CLAIMS

1. A colloidal composition, comprising:

a first phase, comprising at least one gas;

a second phase, comprising at least one monosaccharide, disaccharide, or polysaccharide;

filamentous fungal particles; and

water,

wherein the first phase is dispersed in the second phase, and

wherein at least about 65 wt% of protein in the colloidal composition is provided by the filamentous fungal particles.

2. The colloidal composition of claim 1, wherein the filamentous fungal particles are in a form selected from the group consisting of a flour, wet biomat-derived particles, a paste, and combinations thereof.

3. The colloidal composition of claim 1 or claim 2, comprising the at least one monosaccharide, disaccharide, or polysaccharide in an amount of at least about 10 wt%.

4. The colloidal composition of any one of the preceding claims, comprising at least one monosaccharide or disaccharide and at least one polysaccharide, wherein the polysaccharide is provided in an amount of between about 5 wt% and about 10 wt%.

5. The colloidal composition of any one of the preceding claims, comprising the filamentous fungal particles in an amount of between about 6 wt% and about 17.0 wt%.

6. The colloidal composition of any one of the preceding claims, further comprising at least one fatty substance.

7. The colloidal composition of any one of the preceding claims, further comprising a foam stabilizer in an amount of between about 0.05 wt% and about 0.5 wt%.

8. The colloidal composition of any one of the preceding claims, wherein the colloidal composition is substantially free of non-fungal-derived emulsifiers, stabilizers, and surfactants.

9. The colloidal composition of any one of the preceding claims, wherein the first phase and the second phase remain substantially homogenously mixed, and/or do not visibly separate, for at least about one day, at least about two days, at least about three days, at least about four days, at least about five days, at least about six days, at least about one week, at least about two weeks, at least about three weeks, at least about one month, at least

about two months, at least about three months, at least about four months, at least about five months, at least about six months, at least about seven months, at least about eight months, at least about nine months, at least about ten months, at least about eleven months, at least about twelve months, at least about thirteen months, at least about fourteen months, at least about fifteen months, at least about sixteen months, at least about seventeen months, or at least about eighteen months after formation of the colloidal composition.

10. The colloidal composition of any one of the preceding claims, wherein a volume ratio of the at least one gas to the remainder of the colloidal composition is at least about 0.1, at least about 0.2, at least about 0.3, at least about 0.4, at least about 0.5, at least about 0.75, at least about 1, at least about 2, at least about 3, at least about 4, or at least about 5.

11. The colloidal composition of any one of the preceding claims, wherein the colloidal composition has a foam stability of at least about 50%, at least about 60%, at least about 70%, at least about 80%, at least about 90%, or at least about 95% over a period of at least about one day, at least about two days, at least about three days, at least about four days, at least about five days, at least about six days, at least about one week, at least about two weeks, at least about three weeks, at least about one month, at least about two months, at least about three months, at least about four months, at least about five months, at least about six months, at least about seven months, at least about eight months, at least about nine months, at least about ten months, at least about eleven months, at least about twelve months, at least about thirteen months, at least about fourteen months, at least about fifteen months, at least about sixteen months, at least about seventeen months, or at least about eighteen months.

12. The colloidal composition of any one of the preceding claims, comprising at least one monosaccharide or disaccharide in an amount of between about 17 wt% and about 25 wt%, at least one polysaccharide in an amount of between about 7.2 wt% and about 8.2 wt%, and the filamentous fungal particles in an amount of between about 12.8 wt% and about 17.0 wt%, and further comprising at least one fatty substance in an amount of between about 4.5 wt% and about 10.0 wt% and a foam stabilizer in an amount of between about 0.05 wt% and about 0.50 wt%,

wherein the at least one monosaccharide or disaccharide comprises at least one of sucrose, dextrose, and glucose, the at least one polysaccharide comprises an inulin, the fatty

substance comprises refined coconut oil, and the foam stabilizer comprises locust bean gum, and

further comprising between about 0.01 wt% and about 40 wt% of at least one flavoring ingredient.

13. The colloidal composition of any one of the preceding claims, wherein the colloidal composition is a dairy analog food product.

14. The colloidal composition of any one of the preceding claims, wherein the colloidal composition is a frozen food product.

