[4] Thus, there is an urgent need for palm oil alternatives that do not rely upon utilization of oil palms and incur the associated negative environmental costs.

BRIEF SUMMARY

[4a] In an aspect of the present disclosure, there is provided an edible microbial oil produced by an oleaginous yeast, wherein the edible oil comprises a fatty acid profile comprising:

at least 30% w/w saturated fatty acids;

at least 30% w/w unsaturated fatty acids; and

less than 30% w/w total polyunsaturated fatty acids.

[4b] In another aspect of the present disclosure, there is provided a derivative of the oil disclosed herein, wherein the derivative is a fraction, and wherein the fraction is microbial stearin, microbial olein, microbial soft mid-fraction, microbial super olein, microbial hard mid-fraction, microbial olein, and/or microbial top olein.

[4c] In a further aspect of the present disclosure, there is provided a food product comprising the microbial olein disclosed herein.

[4d] In another aspect of the present disclosure, there is provided a blended fat composition, wherein said composition comprises a vegetable oil lipid source, and at least 1% of the edible microbial oil and/or a derivative thereof disclosed herein.

[4e] In a further aspect of the present disclosure, there is provided a palm oil substitute comprising the edible microbial oil disclosed herein, the derivative disclosed herein, or the blended fat composition disclosed herein.

[4f] In another aspect of the present disclosure, there is provided a food product comprising the derivative disclosed herein.

[4g] In a further aspect of the present disclosure, there is provided a method for producing a food product comprising an edible microbial oil and/or a derivative thereof comprising:

obtaining an edible microbial oil, and/or a derivative thereof, wherein said oil is produced from an oleaginous yeast;

using the microbial oil and/or derivative thereof as an ingredient in a food product; and

producing a food product.

[5] The present disclosure relates to microbial oils and/or derivative thereof, wherein the microbial oil is produced by an oleaginous yeast. In some examples, the microbial oil and/or derivative thereof further comprises ergosterol, β-carotene, torulene, and/or torularhodin. In some examples, the microbial oil and/or derivative thereof comprises at least 50 ppm ergosterol. In some examples, the microbial oil and/or derivative thereof of is produced by *Rhodosporidium toruloides*.

[6] In some examples, the microbial oil comprises a fatty acid profile comprising greater than 30% saturated fatty acids; greater than 30% mono-unsaturated fatty acids; and less than 30% poly-unsaturated fatty acids. In some examples, the microbial oil comprises a saturated fatty acid composition of at least 40%. In some examples, the microbial oil comprises an unsaturated fatty acid composition of at least 40%. In some examples, the microbial oil comprises a triglyceride composition wherein at least 40% of the triglycerides have one unsaturated sidechain; and at least 30% of the triglycerides have two unsaturated sidechains. In some examples, the triglyceride molecules comprise between 10% and 15% of palmitic and/or stearic fatty acids at the sn-2 position.

[7] In some examples, the microbial oil derivative is a fraction, and the fraction is microbial stearin, microbial olein, microbial soft mid-fraction, microbial super olein, microbial hard mid-fraction, microbial olein, and/or microbial top olein.

[8] In another example, the present disclosure relates to a food product comprising an edible microbial oil and/or derivative thereof. In some examples, the food product comprises between 0.1% and 30% edible microbial oil and/or derivative thereof. In some examples, the food product is a nut butter or spread. In some examples, the food product is a chocolate product or a chocolate countline product. In some examples, the food product is a baked good. In some examples, the food product is a meat substitute, and the edible microbial oil is used as a substitute for animal fat. In some examples, the meat substitute is a ground-beef-like product. In some examples, the food product is a cheese-like substance. In some

examples, the food product is a milk-like product. In some examples, the food product is an infant formula. In some examples, the food product does not comprise palm oil or palm kernel oil. In some examples, the food product does not comprise animal fat.

[9] In another example, the present disclosure relates to a blended fat composition, wherein the composition comprises a vegetable oil lipid source, and at least 1% edible microbial oil and/or derivative thereof. In some examples, the vegetable oil lipid is soybean oil, corn oil, rapeseed oil, canola oil, sunflower oil, safflower oil, coconut oil, rice bran oil, olive oil, sesame oil, flaxseed oil, hemp oil, or cottonseed oil. In some examples, the vegetable oil lipid is peanut oil, almond oil, beech nut oil, brazil nut oil, cashew oil, hazelnut oil, macadamia oil, mongongo nut oil, pecan oil, pine nut oil, pistachio oil, walnut oil, or pumpkin seed oil. In some examples, the vegetable oil lipid is grapefruit seed oil, lemon oil, apricot oil, apple seed oil, argan oil, avocado oil, or orange oil. In some examples, the blended fat composition is a cooking oil, frying oil, shortening, margarine, or butter-like product. In some examples, the blended fat composition does not comprise palm oil or palm kernel oil.

[10] In another example, the present disclosure relates to a palm oil substitute comprising an edible microbial oil and/or derivative thereof or a blended fat composition comprising a vegetable oil lipid source, and at least 1% edible microbial oil and/or derivative thereof. In some examples, the palm oil substitute has one or more characteristics similar to plant-derived palm oil selected from the group consisting of: apparent density, refractive index, oxidative stability, saponification value, unsaponifiable matter, iodine value, slip melting point, fatty acid composition, triglyceride content, overall saturation level, and level of mono- and poly-unsaturated fatty acids. In some examples, the palm oil substitute comprises a slip melting point of 30°C-40°C. In some examples, the palm oil substitute is stearin, and the stearin has a slip melting point of greater than 25°C.

