers, preferably 10-18 or 12-16, per polyether arm; and
   (ii) the $PDMS_{DP}$ of the polysiloxane chain is greater than 25, preferably 26-45, more preferably wherein the polyether contains 12 monomers and the $PDMS_{DP}$ is 30-40.

2. A method according to any preceding claim, wherein the alcohol is ethanol.

3. A method according to any preceding claim, wherein, when the amount of alcohol is below 70% vol, mixed PEO/PPO polyethers are preferentially selected.

4. A method according to any preceding claim wherein, when the degree of polymerisation of the polysiloxane back bone is at least 10:

$n(TOTALpolyether) \geq n(PDMS)^{2/3} \times \pi^{1/3} \times 36^{1/3} \times r$

where:

n(TOTALpolyether) is the minimum amount of total polyether side groups

n(PDMS) is the degree of polymerisation of the polysiloxane backbone.

r is a constant = 0.5

5. A method according to any preceding claim, wherein the final composition comprises the alcohol, at least 0.01 weight percent of the final composition of the polyether polysiloxane and water to balance the final composition to 100 weight percent.

6. The method according to any preceding claim wherein the composition is foamable when mixed with air at low pressure, wherein when the composition is mixed with air, the mixture of the composition and air forms a foam.

7. The method according to any preceding claim, wherein the composition comprises an additional surfactant is selected from the group consisting of additional silicone-based surface active agents, fluorinated surfactants, alkylglucosides, poly(ethoxylated and/or propoxylated)alcohol, a poly(ethoxylated and/or propoxylated)ester, a derivative of a poly(ethoxylated and/or propoxylated)alcohol, a derivative of a poly(ethoxylated and/or propoxylated)ester, an alkyl alcohol, an alkenyl alcohol, an ester of a polyhydric alcohol, an ether of a polyhydric alcohol, an ester of a polyalkoxylated derivative of a polyhydric alcohol, an ether of a polyalkoxylated derivative of a polyhydric alcohol, a sorbitan fatty acid ester, a polyalkoxylated derivative of a sorbitan fatty acid ester, a betaine, a sulfobetaine, an imidazoline derivative, an amino acid derivative, a lecithin, a phosphatide, an amine oxide, a sulfoxide and mixtures thereof, present in an amount between 0.10 % to 5% weight percent.

8. A method according to any preceding claim the composition additionally comprising a foam stabilising agent, preferably wherein the foam stabilizing

agent is selected from the group consisting of lactic acid esters of monoglycerides, cationic emulsifiers, quaternary ammonium compounds, triquaternized stearic phospholipid complex, hydroxystearamide propyltriamine salts, lactic acid monoglycerides, food emulsifiers such as glyceryl monostearate, propylene glycol mon[omicron]stearate, sodium stearoyl lactylate, cetyl betaine, glycolether, n-propanol, butyleneglycol, silicone wax, an encapsulated oil, Microcapsule Mineral Oil, and combinations thereof.

9. A method according to any preceding claim the composition including any one of a moisturizer, emollient, lipid layer enhancers and combinations thereof selected from the group consisting of lanolin, vinyl alcohol, polyvinyl pyrrolidone and polyols selected from the group consisting of glycerol, propylene glycol, butyleneglycol, glyceryl oleate and sorbitol, cocoglucoside, a fatty alcohol selected from the group consisting of cetyl alcohol, stearyl alcohol, lauryl alcohol, myristyl alcohol and palmityl alcohol, cetyl alcohol, ceteareth 20, an alkylglucoside, mixtures of alkylglucoside and glyceryl Linoleammonium Chloride or PEG-7 Glyceryl Cocoate, and combinations thereof, present in an amount up to 5%.

10. The method according to any preceding claim, the composition further comprising an acid or a base to adjust a pH of the composition to a preselected pH present in an amount from 0.05 to 0.5 % weight percent of the total composition.

11. A method according to and preceding claim, the composition according to any one of claims 1 to 20 including a preservative in an amount from 0.01 to 5 % weight percent of the total composition.

12. A method according to any preceding claim the composition further comprising constituents selected from the group consisting of organic gums and colloids, lower alkanolamides of higher fatty acids, short chain diols and/or triols, fragrance, colouring matter, ultraviolet absorbers, solvents, suspending agents, buffers, conditioning agents, antioxidants, bactericides and medicinally active ingredients, and combinations thereof.

13. A foaming cleansing composition comprising a polyether polysiloxane surfactant an alcohol and water, wherein the amount of alcohol is from 50% to less than 70% volume, the alcohol is a C1 to C4 straight or branched chain alcohol, most

typically ethanol, and the polyether is selected from a polyethylene oxide (PEO), polypropylene oxide (PPO) or a mixed PEO/PPO polyether; and

(i) the polyether comprises 6-10 monomers, preferably 6-8, per polyether arm; and
(ii) the $PDMS_{DP}$ of the polysiloxane chain is 8-16, preferably 10-12, preferably wherein the polyether contains 8 monomers and the $PDMS_{DP}$ is 10.

