WHAT IS CLAIMED:

1. A microbial oil comprising a triglyceride fraction of at least 70% by weight, wherein the docosahexaenoic acid content of the triglyceride fraction is at least 50% by weight, and wherein the docosapentaenoic acid n-6 content of the triglyceride fraction is from 0.5% by weight to 6% by weight, and wherein the oil comprises 5% by weight or less of heptadecanoic acid.

2. The microbial oil of claim 1, further comprising an arachidonic acid content of the triglyceride fraction of 1.5% or less by weight.

3. A microbial oil comprising a triglyceride fraction of at least 70% by weight, wherein the docosahexaenoic acid content of the triglyceride fraction is at least 40% by weight, wherein the docosapentaenoic acid n-6 content of the triglyceride fraction is from at least 0.5% by weight to 6% by weight, and wherein the ratio of docosahexaenoic acid to docosapentaenoic acid n-6 is greater than 6:1, and wherein the oil comprises 5% by weight or less of heptadecanoic acid.

4. A microbial oil comprising a triglyceride fraction of at least 70% by weight, wherein the docosahexaenoic acid content of the triglyceride fraction is at least 60% by weight, and wherein the oil comprises 5% by weight or less of heptadecanoic acid.

5. The microbial oil of any one of claims 1 to 4, wherein at least 20% of the triglycerides in the triglyceride fraction contain docosahexaenoic acid at two positions in the triglyceride selected from any two of the *sn*-1, *sn*-2, and *sn*-3 positions.

6. The microbial oil of any one of claims 1 to 4, wherein at least 5% of the triglycerides in the triglyceride fraction contain docosahexaenoic acid at all three of the *sn*-1, *sn*-2, and *sn*-3 positions in the triglyceride.

7. A food product, cosmetic, or pharmaceutical composition for animals or humans, comprising the microbial oil of any one of claims 1 to 6.

8. The food product of claim 7, wherein the food product is an infant formula.

9. The food product of claim 8, wherein the infant formula is suitable for premature infants.

10. The food product of claim 7, wherein the food product is milk, a beverage, a therapeutic drink, a nutritional drink, or a combination thereof.

11. The food product of claim 7, wherein the food product is an additive for animal or human food.

12. The food product of claim 7, wherein the food product is a nutritional supplement.

13. The food product of claim 7, wherein the food product is an animal feed.

14. The animal feed of claim 13, wherein the animal feed is an aquaculture feed.

15. The animal feed of claim 13, wherein the animal feed is a domestic animal feed, a zoological animal feed, a work animal feed, a livestock feed, or a combination thereof.

~~16. An isolated thraustochytrid microorganism of the thraustochytrid species deposited under ATCC Accession No. PTA-9695 or a strain derived therefrom, wherein the total fatty acids produced by said microorganism or strain derived therefrom comprise about 10% or less by weight eicosapentaenoic acid.~~

~~17. An isolated thraustochytrid microorganism having the characteristics of the thraustochytrid species deposited under ATCC Accession No. PTA-9695, wherein the total fatty acids produced by said microorganism or strain derived therefrom comprise about 10% or less by weight eicosapentaenoic acid.~~

~~18. An isolated thraustochytrid microorganism, or a strain derived therefrom, comprising a triglyceride fraction, wherein the docosahexaenoic acid content of the triglyceride fraction is at least about 40% by weight, wherein the docosapentaenoic acid n-6 content of the triglyceride fraction is from at least about 0.5% by weight to about 6% by weight, and~~

~~wherein the total fatty acids produced by said microorganism or strain derived therefrom comprise about 10% or less by weight of eicosapentaenoic acid.~~

~~19. An isolated thraustochytrid microorganism of the same species as the thraustochytrid deposited under ATCC Accession No. PTA-9695, or a strain derived therefrom, wherein the total fatty acids produced by said microorganism or strain derived therefrom comprise about 10% or less by weight eicosapentaenoic acid.~~

~~20. The isolated thraustochytrid microorganism of any one of claims 16 to 19, wherein the strain derived therefrom is a mutant strain.~~

~~21. An isolated thraustochytrid microorganism deposited under ATCC Accession No. PTA-9695.~~

~~22. An isolated thraustochytrid microorganism deposited under ATCC Accession No. PTA-9696.~~

~~23. An isolated thraustochytrid microorganism deposited under ATCC Accession No. PTA-9697.~~

~~24. An isolated thraustochytrid microorganism deposited under ATCC Accession No. PTA-9698.~~

~~25. A thraustochytrid biomass comprising the thraustochytrid microorganism of any one of claims 16 to 24 or mixtures thereof.~~

~~26. An isolated thraustochytrid biomass, wherein at least about 50% by weight of the dry cell weight of the biomass are fatty acids, and wherein at least about 50% by weight of the fatty acids are omega-3 fatty acids.~~

~~27. The isolated thraustochytrid biomass of claim 26, wherein at least about 50% by weight of the fatty acids is docosahexaenoic acid.~~

~~28. An isolated thraustochytrid biomass, wherein at least about 25% by weight of the dry cell weight of the biomass is docosahexaenoic acid.~~