[11] In another example, the present disclosure relates to a meat fat substitute comprising an edible microbial oil and/or derivative thereof or a blended fat composition comprising a vegetable oil lipid source, and at least 1% edible microbial oil and/or derivative thereof. In some examples, the meat fat substitute further comprises at least one of an edible gum, a starch, and a gelling agent.

[12] In another example, the present disclosure teaches a method for producing an edible microbial oil comprising obtaining a whole cell or lysed microbial biomass; and extracting crude microbial oil from the whole cell or lysed microbial biomass, wherein said extraction process removes toxins and produces a microbial oil safe for human consumption. In some examples, the method further comprises processing the microbial oil, wherein the processing comprises physical refining, chemical refining, deodorizing, bleaching, and combinations thereof. In some examples, the method further comprises modifying the microbial oil, wherein the modifying comprises fractionation, interesterification, transesterification, hydrogenation, steam hydrolysis, distillation, saponification, or combinations thereof. In some examples, the derivative is a triglyceride, diglyceride, monoglyceride, free fatty acid, fatty acid salt, glycerin, ester, fatty alcohol, derivative thereof, or combination thereof.

[13] In some examples, the disclosure teaches a method for producing a food product comprising: obtaining an edible microbial oil, and/or a derivative thereof, wherein said oil is produced from an oleaginous yeast; using the microbial oil and/or derivative thereof as an ingredient in a food product; and producing a food product. . In some examples, the food product is a nut butter or spread, a chocolate product, a baked good, a meat substitute, a cheese-like product, a milk-like product, an infant formula, a cooking oil, shortening, margarine, or butter-like product.

BRIEF DESCRIPTION OF THE DRAWINGS

[14] The accompanying figures, which are incorporated herein and form a part of the specification, illustrate some, but not the only or exclusive, example embodiments and/or features. It is intended that the embodiments and figures disclosed herein are to be considered illustrative rather than limiting.

[15] **FIG. 1** is a flow diagram illustrating examples of various methods of processing the microbial oil and the resulting derivatives (oleochemicals) which may be used in the food industry.

[16] **FIG. 2A** shows a chromatogram of the triglyceride composition analysis of exemplary crude microbial oil; **FIG. 2B** shows a chromatogram of the triglyceride composition analysis of exemplary crude palm oil; and **FIG. 2C** shows a chromatogram of the triglyceride composition analysis of exemplary crude hybrid palm oil.

CLAIMS

What is claimed is:

1. An edible microbial oil produced by an oleaginous yeast, wherein the edible oil comprises a fatty acid profile comprising:

    at least 30% w/w saturated fatty acids;

    at least 30% w/w unsaturated fatty acids; and

    less than 30% w/w total polyunsaturated fatty acids.

2. A derivative of the oil of claim 1, wherein the derivative is a fraction, and wherein the fraction is microbial stearin, microbial olein, microbial soft mid-fraction, microbial super olein, microbial hard mid-fraction, microbial olein, and/or microbial top olein.

3. The microbial stearin of claim 2, wherein the stearin has a slip melting point of greater than 25°C.

4. A food product comprising the microbial olein of claim 2.

5. A blended fat composition, wherein said composition comprises a vegetable oil lipid source, and at least 1% of the edible microbial oil and/or a derivative thereof of claim 2.

6. The blended fat composition of claim 5, wherein the vegetable oil lipid is soybean oil, corn oil, rapeseed oil, canola oil, sunflower oil, safflower oil, coconut oil, rice bran oil, olive oil, sesame oil, flaxseed oil, hemp oil, peanut oil, almond oil, beech nut oil, brazil nut oil, cashew oil, hazelnut oil, macadamia oil, mongongo nut oil, pecan oil, pine nut oil, pistachio oil, walnut oil, pumpkin seed oil, grapefruit seed oil, lemon oil, apricot oil, apple seed oil, argan oil, avocado oil, orange oil or cottonseed oil.

7. The blended fat composition of claim 5, wherein the composition is a cooking oil, frying oil, shortening, margarine, or butter-like product.

8. The blended fat composition of claim 5, wherein the composition does not comprise palm oil or palm kernel oil.

9. A palm oil substitute comprising the edible microbial oil of claim 1, the derivative of claim 2, or the blended fat composition of claim 5.

10. The edible microbial oil of claim 1, wherein the edible oil comprises a slip melting point of 30°C-40°C.

11. A food product comprising the derivative of claim 2.

12. The food product of claim 11, wherein the food comprises between 0.1% and 30% edible microbial oil derivative.

13. The food product of claim 11, wherein the food product is a nut butter or spread, a chocolate product, a chocolate countline product, a baked good, a meat substitute, a cheese-like product, a milk-like product, an infant formula, a cooking oil, shortening, margarine, or butter-like product.

14. The food product of claim 11, wherein the meat substitute is a ground-beef-like product.

15. The food product of claim 11, wherein the food product is an animal fat substitute.

16. The food product of claim 11, further comprising at least one of an edible gum, a starch, and a gelling agent.

17. The food product of claim 11, wherein the food product does not comprise palm oil or palm kernel oil.

18. The food product of claim 11, wherein the food product does not comprise animal fat.

19. A method for producing a food product comprising an edible microbial oil and/or a derivative thereof comprising:

    obtaining an edible microbial oil, and/or a derivative thereof, wherein said oil is produced from an oleaginous yeast;

    using the microbial oil and/or derivative thereof as an ingredient in a food product; and

    producing a food product.

20. The method of claim 19, wherein the edible microbial oil is produced by *Rhodosporidium toruloides.*

21. The method of claim 19, wherein the food product is a nut butter or spread, a chocolate product, a baked good, a meat substitute, a cheese-like product, a milk-like product, an infant formula, a cooking oil, shortening, margarine, or butter-like product.