CLAIMS

What is claimed is:

1. A composition suitable as food ingredient comprising a preparation from an algae strain overproducing protoporphyrin IX (PPIX).

2. The composition of claim 1, wherein the preparation comprises an algae biomass comprising the algae strain overproducing PPIX.

3. The composition of claim 1 or claim 2, wherein the preparation comprises one or more algal cells or portions thereof.

4. The composition of any one of claims 1-3 , wherein the preparation has a red or red-like color and comprises a PPIX content greater than a chlorophyll content by at least 50%.

5. The composition of any one of claims 2-3, wherein the algae biomass comprises a PPIX content in an amount greater than a heme content.

6. The composition of any one of claims 1-3, wherein the algae biomass comprises at least about 0.5%, 1.0%, 1.5%, 2.0%, 2.5%, or 3.0% PPIX on a weight per total weight basis.

7. The composition of any one of claims 1-6, wherein the algae is a Chlamydomonas sp.

8. The composition of claim 7, wherein the Chlamydomonas sp. is *Chlamydomonas reinhardtii*.

9. The composition of any one of claims 2-8, wherein the algae biomass is concentrated, dried, lyophilized or any combination thereof.

10. The composition of any one of claims 2-8, wherein the preparation is a powder.

11. The composition of any one of claims 1-6, wherein the preparation confers a meat or meat-like color, flavor, or texture to the composition.

12. An uncooked food product comprising the composition of any one of claims 1-10, wherein the preparation imparts a red color or a color similar to red to the uncooked food product.

13. The uncooked food product of claim 12, wherein the uncooked food product is selected from the group consisting of a clean meat, a cultured meat, a synthetic meat, a plant-based meat, and a non-animal cell-based meat.

14. The uncooked food product of claim13, wherein the uncooked food product is selected from the group consisting of a burger, a sausage, a kebab, a filet, a ground meat like product, and a meatball.

15. The uncooked food product of claim 12, wherein the uncooked food product is a fish-like product.

16. The uncooked food productof claim15, wherein the uncooked food product is a tuna-like product.

17. A method of producing a composition suitable as food ingredient comprising: growing an algae in liquid culture, wherein the algae is a PPIX over-producer and the algae comprises a PPIX content greater than a chlorophyll content by at least 50%.

18. The menthod of claim 17, wherein the algae is grown by aerobic fermentation and with acetate or sugar as a carbon source.

19. The method of claim 17 or claim 18, wherein the algae is grown to a density greater than 10g/L, 20 g/L, 30 g/L, 40g/L, 50g/L, 75 g/L, 100g/L, 125 g/L or 150g/L.

20. The method of any one of claims 17-19, wherein the algae (a) is deficient for its ability to produce chlorophyll, (b) is deficient for its ability to produce a functional Mg-chelatase enzyme, (c) lacks a functional ChlD1, ChlD2, ChlDH, ChlB, ChlL, or ChlN gene product, or (d) lacks a functional light dependent protochlorophyllide or a functional light independent protochlorophyllide, or (e) any combination of (a)-(d).

21. The method of any one of claims 17-20, wherein the algae overexpresses a gene selected from the group consisting of glutamyl-tRNA reductase, glutamyl-1-semialdehyde aminotransferase, ALA dehydrogenase, porphobilinogen deaminase,

UPG III synthase, UPG III decarboxylase, CPG oxidase, PPG oxidase, and ferrochelatase.

22. The method of any one of claims 17-21, wherein the algae is red or has a color similar to red when grown in liquid culture.

23. The method of any one of claims 17-22, further comprising isolating the algae biomass from the liquid culture.

24. The method of any one of claims 17-22, further comprising isolating a PPIX composition from the culture.

25. The method of any one of claims17-24, wherein the algae is a Chlamydomonas sp.

26. The method of claim 25, wherein the algae is a *Chlamydomonas reinhardtii*.

27. A dried preparation of algae biomass produced by the method according to any one of claims 17-26.

28. A powder comprising the dried preparation of claim 27.

29. A composition suitable as food ingredient produced by the method according to any one of claims 17-26.

30. A food product comprising the composition claim 29, wherein the food product is selected from the group consisting of a clean meat, a cultured meat, a synthetic meat, a plant-based meat, and a non-animal cell-based meat.

31. A food product comprising the composition of claim 29, wherein the food product is a fish-like product.