15. The colloidal composition of any one of the preceding claims, wherein the at least one gas comprises at least one of air, nitrogen, oxygen, argon, carbon dioxide, and helium.

16. The colloidal composition of any one of the preceding claims, having a total fat content of less than about 10 wt%, less than about 9 wt%, less than about 8 wt%, less than about 7 wt%, less than about 6 wt%, or less than about 5 wt%.

17. The colloidal composition of any one of the preceding claims, having a total fat content of at least about 10 wt%, at least about 15 wt%, at least about 20 wt%, at least about 25 wt%, at least about 30 wt%, at least about 35 wt%, at least about 40 wt%, or at least about 45 wt%.

18. The colloidal composition of any one of the preceding claims, having a saturated fat content of less than about 55 wt% of the total fat content, less than about 50 wt% of the total fat content, less than about 45 wt% of the total fat content, or less than about 40 wt% of the total fat content.

19. The colloidal composition of any one of the preceding claims, having a saturated fat content of less than about 5.5 wt% of the composition, less than about 5 wt% of the composition, less than about 4.5 wt% of the composition, less than about 4 wt% of the composition, less than about 3.5 wt% of the composition, less than about 3 wt% of the composition, less than about 2.5 wt% of the composition, or less than about 2 wt% of the composition.

20. The colloidal composition of any one of the preceding claims, further comprising at least one hydrophobin.

21. The colloidal composition of any one of the preceding claims, wherein the colloidal composition or a mix or precursor thereof has a dynamic viscosity, at 20 °C and 1 atm, of greater than about 400 cP.

22. A colloidal composition, comprising:

an oil phase;

an aqueous phase; and

filamentous fungal particles,

wherein the filamentous fungal particles stabilize the colloidal composition, and wherein the colloidal composition is an oil-in-water emulsion.

23. A colloidal composition, comprising:

a first phase;

a continuous second phase; and

filamentous fungal particles,

wherein the filamentous fungal particles comprise elongated particles having a length of no more than about 120 microns, and wherein the filamentous fungal particles are substantially uniformly dispersed throughout the continuous second phase.

24. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles have an average particle size of between about 2 microns and about 10 microns, between about 10 microns and about 20 microns, between about 20 microns and about 50 microns, between about 50 microns and about 75 microns, or between about 75 microns and about 120 microns.

25. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles comprise at least about 46 wt% protein.

26. The colloidal composition of any one of the preceding claims, wherein at least one of the following is true:

(i) the filamentous fungal particles comprise particles of at least one filamentous fungus belonging to an order selected from the group consisting of Mucorales, Ustilaginales, Russulales, Polyporales, Agaricales, Pezizales, and Hypocreales;

(ii) the filamentous fungal particles comprise particles of at least one filamentous fungus belonging to a family selected from the group consisting of Mucoraceae, Ustilaginaceae, Hericiaceae, Polyporaceae, Grifolaceae, Lyophyllaceae, Strophariaceae, Lycoperdaceae, Agaricaceae, Pleurotaceae, Physalacriaceae, Omphalotaceae, Tuberaceae, Morchellaceae, Sparassidaceae, Nectriaceae, Bionectriaceae, and Cordycipitaceae;

(iii) the filamentous fungal particles comprise particles of at least one filamentous fungus selected from the group consisting of *Rhizopus oligosporus*, *Ustilago esculenta*, *Hericululm erinaceus*, *Polyporous squamosus*, *Grifola fondrosa*, *Hypsizygus marmoreus*,

Hypsizygus ulmarius (elm oyster), *Calocybe gambosa*, *Pholiota nameko*, *Calvatia gigantea*, *Agaricus bisporus*, *Stropharia rugosoannulata*, *Hypholoma lateritium*, *Pleurotus eryngii*, *Pleurotus ostreatus* (pearl), *Pleurotus ostreatus* var. *columbinus* (Blue oyster), *Tuber borchii*, *Morchella esculenta*, *Morchella conica*, *Morchella importuna*, *Sparassis crispa* (cauliflower), *Fusarium venenatum*, *Fusarium* strain *flavolapis*, *Disciotis venosa*, *Clonostachys rosea*, *Cordyceps militaris*, *Trametes versicolor*, *Ganoderma lucidum*, *Flammulina velutipes*, *Lentinula edodes*, *Pleurotus djamor*, *Pleurotus ostreatus*, and *Leucoagaricus* spp;

