CLAIMS

1. A nutritionally enhanced food composition fortified with at least 0.25 mg/g choline salt, between 0.25 mg/g and 5 mg/g omega-3 fatty acid, wherein the nutritionally enhanced food composition comprises at least 25 mg/g protein, and wherein:

when the nutritionally enhanced food composition is exposed to light at a temperature of between 0° C and 25° C for at least 2 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq; or

when the nutritionally enhanced food composition is exposed to light for at least 4 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq.

2. The nutritionally enhanced food composition of claim 1, wherein the nutritionally enhanced food composition comprises at least 25 mg/g protein, and wherein the nutritionally enhanced food composition has an acceptable taste or acceptable odor as determined by a sensory panel, and wherein the nutritionally enhanced food composition has a peroxide value of less than 50mEq.

3. The nutritionally enhanced food composition of claim 1, fortified with at least 1.42 mg/g phosphotidylcholine.

4. The nutritionally enhanced food composition of claim 2 or claim 3, wherein the peroxide value of the food composition is less than 40 mEq, less than 35 mEq, less than 30 mEq, less than 25 mEq, less than 20 mEq, less than 15 mEq, less than 10 mEq, or less than 5 mEq.

5. The nutritionally enhanced food composition of any one of claims 2-4 wherein the protein comprises an isolated protein that was used to fortify the nutritionally enhanced food composition.

6. The nutritionally enhanced food composition of any one of claims 2, 4, and 5, wherein the amount of choline salt is between 0.25 mg/g and 5 mg/g, and the

omega-3 fatty acid comprises docosahexaenoic acid (DHA) and/or alpha-linolenic acid (ALA).

7. The nutritionally enhanced food composition of any one of claims 2-6, wherein:

when the nutritionally enhanced food composition is exposed to light for at least 6 weeks, at least 8 weeks, at least 10 weeks, at least 12 weeks, at least 18 weeks, at least 24 weeks, or at least 52 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor, or wherein the nutritionally enhanced food composition has a peroxide value of less than 50 mEq.

8. The nutritionally enhanced food composition of claim 7, wherein the nutritionally enhanced food composition is stored in a non-refrigerated container during said exposure.

9. The nutritionally enhanced food composition of claim 7, wherein the nutritionally enhanced food composition is stored in a refrigerated container, which is optionally a lighted retail display case during said exposure.

10. The nutritionally enhanced food composition of any one of claims 2-9, wherein the nutritionally enhanced food composition comprises a probiotic or an active culture, optionally wherein the probiotic or active culture comprises *Lactobacillus*, *Bifidobacterium*, *Saccharomyces*, *Enterococcus*, *Streptococcus*, *Pediococcus*, *Leuconostoc*, or *Bacillus*.

11. A nutritionally enhanced food composition fortified with at least 0.25 mg/g phosphotidylcholine and between 0.25 mg/g and 5 mg/g omega-3 fatty acid, wherein the nutritionally enhanced food composition comprises at least 25 mg/g protein, and wherein:

when the nutritionally enhanced food composition is exposed to light at a temperature of between 0° C and 25° C for at least 2 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq; or

when the nutritionally enhanced food composition is exposed to light for at least 4 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq.

12. A method of preparing a nutritionally enhanced food composition, the method comprising:

(a) providing at least one edible food ingredient;
(b) combining choline salt and omega-3-fatty acid with the at least one edible ingredient to prepare the nutritionally enhanced food composition of claim 1;

wherein the nutritionally enhanced food composition has an acceptable taste or acceptable odor as determined by a sensory panel, or wherein the nutritionally enhanced food composition has a peroxide value of less than 50 mEq.

13. A method of preparing a nutritionally enhanced food composition, the method comprising:

(a) providing at least one edible food ingredient;
(b) combining phosphotidylcholine and omega-3-fatty acid with the at least one edible ingredient to prepare the nutritionally enhanced food composition of claim 11.

14. The method of claim 12 or 13, wherein the choline salt or phosphotidyl choline is combined with the at least one edible food ingredient before the omega-3-fatty acid is combined with the at least one edible food ingredient, or the omega-3-fatty acid is combined with the at least one edible food ingredient before the choline salt or phosphotidyl choline is combined with the at least one edible food ingredient.

15. The method of claim 12 or 13, wherein the choline salt or phosphotidyl choline and the omega-3-fatty acid are combined simultaneously with the at least one edible food ingredient.

