CLAIMS

1. A composition comprising:

0.0001% to 90% (w/v) of pure silk fibroin-based protein fragments that are substantially devoid of sericin,

0.1% to 99% (v/v) of an oil,

99% to 0.1% (v/v) water; and

one or more of aspen bark, sodium anisate, talcum powder, hops, and witch hazel;

wherein the pH of the composition is in the range of 4 to 9,

wherein the composition forms a stable emulsion and does not undergo a phase separation upon storage for at least 1 week,

wherein the pure silk fibroin-based protein fragments have an average weight average molecular weight ranging from 5 kDa to 80 kDa, and

wherein the pure silk fibroin-based protein fragments have a polydispersity of between 1.5 and 3.0.

2. The composition of claim 1, comprising 0.01% to 2% (w/v) of the pure silk fibroin-based protein fragments.

3. The composition of claim 1, comprising 0.05% to 0.3% (w/v) of the pure silk fibroin-based protein fragments.

4. The composition of claim 1, wherein the pH of the composition is in the range of 5 to 8.

5. The composition of claim 1, wherein the pH of the composition is in the range of 5 to 7.

6. The composition of claim 1, comprising 0.1% to 25% of an oil, and 99% to 75% water.

7. The composition of claim 1, comprising 25% to 50% of an oil, and 75% to 50% water.

8. The composition of claim 1, comprising 50% to 75% of an oil, and 50% to 25% water.

9. The composition of claim 1, comprising 75% to 99% of an oil, and 25% to 0.1% water.

10. The composition of any one of claims 1 to 9, wherein the pure silk fibroin-based protein fragments have an average weight average molecular weight ranging from 5 kDa to 18 kDa.

11. The composition of any one of claims 1 to 9, wherein the pure silk fibroin-based protein fragments have an average weight average molecular weight ranging from 17 kDa to 40 kDa.

12. The composition of any one of claims 1 to 9, wherein the pure silk fibroin-based protein fragments have an average weight average molecular weight ranging from 39 kDa to 80 kDa.

13. The composition of any one of claims 1 to 12, further comprising 0.1% to 8% (w/v) of hyaluronic acid.

14. The composition of any one of claims 1 to 12, further comprising 0.5% to 2% (w/v) of hyaluronic acid.

15. The composition of any one of claims 1 to 14, wherein the stable emulsion is selected from the group consisting of a water-in-oil (w/o) emulsion and an oil-in-water (o/w) emulsion.

16. The composition of any one of claims 1 to 15, wherein the composition is in a form selected from the group consisting of a liquid, semisolid, solid, lotion, cream, oil, gel, emulsion, stick, spray, ointment, paste, mousse, foam, and suspension.

17. The composition of any one of claims 1 to 16, wherein the oil is selected from the group consisting of an aliphatic oil, a fatty alcohol, a fatty acid, a glyceride (an acylglycerol), a phospholipid, and combinations thereof.

18. The composition of claim 17, wherein the oil is a glyceride, and the glyceride is selected from the group consisting of a monoglyceride, a diglyceride, and a triglyceride.

19. The composition of any one of claims 1 to 16, wherein the oil comprises one or more natural or essential oils.

20. The composition of any one of claims 1 to 19, further comprising 0.1% to 25% of a second oil.

21. The composition of claim 20, wherein the second oil comprises one or more natural or essential oils.

22. The composition of any one of claims 1 to 21, further comprising 0.1% to 5% (w/v) or (v/v) of a pH adjusting agent.

23. The composition of claim 22, wherein the pH adjusting agent is selected from the group consisting of sodium hydroxide (NaOH), potassium hydroxide (KOH), hydrochloric acid (HCl), citric acid, and combinations thereof.

24. The composition of claim 22, further comprising 0.1% to 5% (w/v) or (v/v) of a second pH adjusting agent.

25. The composition of claim 24 wherein the second pH adjusting agent is selected from the group consisting of sodium hydroxide (NaOH), potassium hydroxide (KOH), hydrochloric acid (HCl), citric acid, and combinations thereof.

