

WHAT IS CLAIMED:

1. A purified mung bean protein isolate comprising
 - a mung bean protein content of at least 60% by weight;
 - a globulin-type protein content of at least 50% by weight of the plant protein;
 - a reduced oxidative enzyme activity relative to an otherwise unmodified source of the plant protein; and
 - one or more modulated organoleptic properties that differ from the otherwise unmodified source of the mung bean protein.
2. The purified mung bean protein isolate of claim 1, characterized in that its isoelectric point ranges from about pH 5.2 to about pH 6.0.
3. The purified mung bean protein isolate of claim 1, characterized in that its isoelectric point ranges from about pH 5.4 to about pH 6.0.
4. The purified mung bean protein isolate of claim 1, characterized in that its isoelectric point ranges from about pH 5.6 to about pH 6.0.
5. The purified mung bean protein isolate of claim 1, characterized in that its isoelectric point is pH 5.6, 5.7, 5.8, 5.9 or 6.0.
6. The purified mung bean protein isolate of any one of claims 1 to 5, wherein the modulated organoleptic properties comprise a reduction or absence in one or more of the following: astringent, beany, bitter, burnt, buttery, nutty, sweet, sour, fruity, floral, woody, earthy, beany, spicy, metallic, sweet, musty, grassy, green, oily, vinegary neutral and bland flavor or aromas.
7. The purified mung bean protein isolate of any one of claims 1 to 6, wherein the reduced oxidative enzymatic activity comprises a reduction of oxidization of lipids or residual lipids relative to an otherwise unmodified source of the mung bean protein.
8. The purified mung bean protein isolate of any one of claims 1 to 7, wherein the reduced oxidative enzymatic activity comprises a reduction in the amount of lipids or residual lipids in the isolate relative to the amount of lipids in an otherwise unmodified source of the mung bean protein.
9. The purified mung bean protein isolate of any one of claims 1 to 8, wherein the reduced oxidative enzymatic activity comprises a reduction in the amount of lipoxigenase (EC 1.13.11.-) relative to an otherwise unmodified source of the mung bean protein.
10. The purified mung bean protein isolate of any one of claims 1 to 9, wherein the purified protein isolate exhibits one or more functional properties selected from emulsification, water binding, foaming, gelation, crumb density, structure forming, texture building, cohesion/adhesion, elasticity/springiness, solubility, viscosity, fat absorption, flavor binding, coagulation, leavening, aeration, creaminess, film forming property, sheen/shine addition, freeze/thaw stability, and color.
11. The purified mung bean protein isolate of any one of claims 1 to 10, wherein the purified protein isolate exhibits a gelation onset temperature below 90°C.

12. The purified protein isolate of any one of claims 1 to 11, wherein the purified protein isolate exhibits a gel strength of greater than 2% oscillation strain.
13. The purified mung bean protein isolate of any one of claims 1 to 12, wherein the purified protein isolate exhibits a gel elasticity of greater than 300 Pa.
14. An edible composition comprising the purified mung bean protein isolate of any one of claims 1 to 13, wherein the composition is selected from the group consisting of a gel, a foam, an emulsion, and an aqueous solution.
15. The purified mung bean protein isolate of any one of claims 1 to 14, wherein the isolate comprises greater than 75% mung bean protein.
16. The purified mung bean protein isolate of any one of claims 1 to 15, wherein the mung bean protein comprises at least 60% globulin-type protein.
17. The purified mung bean protein isolate of any one of claims 1 to 16, wherein the globulin-type protein comprises 8S globulin/beta conglycinin.
18. The purified mung bean protein isolate of any one of claims 1 to 17, wherein the globulin-type protein is at a protein having at least 50% identity to SEQ ID NO. 1.
19. The purified mung bean protein isolate of any one of claims 1 to 18, wherein the globulin-type protein has been enriched in the isolate in relation to the amount of protein found in the plant source of the isolate.
20. The purified mung bean protein isolate of claim 19, wherein the enrichment is at least 5%, 10%, 15%, 20% or greater than 20%, in relation to the amount of protein found in the plant source of the isolate.
21. The purified mung bean protein isolate of any one of claims 1 to 20, wherein one or more compounds selected from the group consisting of allergens, anti-nutritional factors, and environmental contaminants has been reduced in the isolate in relation to the amount of the one or more compounds found in the plant source of the isolate.
22. The purified mung bean protein isolate of any one of claims 1 to 21, contacted with one or more co-ingredients selected from the group consisting of a hydrocolloid, a gum, a phosphate, and transglutaminase.
23. The purified mung bean protein isolate of any one of claims 1 to 22, wherein the phosphate is disodium phosphate.
24. An egg substitute comprising the purified mung bean protein isolate of any one of claims 1 to 23, wherein the egg substitute is characterized as having one or more organoleptic properties similar to an egg.
25. The egg substitute of claim 24, wherein the egg substitute exhibits at least one functional property similar or equivalent to a corresponding functional property of an egg.

