The claims defining the invention are as follows:

1. A process for obtaining a microbial oil comprising one or more polyunsaturated fatty acids from one or more microbial cells, wherein the process comprises:

   (a) lysing the cells comprising the microbial oil to form a lysed cell composition;

   (b) treating the lysed cell composition to form an oil-containing emulsion;

   (c) separating the oil-containing emulsion from the lysed cell composition;

   (d) demulsifying the oil-containing emulsion; and

   (e) recovering the oil.

2. The process of claim 1, wherein at least one of (a) or (b) further comprises raising the pH of the cells or the lysed cell composition.

3. The process of claim 1 or claim 2, wherein at least one of (a) or (b) further comprises raising the pH to about 7 or above.

4. The process of any one of the preceding claims, wherein at least one of (a) or (b) further comprises raising the pH from about 7 to about 11.

5. The process of any one of the preceding claims, wherein (a) further comprises controlling the pH of the cells.

6. The process of claim 5, wherein controlling the pH of the cells comprises adding a base.

7. The process of any one of the preceding claims, wherein at least one of (a) or (b) further comprises agitating the cells or the lysed cell composition.

8. The process of any one of the preceding claims, wherein at least one of (a) or (b) further comprises heating the cells or the lysed cell composition to at least 50° C.

9. The process of any one of the preceding claims, wherein at least one of (a) or (b) further comprises heating the cells or the lysed cell composition from about 50° C to about 100° C.

10. The process of any one of the preceding claims, wherein (a) further comprises adding an enzyme in an amount of from about 0.05% to about 20% by weight of the cell broth.

11. The process of any one of the preceding claims, wherein (b) further comprises adding a salt in an amount of from about 0.05% to about 20% by weight of the cell broth.

12. The process of any of claim 11, wherein the salt is selected from the group consisting of alkali metal salts, alkali earth metal salts, sulfate salts, and combinations thereof.

13. The process of any one of the preceding claims, wherein the cells of (a) are unwashed.

14. The process of any one of the preceding claims, wherein the cells of (a) are contained in a fermentation broth.

15. The process of any one of the preceding claims, wherein (c) further comprises heating the oil-containing emulsion and the lysed cell composition to at least 50° C.

16. The process of any one of the preceding claims, wherein (c) further comprises heating the oil-containing emulsion and the lysed cell composition from about 50° C to about 100° C.

17. The process of any one of the preceding claims, wherein (c) further comprises centrifuging.

18. The process of any one of the preceding claims, wherein (d) further comprises heating the oil-containing emulsion to at least 50° C.

19. The process of any one of the preceding claims, wherein (d) further comprises heating the oil-containing emulsion from about 50° C to about 100° C.

20. The process of any one of the preceding claims, wherein (d) further comprises adding an acid.

21. The process of claim 20, wherein the acid comprises citric acid.

22. The process of any one of the preceding claims, wherein (d) further comprises adding a base.

23. The process of claim 22, wherein the base comprises sodium hydroxide.

24. The process of any one of the preceding claims, wherein the polyunsaturated fatty acid is selected from an omega-3 fatty acid, an omega-6 fatty acid, and mixtures thereof.

25. The process of any one of the preceding claims, wherein the polyunsaturated fatty acid is selected from docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA), docosapentaenoic acid (DPA), arachidonic acid (ARA), gamma-linolenic acid (GLA), dihomo-gamma-linolenic acid (DGLA), stearidonic acid (SDA), and mixtures thereof.

26. The process of claim 25, wherein the polyunsaturated fatty acid is docosahexaenoic acid (DHA).

27. The process of claim 25, wherein the polyunsaturated fatty acid is arachidonic acid (ARA).

28. The process of any one of the preceding claims, wherein the microbial cells are algae, yeast, fungi, protest, or bacteria cells.

29. The process of any one of the preceding claims, wherein the microbial cells are from the genus *Mortierella*, genus *Crypthecodinium*, or order Thraustochytriales.

30. The process of claim 29, wherein the microbial cells are from the order Thraustochytriales.

31. The process of claim 29, wherein the microbial cells are from the genus *Thraustochytrium*, *Schizochytrium*, or mixtures thereof.

32. The process of claim 29, wherein the microbial cells are from *Mortierella Alpina*.

33. The process of any one of the preceding claims, wherein the lysed cell composition comprises liquid, cell debris, and microbial oil.

34. The process of any one of the preceding claims, wherein an organic solvent is not used to obtain the oil from the cells.

35. The process of any one of the preceding claims, wherein (e) further comprises centrifuging the oil.

36. The process of any one of the preceding claims, wherein (e) further comprises refining the oil.

37. The process of any one of the preceding claims, wherein the oil comprises at least 30% by weight arachidonic acid.

38. The process of any one of the preceding claims, wherein the oil comprises at least 30% by weight docosahexaenoic acid.

39. The process of any one of the preceding claims, wherein the oil has an anisidine value of less than about 50.

40. The process of any one of the preceding claims, wherein the oil has a phosphorus content of about 8 ppm or less.

41. The process of any one of the preceding claims, wherein the oil has a peroxide value of less than about 5 meq/kg.

42. An oil obtained by the process of any one of the preceding claims.

43. The process of any one of the preceding claims, wherein (a) and (b) are combined together to form a one-step lysing and treating step.

44. A process for obtaining a microbial oil comprising one or more polyunsaturated fatty acids from one or more microbial cells, wherein the process comprises:

(a) lysing the cells comprising the microbial oil to form a lysed cell composition;

(b) treating the lysed cell composition to form an oil-containing emulsion;

(c) separating the oil-containing emulsion from the lysed cell composition; and

(d) demulsifying the oil-containing emulsion; and

(e) recovering the oil,

wherein at least one of (a) and (b) comprises raising the pH of the cells or lysed cell composition, agitating the cells or lysed cell composition, and heating the cells or lysed cell composition.

45. The process of claim 44, wherein (a) further comprises adding an enzyme in an amount of from about 0.05% to about 20% by weight of the cell broth.

46. The process of claim 44 or claim 45, wherein (b) further comprises adding a salt in an amount of from about 0.05% to about 20% by weight of the cell broth.

47. The process of any one of claims 44-46, wherein (c) further comprises heating the oil-containing emulsion and the lysed cell composition to at least 50° C.

48. The process of any one of claims 44-47, wherein (c) further comprises centrifuging.

49. The process of any one of claims 44-48, wherein (d) further comprises at least one of heating to at least 50° C, adding an acid, and adding a base.

50. The process of any one of claims 44-49, wherein (e) further comprises centrifuging the oil.

51. The process of any one of claims 44-50, wherein (e) further comprises refining the oil.

52. A microbial oil produced by any one of claims 44-51.