(iv) the filamentous fungal particles comprise particles of at least one filamentous fungus belonging to the genus *Fusarium*;

(v) the filamentous fungal particles comprise particles of *Fusarium venenatum*; and

(vi) the filamentous fungal particles comprise particles of the *Fusarium* strain *flavolapis* identified by ATCC Accession Deposit No. PTA-10698.

27. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles are derived from a fungal biomass comprising at least one of mycelia, conidia, and a fruiting body.

28. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles are derived from a filamentous fungal biomat.

29. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles are provided as part of a homogenate, the homogenate further comprising water.

30. The colloidal composition of any one of the preceding claims, wherein at least one of the following is true:

(i) no more than about 36.2% of the filamentous fungal particles have a particle size of less than about 53 microns;

(ii) between about 10.7% and about 67.1% of the filamentous fungal particles have a particle size of less than about 105 microns;

(iii) no more than about 69.8% of the filamentous fungal particles have a particle size of between about 53 microns and about 105 microns;

(iv) between about 2.7% and about 59.6% of the filamentous fungal particles have a particle size of between about 105 microns and about 177 microns;

(v) no more than about 28.6% of the filamentous fungal particles have a particle size of between about 177 microns and about 250 microns;

(vi) no more than about 42.6% of the filamentous fungal particles have a particle size of between about 250 microns and about 350 microns;

(vii) no more than about 41.8% of the filamentous fungal particles have a particle size of between about 350 microns and about 590 microns; and

(viii) no more than about 4.8% of the filamentous fungal particles have a particle size of between about 590 microns and about 1190 microns.

31. The colloidal composition of any one of the preceding claims, wherein a circular equivalent number-average particle size of the filamentous fungal particles is between about 1.46 microns and about 6.42 microns.

32. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles comprise at least about 27 wt% dietary fiber.

33. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles comprise at least about 30 wt% protein.

34. The colloidal composition of any one of the preceding claims, comprising at least about 4.0 wt%, at least about 4.5 wt%, at least about 5.0 wt%, at least about 5.5 wt%, at least about 6.0 wt%, at least about 6.5 wt%, at least about 7.0 wt%, at least about 7.5 wt%, at least about 8.0 wt%, at least about 8.5 wt%, at least about 9.0 wt%, at least about 9.5 wt%, at least about 10.0 wt%, at least about 10.5 wt%, at least about 11.0 wt%, at least about 11.5 wt%, at least about 12.0 wt%, or at least about 12.5 wt% protein.

35. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles comprise no more than about 14% moisture.

36. The colloidal composition of any one of the preceding claims, wherein protein, fat, and air are substantially uniformly distributed throughout the colloidal composition.

37. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles comprise at least about 11.0 μmol/g, at least about 11.5 μmol/g, at least about 12.0 μmol/g, at least about 12.5 μmol/g, at least about 13.0 μmol/g, at least about 13.5 μmol/g, at least about 14.0 μmol/g, or at least about 14.5 μmol/g phospholipids.

38. The colloidal composition of any one of the preceding claims, comprising no more than about 18.5 μmol/g, no more than about 18.0 μmol/g, no more than about 17.5 μmol/g, no more than about 17.0 μmol/g, no more than about 16.5 μmol/g, no more than about 16.0 μmol/g, no more than about 15.5 μmol/g, or no more than about 15.0 μmol/g phospholipids.

39. The colloidal composition of any one of the preceding claims, comprising at least about 0.01 wt%, at least about 0.02 wt%, at least about 0.03 wt%, at least about 0.04 wt%, at least about 0.05 wt%, at least about 0.1 wt%, at least about 0.15 wt%, at least about 0.2 wt%, at least about 0.25 wt%, at least about 0.3 wt%, at least about 0.35 wt%, at least about 0.4 wt%, at least about 0.45 wt%, or at least about 0.5 wt% phospholipids.