26. The egg substitute recited in claim 25, wherein the at least one functional property comprises emulsification, water binding capacity, foaming, gelation, crumb density, structure forming, texture building, cohesion, adhesion, elasticity, springiness, solubility, viscosity, fat absorption, flavor binding, coagulation, leavening, aeration, creaminess, film forming property, sheen addition, shine addition, freeze stability, thaw stability, or color.
27. A fat reduction shortening system comprising the purified mung bean protein isolate of any one of claims 1 to 26.
28. A food or beverage composition comprising the purified mung bean protein isolate of any one of claims 1 to 26.
29. The food or beverage composition of claim 28, wherein the food or beverage composition is selected from the group consisting of an edible egg-free emulsion, egg analog, egg-free scrambled eggs, egg-free patty, egg-free pound cake, egg-free angel food cake, egg-free yellow cake, egg- and dairy-free cream cheese, egg-free pasta dough, egg-free custard, egg-free ice cream, and dairy-free milk, cream cheese, pasta dough, pasta, milk or milk-like beverage, a food product comprising said milk or milk-like beverage, custard, ice cream, frozen desert, meat replicas, deli meat replicas, emulsified extruded meats, sausages, fish cake replicas, dips, fillings, spreads, chips, and crackers.
30. The purified mung bean protein isolate of any one of claims 1 to 29, wherein the mung bean protein isolate is produced by a method comprising:
- (a) extracting one or more mung bean proteins from a source of mung bean protein in an aqueous solution at a pH between about 6.5 and 10.0; and
 - (b) precipitating the extracted mung bean protein at a pH in a range of pH 5.2 to pH 6.0.
31. A method for producing a purified mung bean protein isolate comprising:
- (a) extracting one or more mung bean proteins from a source of mung bean protein in an aqueous solution at a pH between about 6.5-10.0;
 - (b) precipitating the mung bean protein at a pH near its isoelectric point of a globulin-rich fraction, or a pH between about 5.0-6.0; or fractionating and concentrating the plant protein using microfiltration or ultrafiltration; and
 - (c) recovering a purified mung bean protein isolate comprising
 - a mung bean protein content of at least 60% by weight;
 - a globulin-type protein content of at least 50% by weight of the mung bean protein;
 - a reduced oxidative enzyme activity relative to an otherwise unmodified source of the mung bean protein; and
- one or more modulated organoleptic properties that differ from the otherwise unmodified source of the mung bean protein.
32. The method of claim 31, wherein the extraction step is performed within a pH range of about 6.5-8.0.
33. The method of claim 31, wherein the precipitating step is performed within a pH range of about pH 5.2 to pH 6.0.
34. The method of claim 31, wherein the precipitating step is performed within a pH range of about pH 5.4 to pH 6.0.

35. The method of claim 31, wherein the precipitating step is performed within a pH range of about pH 5.6 to pH 6.0.
36. The method of claim 31, wherein the precipitating step is performed at pH 5.6, 5.7, 5.8, 5.9 or 6.0.
37. The method of any one of claims 31 to 36, further comprising the step of treating the plant protein with activated carbon, charcoal or clay.
38. The method of any one of claims 31 to 37, further comprising the step of cryo-precipitating at a temperature of about 1 to 4°C.
39. The method of any one of claims 31 to 38, further comprising the recovery of the purified protein isolate by centrifugation.
40. The method of any one of claims 31 to 39, further comprising rehydrating the purified protein isolate to 80% moisture content and adjusting to about pH 6.0.
41. The method of any one of claims 31 to 40, wherein the method further comprises one or more additional steps selected from the group consisting of: diluting aqueous protein in calcium salt solution; filtering protein via heat treatment; diafiltering via selective membranes; diluting protein in buffer to adjust pH per target application; concentrating protein depending upon application; and drying protein depending upon application.
42. The method of one of claims 31 to 41, wherein the method comprises reducing lipophilic off-flavors, substrates or co-factors.
43. The method of one of claims 31 to 41, wherein the method modulates off-flavors or aromas; modulates desired flavors; or provides sensory impressions similar or equivalent to a reference food product.
50. The method of one of claims 31 to 43, further comprising the step of formulating the purified mung bean protein isolate in a food or beverage composition.
51. A purified mung bean protein isolate produced by the method of any one of claims 31-50.
52. A food or beverage composition produced by a method comprising the method of any one of claims 31-50.
53. An egg substitute produced by the method of any one of claims 31-50.
54. A purified mung bean protein isolate comprising:
a transglutaminase-modified mung bean protein content of at least 60% by weight;
a globulin-type protein content of at least 50% by weight of the plant protein;
a reduced oxidative enzyme activity relative to an otherwise unmodified source of the plant protein; and
one or more modulated organoleptic properties that differ from the otherwise unmodified source of the plant protein.

56. The purified protein isolate of claim 55, wherein said purified mung bean protein isolate is modified by 0.0001% to 0.0125% transglutaminase.
57. A method for producing a purified protein isolate comprising:
- extracting one or more plant protein from a source in an aqueous solution at a pH between about 6.5-10.0;
 - precipitating the plant protein at pH near its isoelectric point of a globulin-rich fraction or a pH between about 5.2-6.0; or fractionating and concentrating the plant protein using microfiltration or ultrafiltration;
 - recovering the purified protein isolate comprising
 - a plant protein content of at least 60% by weight;
 - a globulin-type protein content of at least 50% by weight of the plant protein;
 - a reduced oxidative enzyme activity relative to an otherwise unmodified source of the plant protein; and
 - one or more modulated organoleptic properties that differ from the otherwise unmodified source of the mung bean protein; and
 - modifying the mung protein with transglutaminase in the extraction step a. or the recovery step b.
58. The method for producing a purified protein isolate of claim 57, wherein said step d. of modifying the plant protein with transglutaminase in the extraction step a. or the recovery step b. comprises contacting the mung bean protein with 0.0001% to 0.0125% transglutaminase.
59. The method for producing a purified protein isolate of claim 57 or 58, wherein said purified protein isolate is stably cross-linked.
60. The method for producing a purified protein isolate of any one of claims 57 to 59, wherein said purified protein isolate is essentially free of lipxygenase or enzymes that can oxidize lipids.
61. The method for producing a purified protein isolate of any one of claims 57 to 60, wherein said transglutaminase is encapsulated or immobilized on a solid substrate.