We claim:

1. A method of encapsulating a composition, comprising the steps of:
   (a) forming a bicontinuous or Winsor type III microemulsion by combining an emulsifier, a solvent, and a co-emulsifier and stirring or agitating the combination;
   (b) adding the composition to the microemulsion and mixing to substantial homogeneity; and
   (c) optionally blending the microemulsion of step (b) with a carrier.

2. A method of encapsulating a composition, comprising the steps of:
   (a) mixing the composition with a co-emulsifier by combining;
   (b) adding an emulsifier, a solvent, and a co-emulsifier to form a bicontinuous or Winsor type III microemulsion; and
   (c) optionally blending the microemulsion of step (b) with a carrier.

3. A method of claim 1, wherein the emulsifier is polysorbate 80, the solvent is selected from the group consisting of glycerol and limonene, and the co-emulsifier is ethanol.

4. A method of claim 1, further comprising water added in either step (a) or step (b) or both.

5. A method of claim 1, wherein the composition is either oil-soluble or water-soluble.

6. A method of claim 1, wherein the composition is selected from the group consisting of organic acids, surfactants, flavors, colors, antimicrobials, micronutrients, medications, eye dye and nutraceuticals.

7. A bicontinuous microemulsion to enhance encapsulation and stability of amphiphilic or lipophilic oil-soluble or hydrophilic water-soluble materials into feed and food compositions, comprising:
   (a) an oil phase comprising said amphiphilic or lipophilic oil-soluble material;

(b) an aqueous phase comprising said amphiphilic or hydrophilic water-soluble material; and

(c) a food grade emulsifier system comprising

(i) an ionic or non-ionic or zwitterionic emulsifier, and

(ii) a co-emulsifier; and

(d) wherein said oil phase is dispersed as particles having an average diameter of below 1μm, within said aqueous phase; or

(e) wherein said aqueous phase is dispersed as particles or continuous phase having an average diameter of below 1μm, within said oil phase.

8. The bicontinuous microemulsion according to claim 7, wherein the aqueous phase comprises from about 10% to about 90% of the total, the balance being oil phase and food grade emulsifier system, or wherein the oil phase comprises from about 10% to about 90% of the total, the balance being aqueous phase and food grade emulsifier system.

9. The bicontinuous microemulsion according to claim 7, wherein the aqueous or oil phase contains dissolved materials selected from colorants, vitamins, juices, antioxidants, extracts of natural components, medicaments, simple phenols, polyphenols, bioflavonoids, dairy products, proteins (including enzymes), peptides, amino acids, salts, sugars, sweeteners, flavors, flavor precursors, nutrients, minerals, acids and seasonings, and mixtures thereof.

10. The bicontinuous microemulsion according to claim 7, wherein the emulsifier is selected from the group consisting of glycerol ester of fatty acids, monoglycerides, diglycerides, ethoxylated monoglycerides, polyglycerol ester of fatty acids, lecithin, glycerol ester of fatty acids, sorbitan esters of fatty acids, sucrose esters of fatty acids, and mixtures thereof.

11. The bicontinuous microemulsion according to claim 7, wherein the co-emulsifier is a water miscible alcohol emulsifying agent selected from the group consisting of ethanol, propanol, propylene glycol, glycerol and mixtures thereof.

12. The bicontinuous microemulsion according to claim 7, wherein the oil is selected from the group consisting of limonene, vegetable oils, animal oils, polyol polyesters and mixtures thereof.

CLAIMS

1. A method of encapsulating a carotenoid in a bicontinous microemulsion nanostructure for administration to an animal, comprising the steps of:

(a) forming a bicontinuous or Winsor type III microemulsion by combining an emulsifier, a solvent, and a co-emulsifier and stirring or agitating the combination;

(b) adding the carotenoid to the microemulsion and mixing the resulting composition to substantial homogeneity to obtain an encapsulated carotenoid that is stable against release of the composition for at least one month; and

(c) blending the microemulsion of step (b) with a dry carrier to create a free-flowing powder.

2. A method of encapsulating a carotenoid for administration to an animal, comprising the steps of:

(a) mixing the carotenoid with a co-emulsifier by combining;

(b) adding an emulsifier, a solvent, and a co-emulsifier to form a bicontinuous or Winsor type III microemulsion; and

(c) blending the microemulsion of step (b) with a carrier to form a free-flowing powder.

3. A method of claim 1, wherein the emulsifier is polysorbate 80, the solvent is selected from the group consisting of glycerol and limonene, and the co-emulsifier is ethanol.

4. A method of claim 1, further comprising water added in either step (a) or step (b) or both.

5. A method of claim 1, wherein the carotenoid is selected from the group consisting of lutein, capsanthin, zeaxanthin and carotene.

6. A bicontinuous microemulsion to enhance encapsulation and stability of carotenoids into animal feed and food compositions as a free-flowing powder, comprising:

(a) a carotenoid;

(b) an oil phase comprising an amphiphilic or lipophilic oil-soluble material;

(c) an aqueous phase comprising an amphiphilic or hydrophilic water-soluble material; and

(d) a food grade emulsifier system comprising

(i) an ionic or non-ionic or zwitterionic emulsifier, and

(ii) a co-emulsifier; and

(e) wherein said oil phase is dispersed as particles having an average diameter of below 1μm, within said aqueous phase; or

(f) wherein said aqueous phase is dispersed as particles or continuous phase having an average diameter of below 1μm, within said oil phase.

7. The bicontinuous microemulsion according to claim 6, wherein the aqueous phase comprises from about 10% to about 90% of the total, the balance being oil phase and food grade emulsifier system, or wherein the oil phase comprises from about 10% to about 90% of the total, the balance being aqueous phase and food grade emulsifier system.

8. The bicontinuous microemulsion according to claim 6, wherein the aqueous or oil phase contains dissolved materials selected from colorants, vitamins, juices, antioxidants, extracts of natural components, medicaments, simple phenols, polyphenols, bioflavonoids, dairy products, proteins (including enzymes), peptides, amino acids, salts, sugars, sweeteners, flavors, flavor precursors, nutrients, minerals, acids and seasonings, and mixtures thereof.

9. The bicontinuous microemulsion according to claim 6, wherein the emulsifier is selected from the group consisting of glycerol ester of fatty acids, monoglycerides, diglycerides, ethoxylated monoglycerides, polyglycerol ester of fatty acids, lecithin, glycerol ester of fatty acids, sorbitan esters of fatty acids, sucrose esters of fatty acids, and mixtures thereof.

10. The bicontinuous microemulsion according to claim 6, wherein the co-emulsifier is a water miscible alcohol emulsifying agent selected from the group consisting of ethanol, propanol, propylene glycol, glycerol and mixtures thereof.

11. The bicontinuous microemulsion according to claim 6, wherein the oil is selected from the group consisting of limonene, vegetable oils, animal oils, polyol polyesters and mixtures thereof.