14. A foaming cleansing composition comprising a polyether polysiloxane surfactant an alcohol and water, wherein the amount of alcohol is 70% to 90% volume, the alcohol is a C1 to C4 straight or branched chain alcohol,, mots typically ethanol, and the polyether is selected from a polyethylene oxide (PEO), polypropylene oxide (PPO) or a mixed PEO/PPO polyether; and

(i) the polyether comprises at least 10 monomers, preferably 10-18 or 12-16, per polyether arm; and
(ii) the $PDMS_{DP}$ of the polysiloxane chain is greater than 25, preferably 26-45 preferably wherein the polyether contains 12 monomers and the $PDMS_{DP}$ is 30-40.

15. A composition according to any of claims 13-14 wherein, when the degree of polymerisation of the polysiloxane back bone is at least 10:

$$n(TOTALpolyether) \geq n(PDMS)^{2/3} \times \pi^{1/3} \times 36^{1/3} \times r$$

where:

n(TOTALpolyether) is the minimum amount of total polyether side groups

n(PDMS) is the degree of polymerisation of the polysiloxane backbone.

r is a constant = 0.5

16. A composition according to any of claims 13-15, wherein the final composition comprises the alcohol, at least 0.01 weight percent of the final composition of the polyether polysiloxane and water to balance the composition to 100 weight percent.

17. A composition according to any of claims 13-16 wherein the composition is foamable when mixed with air at low pressure, wherein when the composition is mixed with air, the mixture of the composition and air forms a foam.

18. A composition according to any of claims 13-17, wherein the composition comprises an additional surfactant is selected from the group consisting of additional silicone-based surface active agents, fluorinated surfactants, alkylglucosides, poly(ethoxylated and/or propoxylated)alcohol, a poly(ethoxylated and/or propoxylated)ester, a derivative of a poly(ethoxylated and/or propoxylated)alcohol, a derivative of a poly(ethoxylated and/or propoxylated)ester, an alkyl alcohol, an alkenyl alcohol, an ester of a polyhydric alcohol, an ether of a polyhydric alcohol, an ester of a polyalkoxylated derivative of a polyhydric alcohol, an ether of a polyalkoxylated derivative of a polyhydric alcohol, a sorbitan fatty acid ester, a polyalkoxylated derivative of a sorbitan fatty acid ester, a betaine, a sulfobetaine, an imidazoline derivative, an aminoacid derivative, a lecithin, a phosphatide, an amine oxide, a sulfoxide and mixtures thereof, present in an amount between 0.10 % to 5% weight percent.

19. A composition according to any of claims 13-18 the composition additionally comprising a foam stabilising agent, preferably wherein the foam stabilizing agent is selected from the group consisting of lactic acid esters of monoglycerides, cationic emulsifiers, quaternary ammonium compounds, triquaternized stearic phospholipid complex, hydroxystearamide propyltriamine salts, lactic acid monoglycerides, food emulsifiers such as glyceryl monostearate, propylene glycol mon[omicron]stearate, sodium stearoyl lactylate, cetyl betaine, glycolether, n-propanol, butyleneglycol, silicone wax, an encapsulated oil, Microcapsule Mineral Oil, and combinations thereof.

20. A composition according to any of claims 13-19 the composition including any one of a moisturizer, emollient, lipid layer enhancers and combinations thereof selected from the group consisting of lanolin, vinyl alcohol, polyvinyl pyrrolidone and polyols selected from the group consisting of glycerol, propylene glycol, butyleneglycol, glyceryl oleate and sorbitol, cocoglucoside, a fatty alcohol selected from the group consisting of cetyl alcohol, stearyl alcohol, lauryl alcohol, myristyl alcohol and palmityl alcohol, cetyl alcohol, ceteareth 20, an alkylglucoside, mixtures of alkylglucoside and glyceryl Linoleammonium Chloride or PEG-7 Glyceryl Cocoate, and combinations thereof, present in an amount up to 5%.

21. A composition according to any of claims 13-20, the composition further comprising an acid or a base to adjust a pH of the composition to a preselected pH present in an amount from 0.05 to 0.5 % weight percent of the total composition.

22. A composition according to any of claims 13-21, the composition according to any one of claims 1 to 20 including a preservative in an amount from 0.01 to 5 % weight percent of the total composition.

23. A composition according to any of claims 13-22, the composition further comprising constituents selected from the group consisting of organic gums and colloids, lower alkanolamides of higher fatty acids, short chain diols and/or triols, fragrance, colouring matter, ultraviolet absorbers, solvents, suspending agents, buffers, conditioning agents, antioxidants, bactericides and medicinally active ingredients, and combinations thereof.

24. A composition according to any of claims 13-23 stored in an unpressurized dispenser having a dispenser pump for mixing the composition with air and dispensing foam therefrom.

25. A computer implemented method comprising imputing an amount of alcohol to be used in a composition and selecting a polyether polysiloxane surfactant to optimise an alcohol and water containing foaming cleansing composition by a method according to claims 1 to 12, preferably wherein the computer comprises a computer processor and a computer memory.