16. The nutritionally enhanced food composition of claim 2 or claim 4 or the method of any one of claims 12-15, wherein the nutritionally enhanced food composition comprises 25-200 mg/g protein, 25-180 mg/g protein, 25-170 mg/g protein, 25-150 mg/g protein, 25-125 mg/g protein, 25-120 mg/g protein, 25-110 mg/g protein, 25-

100 mg/g protein, 25-90 mg/g protein, 25-80 mg/g protein, 25-70 mg/g protein, 25-60 mg/g protein, or 25-50 mg/g protein.

17. The method of any one of claims 12-16, wherein the at least one edible food ingredient comprises protein in an amount sufficient to provide a protein concentration of at least 25 mg/g, 25-200 mg/g, 25-180 mg/g, 25-170 mg/g, 25-150 mg/g, 25-125 mg/g, 25-120 mg/g, 25-110 mg/g, 25-100 mg/g, 25-90 mg/g, 25-80 mg/g, 25-70 mg/g, 25-60 mg/g, or 25-50 mg/g of the nutritionally enhanced food composition.

18. The method of any one of claims 12-16, the method further comprising the step of adding an isolated protein to the at least one edible food ingredient.

19. The nutritionally enhanced food composition of claim 5 or the method of claim 18, wherein the isolated protein is whole milk protein, casein, or whey, or the isolated protein is a vegetable protein selected from the group consisting of soy protein, pea protein, cottonseed protein, corn protein, and wheat protein.

20. The nutritionally enhanced food composition of any one of claims 2, 4, and 5 or the method of any one of claims 14-19, wherein the amount of the choline salt is between 0.25 mg/g and 5 mg/g, between 0.25 mg/g and 4 mg/g, between 0.25 mg/g and 3.5 mg/g, between 0.25 mg/g and 3 mg/g, between 0.25 mg/g and 2.5 mg/g, between 0.25 mg/g and 2 mg/g, between 0.25 mg/g and 1.75 mg/g, between 0.25 mg/g and 1.5 mg/g, between 0.25 mg/g and 1.25 mg/g, and between 0.25 mg/g and 1 mg/g.

21. The nutritionally enhanced food composition of any one of claims 2-5, the method of any one of claims 14-19, or the nutritionally enhanced food composition of claim 20 wherein the amount of the omega-3 fatty acid is between 0.25 mg/g and 4 mg/g, between 0.25 mg/g and 3.5 mg/g, between 0.25 mg/g and 3 mg/g, between 0.25 mg/g and 2.5 mg/g, between 0.25 mg/g and 2 mg/g, between 0.25 mg/g and 1.75 mg/g, between 0.25 mg/g and 1.5 mg/g, between 0.25 mg/g and 1.25 mg/g, and between 0.25 mg/g and 1 mg/g.

22. The nutritionally enhanced food composition of any one of claims 2-10, the method of any one of claims 14-19, or the nutritionally enhanced food composition of claim 20 or claim21, wherein the nutritionally enhanced food composition is packaged in a non-photo protective packaging material, optionally wherein the non-

photo protective packaging material comprises polylactic acid (PLA), polyethylene terephthalate (PET), polystyrene, or polypropylene.

23. The method of any one of claims 14-22, wherein the method further comprises the steps of mixing, blending, chopping, whipping, kneading, folding, heating, cooling, or freezing.

24. A method of reducing the oxidation of an omega-3 fatty acid in a nutritionally enhanced food composition, the method comprising fortifying a food composition with choline and omega-3 fatty acid, wherein the nutritionally enhanced food composition comprises at least 0.25 mg/g choline salt or phosphotidyl choline, at between 0.25 mg/g and 5 mg/g omega-3 fatty acid, and at least 25 mg/g protein, wherein oxidation of the omega-3 fatty acid is reduced as compared to oxidation of the omega-3 fatty acid in a nutritionally enhanced food composition not comprising at least 0.25 mg/g choline salt or phosphotidyl choline, at between 0.25 mg/g and 5 mg/g omega-3 fatty acid, and at least 25 mg/g protein and wherein:

when the nutritionally enhanced food composition is exposed to light at a temperature of between 0° C and 25° C for at least 2 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq; or

when the nutritionally enhanced food composition is exposed to light for at least 4 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq.