~~29. The isolated thraustochytrid biomass of any one of claims 25 to 28, wherein about 10% or less by weight of the fatty acids is eicosapentaenoic acid, and wherein the weight ratio of docosahexaenoic acid to eicosapentaenoic acid is at least about 5:1.~~

~~30. The isolated thraustochytrid biomass of any one of claims 25 to 29, wherein about 1.5% or less by weight of the fatty acids is arachidonic acid, and wherein the weight ratio of docosahexaenoic acid to arachidonic acid is at least about 20:1.~~

~~31. The isolated thraustochytrid biomass of any one of claims 25 to 30, further comprising docosahexaenoic acid and docosapentaenoic acid n-6 in a weight ratio of at least about 10:1.~~

~~32. An isolated thraustochytrid culture comprising the thraustochytrid microorganism of any one of claims 16 to 24 or mixtures thereof.~~

~~33. The isolated thraustochytrid culture of claim 32, further comprising at least about 5% dissolved oxygen.~~

~~34. A food product, cosmetic, or pharmaceutical composition for animals or humans, comprising the thraustochytrid microorganism or thraustochytrid biomass of any one of claims 16 to 31 or mixtures thereof.~~

~~35. A method for producing a microbial oil comprising omega-3 fatty acids, the method comprising:~~

~~(a) growing the isolated thraustochytrid microorganism of any one of claims 16 to 24 or mixtures thereof in a culture to produce a biomass, and~~

~~(b) extracting an oil comprising omega-3 fatty acids from the biomass.~~

~~36. The method of claim 35, wherein the culture comprises at least about 5% dissolved oxygen.~~

~~37. The method of claim 35, wherein the culture pH is maintained at about 6.5 to about 8.5.~~

~~38. The method of claim 35, wherein the culture temperature is maintained at about 17°C to about 30°C.~~

~~39. The method of claim 35, wherein the culture comprises a glucose concentration of about 5 g/L to about 50 g/L.~~

~~40. A method for producing a microbial oil comprising omega-3 fatty acids, the method comprising extracting an oil comprising omega-3 fatty acids from the biomass of any one of claims 25 to 31.~~

~~41. The method of claim 40, wherein the microbial oil comprising omega-3 fatty acids is extracted using a hexane extraction process.~~

~~42. The method of claim 40, wherein the microbial oil comprising omega-3 fatty acids is extracted using a solventless extraction process.~~

~~43. The method of any one of claims 35 to 42, or the isolated thraustochytrid culture of claim 32 or claim 33, wherein the dry cell weight of biomass isolated from each liter of culture is at least about 50 g after growing for about 7 days at about 17°C to about 30°C in a culture medium of about pH 6.5 to about pH 8.0 comprising sources of carbon, nitrogen, and nutrients, and about 950 ppm to about 8500 ppm chloride ions.~~

~~44. The method of any one of claims 35 to 42, or the isolated thraustochytrid culture of claim 32 or claim 33, wherein the omega-3 fatty acids productivity is at least about 2 g/L/day after growing for about 7 days at about 17°C to about 30°C in a culture medium of about pH 6.5 to about pH 8.0 comprising sources of carbon, nitrogen, and nutrients, and about 950 ppm to about 8500 ppm chloride ions.~~

~~45. A microbial oil produced by the method of any one of claims 35 to 44.~~

4616. Use of the isolated microorganism, biomass, or microbial oil of any one of claims 1 to 6, ~~16 to 31, 45~~, or mixtures thereof, for the manufacture of a medicament for the treatment of inflammation or a condition related thereto.

~~47. Use of the isolated microorganism, biomass, or microbial oil of any one of claims 1 to 6, 16 to 31, 45, or mixtures thereof, for the treatment of inflammation or a condition related thereto.~~

4817. The isolated microorganism, biomass, or microbial oil of any one of claims 1 to 6, ~~16 to 31, 45~~, or mixtures thereof, for use in the treatment of inflammation or a condition related thereto.

4918. The microbial oil of any one of claims 1 to 6, wherein said oil is a crude oil.

5019. The microbial oil of any one of claims 1 to 6, 4918, wherein said oil is a refined oil.

5120. The microbial oil of any one of claims 1 to 6, ~~49~~ 18 to ~~50~~19, wherein said oil is a diluted microbial oil.

~~52~~21. The microbial oil of anyone of claims 1 to 6, ~~49~~ 18 to ~~50~~19, wherein said oil is an enriched oil.

~~53~~22. An infant formula comprising the microbial oil of any one of claims 1 to 6, ~~49~~ 18 to ~~52~~21, or mixtures thereof in combination with a physically refined oil derived from a arachidonic acid-producing microorganism.

~~54~~23. The infant formula according to claim ~~53~~22, wherein the arachidonic acid-producing microorganism is selected from *Mortierella alpina* and *Mortierella* sect. *schmuckeri*.

~~55~~24. An infant formula supplemented with a microbial oil of any one of claims 1 to 6, ~~49~~ 18 to ~~52~~21, or mixtures thereof in combination with an oil rich in arachidonic acid.