26. The composition of claim 24, wherein the first pH adjusting agent is sodium hydroxide (NaOH) and the second pH adjusting agent is hydrochloric acid (HCl).

27. The composition of any one of claims 1 to 26, further comprising an additive.

28. The composition of claim 27, wherein the additive is selected from the group consisting of vitamin E, vitamin A, vitamin B, vitamin C, aspen bark, sodium anisate, oat flour, titanium oxide, titanium dioxide, glycerin, zinc oxide, a preservative, an aluminum based compound, a

mineral salt, talcum powder, sodium bicarbonate, hops, aloe vera, witch hazel, and combinations thereof.

29. The composition of claim 28, wherein the additive is a combination of vitamin E, aspen bark, and sodium anisate.

30. The composition of any of claims 1 to 29, further comprising a sunscreen or sunblock.

31. The composition of claim 30, wherein the sunscreen or sunblock is selected from the group consisting of amiloxate (isopentyl-4-methoxycinnamate), para-aminobenzoic acid, Benzophenone-9 (sodium dihydroxy dimethoxy disulfobenzophenone), padimate O (octyldimethyl para-aminobenzoic acid), phenylbenzimidazole sulfonic acid, cinoxate, dioxybenzone, oxybenzone, homosalate, menthyl anthranilate, 4-methylbenzylidene camphor, Mexoryl XL (drometrizole trisiloxane), Neo Heliopan AP (disodium phenyl dibenzimidazole tetrasulfonate), octocrylene, octyl methoxycinnamate, octyl salicylate, sulisobenzone, Tinosorb M (bisoctrizole, methylene bis-benzotriazolyl tetramethylbutylphenol), titanium dioxide, zinc oxide, micronized titanium dioxide, micronized zinc oxide, oil soluble zinc oxide, Tinosorb S (bis-ethylhexyloxyphenol methoxyphenol triazine), Tinsorb A2B (tris-biphenyl triazine), trolamine salicylate, avobenzone, ecamsule, titanium dioxide, 4-MBC, Uvinul T 150 (octyl triazone), Uvinul A Plus (diethylamino hydroxybenzoyl hexyl benzoate), Parsol SLX (dimethico-diethylbenzalmalonate), zinc oxide, melanin, a melanin derivative, raspberry seed oil, carrot oil, and combinations thereof.

32. The composition of claim 31, wherein the sunscreen or sunblock is selected from the group consisting of titanium dioxide, zinc oxide, micronized titanium dioxide, micronized zinc oxide, oil soluble zinc oxide, octylcrylene, avobenzone, octinoxate, octisalate, oxybenzone, homosalate, helioplex, 4-MBC, mexoryl SX and SL, tinosorb S and M, uvinul T 150, uvinul A plus, and a combination thereof.

33. The composition of any of claims 1 to 32, wherein the composition comprises an emollient.

34. The composition of claim 33, wherein the emollient comprises one or more of a hydrocarbon oil, a hydrocarbon wax, a silicone oil, an acetoglyceride ester, an ethoxylated glyceride, an alkyl ester of a fatty acid, an alkenyl ester of a fatty acid, a fatty acid, a fatty alcohol, a fatty alcohol ether, an ether-ester, lanolin, a lanolin derivative, a polyhydric alcohol, a polyether derivative, a polyhydric ester, a wax ester, a beeswax derivative, a vegetable wax, a natural or essential oil, a phospholipid, a sterol, and an amide.

35. The composition of any of claims 1-34, wherein the composition is in the form of a sunscreen, a cleanser, a bar of soap, a lip balm, a foot balm, a deodorant stick, an antiperspirant stick, a liquid deodorant, a spray deodorant, a liquid antiperspirant, a spray antiperspirant, a conditioner, a shampoo, or a combination thereof.