25. A composition for nutritionally enhancing a food product, the composition comprising choline and omega-3 fatty acid at a ratio of 1:20 to 20:1 w/w, wherein:

when the nutritionally enhanced food composition is exposed to light at a temperature of between 0° C and 25° C for at least 2 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq; or

when the nutritionally enhanced food composition is exposed to light for at least 4 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq.

26. The composition for nutritionally enhancing a food product of claim25, wherein the choline comprises a choline salt.

27. The composition for nutritionally enhancing a food product of claim25, wherein the choline comprises a phosphotidylcholine.

28. The composition of claim 26, wherein the composition comprises protein in an amount sufficient to prepare a food product that comprises at least 25 mg protein per gram of food product.

29. The composition of claim 28, wherein the amount of the protein is sufficient to prepare a food product that comprises 25-200 mg/g protein, 25-180 mg/g protein, 25-170 mg/g protein, 25-150 mg/g protein, 25-125 mg/g protein, 25-120 mg/g protein, 25-110 mg/g protein, 25-100 mg/g protein, 25-90 mg/g protein, 25-80 mg/g protein. 25-70 mg/g protein, 25-60 mg/g protein, or 25-50 mg/g protein.

30. The composition of claim 28 or claim 29, wherein the protein comprises an isolated protein.

31. The composition of claim 30, wherein the isolated protein comprises whole milk protein, casein, or whey, or the isolated protein is a vegetable protein selected from the group consisting of soy protein, pea protein, cottonseed protein, corn protein, and wheat protein.

32. The composition of any one of claims 26, 27, and 29-31, wherein the amount of the choline salt is sufficient to prepare a food product that comprises choline salt at a concentration of between 0.25 mg/g and 5 mg/g, between 0.25 mg/g and 4 mg/g, between 0.25 mg/g and 3.5 mg/g, between 0.25 mg/g and 3 mg/g, between 0.25 mg/g and 2.5 mg/g, between 0.25 mg/g and 2 mg/g, between 0.25 mg/g and 1.75 mg/g, between 0.25 mg/g and 1.5 mg/g, between 0.25 mg/g and 1.25 mg/g, and between 0.25 mg/g and 1 mg/g food product.

33. The composition of any one of claims 26-32, wherein the amount of the omega-3 fatty acid is sufficient to prepare a food product that comprises omega-3 fatty acid at a concentration of between 0.25 mg/g and 5 mg/g, between 0.25 mg/g and 4 mg/g, between 0.25 mg/g and 3.5 mg/g, between 0.25 mg/g and 3 mg/g, between 0.25 mg/g and 2.5 mg/g, between 0.25 mg/g and 2 mg/g, between 0.25 mg/g and 1.75 mg/g, between 0.25 mg/g and 1.5 mg/g, between 0.25 mg/g and 1.25 mg/g, and between 0.25 mg/g and 1 mg/g.

34. A method of preparing a composition for nutritionally enhancing a food product, the method comprising the steps of combining a choline salt and an omega-3-fatty acid in a ratio of 1:20 to 20:1 w/w, and an isolated protein or an ingredient comprising protein, wherein:

when the nutritionally enhanced food composition is exposed to light at a temperature of between 0° C and 25° C for at least 2 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq; or

when the nutritionally enhanced food composition is exposed to light for at least 4 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq.

35. A method of preparing a composition for nutritionally enhancing a food product, the method comprising the steps of combining a phosphotidylcholine and an omega-3-fatty acid in a ratio of 1:20 to 20:1 w/w, and an isolated protein or an ingredient comprising protein, wherein:

when the nutritionally enhanced food composition is exposed to light at a temperature of between 0° C and 25° C for at least 2 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq; or

when the nutritionally enhanced food composition is exposed to light for at least 4 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq.

36. The method of claim 34 or claim 35, wherein:

(a) the choline salt or phoshotidyl choline is first combined with the omega-3-fatty acid to prepare a choline salt/omega-3 fatty acid formulation or a phosphtidylcholine/omega-3 fatty acid formulation, respectively, and

(b) the choline salt/omega-3 fatty acid formulation or the phosphtidylcholine/omega-3 fatty acid formulation is combined with the ingredient comprising protein or an isolated protein.

37. The method of claim 34 or 36, wherein the choline salt or phoshotidyl choline, the omega-3 fatty acid, and the ingredient comprising protein or an isolated protein, are combined simultaneously.

