WHAT IS CLAIMED IS:

1. A protein composition comprising:

at least 50% by dry weight of a plurality of plant proteins, fungal proteins, algal proteins, bacterial proteins, protozoan proteins, invertebrate proteins, or a combination thereof,

wherein the protein composition is a low color protein composition or wherein the protein composition comprises less than 1.0% by dry weight of lipids.

2. A protein composition produced by a method comprising:

(a) adding an aqueous solution to a source protein composition to form a solution of solubilized protein;

(b) optionally removing solids from the solution of solubilized protein;

(c) optionally heating the solution of solubilized protein;

(d) optionally adjusting the pH of the solution of solubilized protein to about 4.0 to about 9.0;

(e) optionally cooling the solution of solubilized protein to about 0 °C to about 10 °C;

(f) adding an organic solvent to the solution of solubilized protein to form a solid phase and a liquid phase;

(g) separating the solid phase from the liquid phase to form the protein composition;

(h) optionally washing the protein composition with a wash solvent; and

(i) optionally treating the protein composition,

wherein the protein composition comprises at least at least 50% by dry weight of a plurality of plant proteins, fungal proteins, algal proteins, bacterial proteins, protozoan proteins, invertebrate proteins, or a combination thereof.

3. The protein composition of any one of claims 1-2, wherein the protein composition has an isoflavone content of less than about 125 ppm, a saponin content of less than about 75 ppm, or a phospholipid content of less than about 500 ppm.

4. The protein composition of any one of claims 1-3, wherein the protein composition comprises less than 8% by dry weight of insoluble carbohydrates and/or less than 0.8% by dry weight of lipids.

5. The protein composition of any one of claims 1-4, wherein the protein composition has a luminance of at least 86 on a scale from 0 (black control value) to 100 (white control value), or wherein the protein composition has a chroma value of less than 14.

6. The protein composition of any one of claims 1-5, wherein the protein composition is in the form of a solution, suspension, emulsion, a solid, or a powder.

7. A food product comprising the protein composition of any one of claims 1-6.

8. A method for producing a protein composition, the method comprising:

(a) adding an aqueous solution to a source protein composition to form a solution of solubilized protein;

(b) optionally removing solids from the solution of solubilized protein;

(c) optionally heating the solution of solubilized protein;

(d) optionally adjusting the pH of the solution of solubilized protein to about 4.0 to about 9.0;

(e) optionally cooling the solution of solubilized protein to about 0 °C to about 10 °C;

(f) adding an organic solvent to the solution of solubilized protein to form a solid phase and a liquid phase;

(g) separating the solid phase from the liquid phase to form the protein composition;

(h) optionally washing the protein composition with a wash solvent; and

(i) optionally resolubilizing the protein composition,

wherein the protein composition comprises at least at least 50% by dry weight of a plurality of plant proteins, fungal proteins, algal proteins, bacterial proteins, protozoan proteins, invertebrate proteins.

9. The method of claim 8, wherein step (a) is performed at a pH of about 7.0 to about 10.0.

10. The method of any one of claims 8-9, wherein step (d) comprises adjusting the pH of the solution of solubilized protein to about 6.0 to about 7.0.

11. The method of any one of claims 8-10, wherein step (f) comprises adding the organic solvent to a final concentration of about 40% to about 70% (v/v), optionally wherein at the beginning of step (f), the organic solvent has a temperature of about -20 °C to about 10 °C.

12. The method of any one of claims 8-11, wherein step (e) comprises cooling the solution of solubilized protein to a temperature of about 0 °C to about 4 °C.

13. The method of any one of claims 8-12, wherein step (c) comprises heating the solution of solubilized protein at a temperature of about 85 °C to about 95 °C.

14. The method of any one of claims 8-13, wherein the organic solvent is selected from the group consisting of ethanol, methanol, propanol, isopropyl alcohol, and acetone.

15. The method of any one of claims 8-14, wherein the protein composition has a saponin content that is less than 50% of the saponin content of the source protein composition, an isoflavone content that is less than 50% of the isoflavone content of the source protein composition, a phospholipid content that is less than 50% of the phospholipid content of the source protein composition, a lipid content that is less than 50% of the lipid content of the source

protein composition, a phenolic acid content that is less than 50% of the phenolic acid content of the source protein composition, or a combination thereof.