36. A method for preparing a composition comprising the steps of:

providing a composition comprising:

0.0001% to 90% (w/v) of pure silk fibroin-based protein fragments that are substantially devoid of sericin,

99% to 0.1% (v/v) of water;

adding a first pH adjusting agent to adjust the pH of the composition to at least 10;

adding 0.1% to 99% (v/v) of an oil;

adding one or more of aspen bark, sodium anisate, talcum powder, hops, and witch hazel;

mixing the composition until it is homogeneous;

adding a second pH adjusting agent to adjust the pH of the composition to the range of 4 to 9; and

storing the composition for a period of time, wherein the composition remains a stable emulsion and does not undergo a phase separation upon storage for at least 1 week;

wherein the pure silk fibroin-based protein fragments have an average weight average molecular weight ranging from 5 kDa to 80 kDa, and

wherein the pure silk fibroin-based protein fragments have a polydispersity of between 1.5 and 3.0.

37. The method of claim 36, wherein the pure silk fibroin-based protein fragments have an average weight average molecular weight ranging from 5 kDa to 18 kDa.

38. The method of claim 36, wherein the pure silk fibroin-based protein fragments have an average weight average molecular weight ranging from 17 kDa to 40 kDa.

39. The method of claim 36, wherein the pure silk fibroin-based protein fragments have an average weight average molecular weight ranging from 39 kDa to 80 kDa.

40. The method of any one of claims 36 to 39, further comprising the step of adding 0.1% to 8% (w/v) hyaluronic acid.

41. The method of any one of claims 36 to 40, wherein the stable emulsion is selected from the group consisting of a water-in-oil (w/o) emulsion and an oil-in-water (o/w) emulsion.

42. The method of any one of claims 36 to 41, further comprising the step of adding an additive.

43. The method of any one of claims 36 to 42, wherein the oil is selected from the group consisting of jojoba oil, rosehip oil, glycerin, coconut oil, lemongrass oil, shea butter, or a combination thereof.

44. A moisturizing composition for use to improve skin hydration if applied once daily to human skin for a period of at least one week, wherein the moisturizing composition comprises:

0.1% to 5% silk solution, wherein the silk solution comprises 1% to 10% (w/v) of pure silk fibroin-based protein fragments that are substantially devoid of sericin;

0.1% to 5% (w/v) of hyaluronic acid;

0.1% to 25% (v/v) of an oil or butter;

one or more of aspen bark, sodium anisate, talcum powder, hops, and witch hazel; and

0.1% to 1.5% (v/v) of a pH adjusting agent;

wherein the moisturizing composition forms a stable emulsion and does not undergo a phase separation upon storage for at least 1 week.

45. A moisturizing composition for use to improve skin hydration if applied once daily to human skin for a period of at least one week, wherein the moisturizing composition comprises:

0.06% to 0.3% (w/v) pure silk fibroin-based protein fragments that are substantially devoid of sericin;

0.1% to 5% (w/v) of hyaluronic acid;

0.1% to 25% (v/v) of an oil or butter;

one or more of aspen bark, sodium anisate, talcum powder, hops, and witch hazel; and

0.1% to 1.5% (v/v) of a pH adjusting agent;

wherein the moisturizing composition forms a stable emulsion and does not undergo a phase separation upon storage for at least 1 week.

46. A moisturizing composition for use to improve skin hydration if applied once daily to human skin for a period of at least one week, wherein the moisturizing composition comprises:

1 % to 5 % silk solution (v/v), wherein the silk solution comprises 1% to 10% (w/v) of pure silk fibroin-based protein fragments that are substantially devoid of sericin;

1 % to 3 % (w/v) of hyaluronic acid;

1 % to 15% (v/v) of an oil or butter;

one or more of aspen bark, sodium anisate, talcum powder, hops, and witch hazel; and

0.1 % to 1 % (v/v) of a pH adjusting agent;

wherein the moisturizing composition forms a stable emulsion and does not undergo a phase separation upon storage for at least 1 week.