38. A fruit or vegetable preparation, the fruit or vegetable preparation fortified with omega-3fatty acid and choline, the fruit or vegetable preparation comprising 1 mg/g to 10 mg/g omega-3 fatty acid and 0.50 mg/g to 5 mg/g choline at a 1:20 to 20:1 weight/weight; wherein:

when the nutritionally enhanced food composition is exposed to light at a temperature of between 0° C and 25° C for at least 2 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq; or

when the nutritionally enhanced food composition is exposed to light for at least 4 weeks, the nutritionally enhanced food composition has an acceptable taste or acceptable odor or a peroxide value of less than 50 mEq.

39. A method of preparing the fruit or vegetable preparation of claim 38, the method comprising:

(a) providing a base fruit or vegetable puree;

(b) combining choline and omega-3-fatty acid with the base fruit or vegetable puree to prepare puree A;

(c) subjecting puree A to a temperature of between 65°C to 100°C for a period of between 1 second to 30 minutes to prepare a fruit or vegetable preparation; and

(d) cooling the fruit or vegetable preparation to ambient temperature, wherein the fruit of vegetable preparation has an acceptable appearance, aroma, flavor or texture as determined

by a sensory panel, or wherein the fruit or vegetable preparation has a peroxide value of less than 50 mEq.

40. The fruit or vegetable preparation of claim 38 or the method of claim 39, wherein the fruit or vegetable preparation comprises between 1 mg/g to 7.5 mg/g omega-3 fatty acid, between 1 mg/g to 5 mg/g omega-3 fatty acid, between 1 mg/g to 4 mg/g omega-3 fatty acid, between 1.5 mg/g to 4 mg/g, between 1.5 mg/g to 3.5 mg/g, between 2 mg/g to 3.5 mg/g, or between 2 mg/g to 3 mg/g omega-3 fatty acid.

41. The fruit or vegetable preparation of claim 38, the method of claim 39, or the fruit or vegetable preparation or method of claim 40, wherein the fruit or vegetable preparation comprises between 0.50 mg/g to 4 mg/g choline, between 0.50 mg/g to 3.5 mg/g choline, between 0.50 mg/g to 3 mg/g choline, between 0.50 mg/g to 2.5 mg/g choline, between 0.50 mg/g to 2.00 mg/g choline, between 0.75 mg/g to 2.50 mg/g choline, between 0.75 mg/g to 2 mg/g choline, between 1 mg/g to 2 mg/g choline, or between 1 mg/g to 2 mg/g choline.

42. The fruit or vegetable preparation of claim 38, the method of claim 39, or the fruit or vegetable preparation or method of claim 40 or claim 41, wherein the fruit or vegetable preparation has acceptable appearance, aroma, flavor and texture:

after exposure to a temperature of between 30°C to 50°C for a period of between 9 to 52 weeks;

after exposure to a temperature of between 10°C to 50°C for a period of between 9 to 48 weeks; or

after exposure to a temperature of between 10°C to 50°C for a period of between 9 to 26 weeks.

43. The fruit or vegetable preparation of claim 38, the method of claim 39, or the fruit or vegetable preparation or method of any one of claims 40-42, wherein the peroxide value of the fruit or vegetable preparation is less than 40 mEq, less than 35 mEq, less than 30 mEq, less than 25 mEq, less than 20 mEq, less than 15 mEq, less than 10 mEq, or less than 5 mEq.

44. The fruit or vegetable preparation of claim 38, the method of claim 39, or the fruit or vegetable preparation or method of any one of claims 40-43, wherein:

the fruit or vegetable preparation further comprises one or more of a thickening or gelling agent, a sweetener, an antioxidant, a grain, seeds, or a dairy product; and/or

the method further comprises one or more of the following:

adding a thickening or gelling agent to the fruit or vegetable preparation;

adding a sweetener to the fruit or vegetable preparation;

adding an antioxidant to the fruit or vegetable preparation;

adding a grain or seeds to the fruit or vegetable preparation; or

adding a dairy product to the fruit or vegetable preparation.

45. The fruit or vegetable preparation of claim 38, the method of claim 39, or the fruit or vegetable preparation or method of any one of claims 40-44, the fruit or vegetable preparation further comprising isolated protein, and/or the method further comprising the addition of an isolated protein.

