

WHAT IS CLAIMED IS:

1. A microbial oil comprising at least 85% total fatty acids by weight, wherein the total fatty acids comprise at least 50% docosahexaenoic acid by weight, between 6% to 18% docosapentaenoic acid n-6 by weight, and less than 1% stearic acid by weight.
2. A microbial oil comprising at least 85% total fatty acids by weight, wherein the total fatty acids comprise at least 60% docosahexaenoic acid by weight.
3. The microbial oil of claim 1 or 2, wherein the total fatty acids comprise 0.01% to 1% stearic acid by weight.
4. The microbial oil of any one of claims 1-3, wherein the total fatty acids comprise between 10% to 18% docosapentaenoic acid n-6 by weight.
5. The microbial oil of any one of claims 1-4, wherein the microbial oil comprises 85% to 95% total fatty acids by weight.
6. The microbial oil of any one of claims 1-4, wherein the microbial oil comprises at least 90% total fatty acids by weight.
7. The microbial oil of any one of claims 1-6, wherein the total fatty acids comprise less than 1% eicosapentaenoic acid by weight.
8. The microbial oil of any one of claims 1-7, wherein the total fatty acids comprise less than 3% pentadecanoic acid by weight.
9. The microbial oil of any one of claims 1-8, wherein the total fatty acids comprise less than 40% saturated fatty acids.
10. The microbial oil of claim 9, wherein the total fatty acids comprise between 10% and 40% saturated fatty acids.

11. The microbial oil of claim 9, wherein the total fatty acids comprise between 10% and 30% saturated fatty acids.
12. The microbial oil of any one of claims 1-11, wherein the total fatty acids comprise 60% to 70% docosahexaenoic acid by weight.
13. The microbial oil of any one of claims 1-12, wherein the total fatty acids comprise 0.01% to 2.0% arachidonic acid by weight.
14. The microbial oil of any one of claims 1-13, wherein the total fatty acids comprise 0.01% to 1% eicosatetraenoic acid by weight.
15. The microbial oil of any one of claims 1-14, wherein the microbial oil comprises at least 90% triglycerides.
16. The microbial oil of claim 15, wherein the microbial oil comprises at least 95% triglycerides.
17. The microbial oil of any one of claims 1-16, wherein the ratio of docosahexaenoic acid to docosapentaenoic acid n-6 is less than or equal to 7:1.
18. The microbial oil of any one of claims 1-17, wherein the total fatty acids comprise less than 4% myristic acid by weight.
19. The microbial oil of any one of claims 1-18, wherein the total fatty acids comprise less than 30% palmitic acid by weight.
20. The microbial oil of any one of claims 1-19, wherein the total fatty acids comprise at least 60% docosahexaenoic acid by weight and between 10% by weight to 18% docosapentaenoic acid n-6 by weight.
21. The microbial oil of any one of claims 1-20, wherein the total fatty acids comprise 0.1% to 0.5% heptadecanoic acid by weight.

22. The microbial oil of any one of claims 1-21, wherein the oil is produced by culturing an *Aurantiochytrium* microorganism in a culture medium at a temperature from 22° to 28°C.
23. The microbial oil of any one of claims 1-21, wherein the oil is produced by culturing an *Aurantiochytrium* microorganism in a culture medium at a temperature from 25° to 28°C.
24. A method of making a biomass comprising culturing an oil-producing *Aurantiochytrium* microorganism in a culture medium comprising a fatty acid synthesis inhibitor, wherein the biomass comprises at least 500 mg/g oil.
25. The method of claim 24, wherein the culture medium is at a temperature of 18°C to 22°C.
26. The method of claim 24, wherein the culture medium is at a temperature of 22°C to 28°C.
27. The method of claim 24, wherein the culture medium is at a temperature of 25°C to 28°C.
28. The method of any one of claims 24-27, wherein the method further comprises adding the microorganisms to the culture medium and wherein the fatty acid synthesis inhibitor is added to the culture medium between 24 to 48 hours after addition of the microorganisms to the culture medium.
29. The method of any one of claims 24-27, wherein the method further comprises adding the microorganisms to the culture medium and wherein the fatty acid synthesis inhibitor is added to the culture medium at least 6, 12, 24 or 48 hours after addition of the microorganisms to the culture medium.
30. The method of any one of claims 24-29, wherein the culturing comprises adding one or more doses of the fatty acid synthesis inhibitor to the culture medium.
31. The method of any one of claims 24-27, wherein the method further comprises adding the microorganisms to the culture medium and wherein the culturing comprises adding the fatty acid synthesis inhibitor in 2, 3, 4, 5, or 6 doses beginning 12 hours after addition of the microorganisms to the culture medium.

32. The method of claim 31, wherein the doses are added every 6, 12, or 24 hours.
33. The method of any one of claims 24-32, wherein a total concentration of the fatty acid synthesis inhibitor added to the culture medium during the culturing comprises between 3 and 40 μM .
34. The method of any one of claims 24-33, wherein a total concentration of the fatty acid synthesis inhibitor added to the culture medium during the culturing comprises between 30 μg and 700 μg of inhibitor per gram of biomass.
35. The method of any one of claims 24-33, wherein the fatty acid synthesis inhibitor is fed to the culture medium.
36. The method of any one of claims 24-35, wherein the microorganism has IDAC Accession No. 220716-01.
37. The method of any one of claims 24-36, wherein the method further comprises isolating the oil from the biomass.
38. The method of any one of claims 24-37, wherein the oil comprises fatty acids and the fatty acids comprise at least 50% docosahexaenoic acid by weight, between 6% to 18% docosapentaenoic acid n-6 by weight and less than 1% stearic acid by weight.
39. The method of any one of claims 24-38, wherein the oil comprises fatty acids and the fatty acids comprise between 10% to 18% docosapentaenoic acid n-6 by weight.
40. The method of any one of claims 24-39, wherein the oil comprises fatty acids and the fatty acids comprise less than 1% eicosapentaenoic acid by weight.
41. The method of any one of claims 24-40, wherein the oil comprises fatty acids and the fatty acids comprise between 10% and 40% saturated fatty acids.
42. The method of any one of claims 24-41, wherein the oil comprises fatty acids and the fatty acids comprise 50% to 70% docosahexaenoic acid by weight.

43. The method of any one of claims 24-42, wherein the oil comprises fatty acids and the fatty acids comprise at least 95% by weight triglycerides.

44. The method of any one of claims 24-43, wherein the oil comprises fatty acids and the fatty acids comprise at least 60% docosahexaenoic acid by weight and between 10% by weight to 18% docosapentaenoic acid n-6 by weight.

45. The method of any one of claims 24-44, wherein the oil comprises fatty acids and the fatty acids comprise 0.1% to 0.5% heptadecanoic acid by weight.