

Example 13

Reduced lipoxygenase BC-SPI to reduce off-flavor development

Lipoxygenase enzymes are known to cause off-flavor development in soy protein ingredients by catalyzing the oxidation of polyunsaturated fats (Nishiba, Y. et al., *J. Agric. Food Chem.* 43:738-741, 1995). The lipoxygenase null trait of a soybean variety developed by Keisuke Kitamura (Japan. J. Breed. 41:507-509, 1991) was transferred to a U. S. food bean lacking at least one lipoxygenase genes and then further crossed with the high beta-conglycinin variety to create a low-flavor, high beta-conglycinin soybean variety lacking all three lipoxygenases. Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity and understanding, it will be obvious that certain changes and modifications may be practiced within the scope of the invention, as limited only by the scope of the appended claims.

What is claimed is:

1. A soy protein composition comprising a beta-conglycinin content between about 40% and about 80% of the protein and a glycinin content of less than 10% of the protein, wherein the sum of methionine and cysteine in the composition is greater than 15 about mg/g protein.

2. The composition of claim 1, wherein the composition is made from a soybean having a beta-conglycinin content greater than 40% of the protein and having a glycinin content of less than 10% of the protein.

3. The composition of claim 1, wherein the composition is selected from the group consisting of:

- a) soybean meal;
- b) soyflour;
- c) defatted soyflour;
- d) soymilk;
- e) spray-dried soymilk;
- f) soy protein concentrate;
- g) texturized soy protein concentrate;
- h) hydrolyzed soy protein;
- i) soy protein isolate; and
- j) spray-dried tofu.

4. The composition of claim 1, wherein beta-conglycinin comprises a mixture of alpha-, alpha prime- and beta-subunits.

5. The composition of claim 1, wherein beta-conglycinin lacks beta-subunits.

6. The composition of claim 1, wherein beta-conglycinin lacks alpha prime- and beta-subunits.

7. The composition of claim 1, wherein beta-conglycinin lacks the alpha- and beta-subunits.

8. The composition of claim 1, wherein the sum of cysteine and methionine in the composition is greater than 26 mg/g protein.

9. The composition of claim 1, wherein the sulfur amino acid content is about 15-35 mg/g protein and the arginine content is greater than about 70 mg/g protein.

10. The composition of claim 1, wherein less than 10% of the particle volume of the composition is from particles greater than 10 microns in diameter, as measured by adding enough of the composition to water circulating in a light scattering-particle size analyzer equipped with a peristaltic pump to obtain a light transmittance of 80-90% and mixing

for 10 minutes in the instrument with agitation speed of 2 and circulation speed of 2, and using a relative reflectance index of 1.02-ooi.

11. The composition of claim 1, wherein the nitrogen solubility index (NSI) of the composition is greater than 90% at a pH of 7.0 to 7.4.

12. The composition of claim 1, wherein the protein of said composition is denatured.

13. The composition of claim 12, wherein the protein is denatured such that the NSI is less than 70% at a pH of 7.0 to 7.4 and greater than 20% of the particle volume of the composition is from particles greater than 10 microns in diameter, as measured by adding enough of the composition to water circulating in a light scattering particle size analyzer equipped with a peristaltic pump to obtain a light transmittance of 80-90% and mixing for 10 minutes in the instrument with agitation speed of 2 and circulation speed of 2 and using a relative reflectance index of 1.02-ooi.

14. The composition of claim 1, wherein the composition has a color reflectance value for whiteness (L value) of greater than 86.5 and a reflectance value for yellowness (b value) of less than 10.

15. The composition of claim 1, wherein the protein of said composition is partially hydrolyzed using a protease.

16. The partially hydrolyzed composition of claim 15, wherein the hydrolysis products of beta-conglycinin in said composition are approximately 30 kDa.

17. A nutritional product for lowering serum cholesterol and triglycerides in humans comprising a soy protein composition comprising a beta-conglycinin content between about 40% and about 80% of the protein and a glycinin content of less than 10% of the protein, wherein the sum of methionine and cysteine in the composition is greater than about 15 mg/g protein.

18. The nutritional product of claim 17, wherein the product is a liquid beverage or dry beverage mix further comprising sucrose, calcium carbonate, flavor, salt, gum and vitamin.

19. The nutritional product of claim 18, wherein the gum is carrageenan.

20. The nutritional product of claim 18, wherein the gum is xanthangum.

21. The nutritional product of claim 18, wherein the gum is guar gum.

22. A soy protein composition comprising a beta-conglycinin content between about 40% and about 80% of the protein and a glycinin content of less than 10% of the protein, and further comprising lysine at greater than about 60 mg/g protein, arginine at greater than about 70 mg/g protein and the sum of methionine and cysteine in the composition is greater than about 15 mg/g protein.

23. The composition of claim 1, wherein the sum of cysteine and methionine in the composition is less than 24 mg/g protein.

24. A composition of claim 1 which when sonicated for one minute with peanut oil, NaCl, sucrose, CaCl₂ and water, will form an emulsion having a median particle diameter of less than twelve microns, wherein said particle diameter is not significantly altered by heating said emulsion to 90 degrees and cooling, wherein said emulsion comprises 0.4% NaCl, 5% sucrose and 4 mM CaCl₂ in the water phase, pH6.7, 10% peanut oil, and 1% protein from the composition of claim 1.