46. The fruit or vegetable preparation or method of claim 45, wherein the isolated protein is selected from the group consisting of:

plant protein, optionally selected from the group consisting of barley protein, oat protein, rice protein, wheat protein, and potato protein;

pulse protein, selected from the group consisting of common bean protein *(Phaseolus vulgaris),* chickepea protein, fava bean protein, lentil protein, lima bean protein, mung bean protein, peanut protein and soy protein

nut protein, optionally selected from the group consisting of almond protein, cashew protein, chestnut protein, hazelnut protein, macademia nut protein, pecan protein, pistachio protein and walnut protein;

algal protein, optionally selected from the group consisting *Spirulina* protein, *Chlorella* protein, blue-green algae protein, green algae protein and red algae protein;

dairy protein, optionally selected from the group consisting of whey protein and casein; and

mycoprotein, optionally selected from the group consisting of *Saccharomyces* protein and *Fusarium* protein.

47. The fruit or vegetable preparation of claim 38, the method of claim 39, or the fruit or vegetable preparation or method of any one of claims 40-46, wherein choline comprises a choline salt.

48. The nutritionally enhanced food composition of any one of claims 2, 4-10, the method of any one of claims 12, 14, and 15, 17, 18 and 23, the nutritionally enhanced food composition or method of any one of claims 16 and 19-22, the composition of any one of claims 24-27 and 29-33, the method of any one of claims 34, 36, and 37, or the fruit or vegetable preparation or method of claim 47, wherein the choline salt is selected from the group consisting of choline acetate, choline bicarbonate, choline chloride, choline citrate, choline bitartrate, and choline lactate.

49. The nutritionally enhanced food composition, method, composition, or fruit or vegetable preparation of claim 48, wherein the choline salt is choline chloride.

50. The nutritionally enhanced food composition of any one of claims 1-10, the method of any one of claims 12-15, 17, 18 and 23, the nutritionally enhanced food composition or method of any one of claims 16 and 19-22, the composition of any one of claims 24-33, the method of any one of claims 34-37, the fruit or vegetable preparation of claim 38, the method of claim 39, the fruit or vegetable preparation or method of any one of claims 40-47, or the nutritionally enhanced food composition, method, composition, or fruit or vegetable preparation of claim 48 or claim 49, wherein the omega-3 fatty acid is encapsulated.

51. The nutritionally enhanced food composition, method, composition, or fruit or vegetable preparation of claim 50, wherein the omega-3 fatty acid is encapsulated by unmodified polysaccharide, modified polysaccharide, or gelatin, optionally wherein the unmodified polysaccharide or modified polysaccharide is selected from the group consisting of agar, carageenen, maltodextrin, corn syrup solids, pectin, xanthan gum, gellan, monosaccharide and disaccharide.

52. The nutritionally enhanced food composition of any one of claims 1-10, the method of any one of claims 12-15, 17, 18 and 23, the nutritionally enhanced food composition or method of any one of claims 16 and 19-22, the composition of any one of claims 24-33, the method of any one of claims 34-37, the fruit or vegetable preparation of claim 38, the method of claim 39, the fruit or vegetable preparation or

method of any one of claims 40-47, or the nutritionally enhanced food composition, method, composition, or fruit or vegetable preparation of claim 48-51, wherein the omega-3 fatty acid is selected from the group consisting of docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA) and alpha-linolenic acid (ALA).

53. The nutritionally enhanced food composition, method, composition, or fruit or vegetable preparation of claim 52, wherein the omega-3 fatty acid comprises DHA and ALA.

54. The nutritionally enhanced food composition, method, composition, or fruit or vegetable preparation of claim 52, wherein the omega-3 fatty acid comprises DHA and/or EPA.

55. The nutritionally enhanced food composition of any one of claims 1-10, the method of any one of claims 12-15, 17, 18 and 23, the nutritionally enhanced food composition or method of any one of claims 16 and 19-22, the composition of any one of claims 24-33, the method of any one of claims 34-37, the fruit or vegetable preparation of claim 38, the method of claim 39, the fruit or vegetable preparation or method of any one of claims 40-47, or the nutritionally enhanced food composition, method, composition, or fruit or vegetable preparation of claim 48-54, wherein the nutritionally enhanced food composition, composition, or fruit or vegetable preparation comprises iron or wherein the method comprises the addition of iron.

56. The nutritionally enhanced food composition, method, composition, or fruit or vegetable preparation of claim 55, wherein the iron is encapsulated.