40. The colloidal composition of any one of the preceding claims, comprising no more than about 1 wt%, no more than about 0.95 wt%, no more than about 0.9 wt%, no more than about 0.85 wt%, no more than about 0.8 wt%, no more than about 0.75 wt%, no more than about 0.7 wt%, no more than about 0.65 wt%, no more than about 0.6 wt%, or no more than about 0.55 wt% phospholipids.

41. The colloidal composition of any one of the preceding claims, having a pH of between about 5 and about 7.

42. The colloidal composition of any one of the preceding claims, having a zeta potential magnitude, at a temperature of 20°C and a pH of between 5 and 7, of at least about 10 mV, at least about 15 mV, or at least about 20 mV.

43. The colloidal composition of any one of the preceding claims, having a contact angle on a silicon wafer, at a temperature of 25°C and a pressure of 1 atm, of at least about 45°.

44. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles comprise at least one compound selected from the group consisting of vitamins, lipids, glycolipids, polysaccharides, sugar alcohols, and ω-3 fatty acids.

45. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles comprise at least one substance that improves an aesthetic or sensory quality of the filamentous fungus, wherein the substance is selected from the group consisting of pigments, inks, dyes, and fragrances.

46. The colloidal composition of any one of the preceding claims, wherein the colloidal composition is substantially free of lactose and the filamentous fungal particles comprise one or more β-glucans.

47. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles comprise at least one hydrophobin.

48. The colloidal composition of any one of the preceding claims, wherein the filamentous fungal particles comprise at least one ice-structuring protein.

49. A particle-stabilized colloidal food product, comprising:

a dispersed phase;

a dispersion medium; and

filamentous fungal particles,

wherein at least a portion of the filamentous fungal particles are positioned at an interface between the dispersed phase and the dispersion medium to stabilize the colloidal food product.

50. The colloidal food product of claim 49, wherein the dispersed phase comprises an oil and the dispersion medium comprises water.

51. A method for preparing the colloidal food product of claim 49 or claim 50.

52. A Pickering emulsion, comprising:

a dispersed phase;

a continuous phase; and

filamentous fungal particles,

wherein at least a portion of the filamentous fungal particles adsorb onto an interface between the continuous phase and the dispersed phase to stabilize the emulsion by the Pickering phenomenon.

53. A method for preparing the Pickering emulsion of claim 52, comprising:

combining a dispersed phase material, a continuous phase, and filamentous fungal particles to form a mixture; and

agitating the mixture to form the Pickering emulsion.

54. A colloid, comprising:

a first phase;

a second phase; and

filamentous fungal particles,

the colloid having a zeta potential magnitude, at a temperature of 20°C and a pH of between 5 and 7, of at least about 10 mV, at least about 15 mV, or at least about 20 mV.

55. A method for preparing an ice cream analog food product, comprising:

(a) heating a first mixture to a first temperature, the first mixture comprising a fungal dispersion, the fungal dispersion comprising particles of filamentous fungus dispersed in water;

(b) adding at least one monosaccharide, disaccharide, or polysaccharide to the first mixture to form a fungus- and saccharide-containing mixture;

(c) heating the fungus- and saccharide-containing mixture to a second temperature;

(d) heating the fungus- and saccharide-containing mixture to a third temperature and maintaining this temperature for at least about two minutes to form an emulsion;

(e) cooling the emulsion to a fourth temperature;

(f) churning the emulsion to incorporate air into the emulsion; and

(g) freezing the emulsion to a fifth temperature.

56. An ice cream analog food product, made by the method of claim 55.

57. A colloidal composition, comprising:

an oil phase;

an aqueous phase; and

filamentous fungal particles that stabilize the colloidal composition,

wherein the oil phase is a dispersion medium and the aqueous phase is a liquid dispersed phase, such that the colloidal composition is a water-in-oil colloid.

58. A particle-stabilized colloidal food product, comprising:

a dispersed phase;

a dispersion medium; and

filamentous fungal particles,

wherein:

at least a portion of the filamentous fungal particles are positioned at an interface between the dispersed phase and the dispersion medium to stabilize the colloidal food product; and

the particle-stabilized colloidal food product is a gel.