16. A food product comprising a protein composition produced by the method of any one of claims 8-15.

17. A method of extracting small molecules from a protein source composition, the method comprising:

(a) adding an aqueous solution to a source protein composition to form a solution of solubilized protein;

(b) optionally removing solids from the solution of solubilized protein;

(c) optionally heating the solution of solubilized protein;

(d) optionally adjusting the pH of the solution of solubilized protein to about 4.0 to about 9.0;

(e) optionally cooling the solution of solubilized protein to about 0 °C to about 10 °C;

(f) adding an organic solvent to the solution of solubilized protein to form a solid phase and a liquid phase;

(g) separating the solid phase from the liquid phase to form a solution enriched in small molecules.

18. A food product comprising:

a fat;

optionally one or more flavor precursor compounds; and

at least 10% by dry weight of a protein composition, wherein the protein composition is the protein composition of any one of claims 1-6.

19. A food product comprising:

a fat;

optionally one or more flavor precursor compounds; and

at least 10% by dry weight of a protein composition, wherein the protein composition is a protein composition produced by the method of any one of claims 8-15.

20. A method for preparing a food product, the method comprising:

combining a fat, one or more optional flavor precursor compounds, and a protein composition, wherein the protein composition is the protein composition of any one of claims 1-6.

21. A method for preparing a food product, the method comprising:

combining a fat, one or more optional flavor precursor compounds, and a protein composition, the protein composition produced by the method by the method of any one of claims 8-15.

22. A method for reducing perceived protein source flavor in a food product, the method comprising:

combining a fat, one or more flavor precursor compounds and a protein composition, the protein composition produced by the method of any one of claims 8-15,

wherein at least 5% by weight of the protein content of the food product comprises the protein composition, thereby reducing perceived protein source flavor in a food product, as compared to a food product having a similar protein content but lacking the protein composition.

23. A method of evaluating a protein composition for effect on flavor in a food product, the method comprising:

determining that a level of one or more volatile compounds in a set of volatile compounds of a first protein composition from a protein source is higher than the level of the one or more volatile compounds of a second protein composition from the protein source; and

determining that the second protein composition is superior to the first protein composition for use in a food product.

24. A method of evaluating a protein composition for effect on flavor in a food product, the method comprising:

determining that a level of one or more volatile compounds in a set of volatile compounds of a source protein composition from a protein source is higher than the level of the one or more volatile compounds of a protein composition from the protein source; and

determining that the protein composition is superior to the source protein composition for use in a food product.

25. The method of claim 23, wherein the second protein composition is the protein composition of any one of claims 1-6.

26. The method of claim 24, wherein the protein composition is the protein composition of any one of claims 1-6.

27. A method of reducing flavor in a protein composition, the method comprising:

(a) determining a level of one or more volatile compounds in a set of volatile compounds of a first protein composition from a protein source;

(b) preparing a second protein composition from the protein source, wherein preparing the second protein composition comprises reducing the amount of one or more components of the protein source that are included in the second protein composition; and

(c) determining that a level of one or more volatile compounds in a set of volatile compounds from the second protein composition is lower than the level of the one or more volatile compounds in a set of volatile compounds in the first protein composition.

28. A method of determining a cause of flavor in a protein composition, the method comprising:

(a) determining a level of one or more volatile compounds in a set of volatile compounds of a first protein composition from a protein source;

(b) providing a second protein composition from the protein source, wherein the second protein composition comprises a decreased amount of one or more components of the protein source;

(c) determining that a level of one or more volatile compounds in a set of volatile compounds from the second protein composition is lower than the level the of one or more volatile compounds in a set of volatile compounds in the first protein composition; and

(d) identifying the one or more components of the protein course to be a cause of flavor in the protein composition.

29. The method of claim 27 or claim 28, wherein the second protein composition is the protein composition of any one of claims 1-6.

30. A milk replica comprising:

an emulsion of a fat, water, and the protein composition of any one of claims 1-6.