Claims:

1. A composition comprising iron, buffering agent and a carrier comprising denatured protein, wherein the composition releases at least 71% of the total load of iron as ferrous iron over the course of one hour in simulated gastric fluid at pH 1.6, and wherein the composition when placed in simulated gastric fluid at pH 1.6 buffers the pH to at least 2 after 30 minutes, and wherein the composition when placed in a simulated intestinal fluid at pH 6.6 buffers the solution to at most pH 5.5 after 30 minutes, and wherein the composition, when administered orally to a human, has a relative trough to peak ratio of serum iron over 2 hours of at least 120% that of an equimolar dose of an orally administered immediate release ferrous sulfate composition;

wherein the composition has a total iron content of 2.5% to 50% by weight, the denatured protein is present in an amount from 5% to 80% by weight, the buffering agent is present in an amount of 6% to 20% by weight and comprises acetate and acetic acid;

wherein the denatured protein forms a matrix and the iron is trapped in the matrix;

wherein the composition is in the form of microbeads; and

wherein the water content of the composition is less than 10% by weight.

2. A composition comprising iron and denatured protein core, an iron salt and a pH modifying agent wherein the composition releases at least 71% of its total load of iron in acidic gastric conditions and at least 50 % of its pH modifier and wherein the composition, when administered orally to a human, has a relative trough to peak Ratio of serum iron over 2 hours of at least 120% that of an equimolar dose of an orally administered ferrous sulfate composition

wherein the composition has a total iron content of 2.5% to 50% by weight, the denatured protein is present in an amount from 5% to 80% by weight, the pH modifying agent is present in an amount of 6% to 20% by weight and comprises acetate and acetic acid;

wherein the denatured protein forms a matrix and the iron is trapped in the matrix;

wherein the composition is in the form of microbeads; and

wherein the water content of the composition is less than 10% by weight.

3. The composition according to any preceding claim which releases at least 50% for example at least 71%, for example at least 75%, such as at least 80 % of its buffering agent over the course of 30 minutes in simulated gastric fluid at pH 1.6.

4. The composition according to any preceding claim, which has an iron: protein ratio, by weight, of 1:50 to 5:1, for example 1:40 to 1:3.

5. The composition according to any preceding claim which has a buffering agent: protein ratio, by weight, of 1:50 to 5:1, for example 1:40 to 1:3.

6. The composition according to any preceding claim which has a buffering agent: iron ratio, by weight, of 1:10 to 10:1, for example 1:3 to 3:1.

7. The composition according to any preceding claim which is substantially amorphous.

8. The composition according to any preceding claim wherein the denatured protein is at least 50%, 80% or 90% denatured.

9. The composition according to any preceding claim wherein the denatured protein may contain at least 50%, 80% or 90% denatured beta lactoglobulin.

10. The composition according to any preceding claim wherein the denatured protein has been subjected to a divalent metal iron removal process.

11. The composition according to any preceding claim wherein the composition has a core which comprises a denatured aggregated protein matrix.

12. The composition according to any preceding claim wherein the composition has a core and a skin and the skin comprises a denatured aggregated protein and optionally, the skin further comprises a gelling agent.

13. The composition according to any preceding claim wherein the composition has a core and the core comprises a denatured aggregated protein matrix.

14. The composition according to any preceding claim wherein the denatured protein contains, excluding iron, less than 500 mg divalent metal ions per 100g protein, such as less than 300mg divalent metal ions per 100g protein, for example 100mg divalent metal ions per 100g protein.

15. The composition according to any preceding claim wherein when administered orally to a human, has a Trough To Peak ratio of serum iron over 2 hours of at least 130%, 140% ,150%, 160% or 175% that of an equimolar dose of an orally administered immediate release ferrous sulfate composition.

16. The composition according to any preceding claim wherein when administered orally to a human, may have a trough to peak ratio of serum iron over 2 hours of at least 130%, 140% or 150% that of an equimolar dose of an orally administered immediate release ferrous sulfate composition.

17. The composition according to any preceding claim wherein the composition may release more than 70% for example more than 71 wt% of the total iron content as ferrous iron over the course of 15 minutes, or 30 minutes, or 45 minutes, or 60 minutes in simulated gastric fluid at pH 1.6; the composition may release more than 75 wt% of the total iron content as ferrous iron over the course of 15 minutes, or 30 minutes, or 45 minutes, or 60 minutes in simulated gastric fluid at pH 1.6; the composition may release more than 80 wt% of the total iron content as ferrous iron over the course of 15 minutes, or 30 minutes, or 45 minutes, or 60 minutes in simulated gastric fluid at pH 1.6; the composition may release more than 85 wt% of the total iron content as ferrous iron over the course of 15 minutes, or 30 minutes, or 45 minutes, or 60 minutes in simulated gastric fluid at pH 1.6; the composition may release more than 90 wt% of the total iron content as ferrous iron over the course of 15 minutes, or 30 minutes, or 45 minutes, or 60 minutes in simulated gastric fluid at pH 1.6; the composition may release more than 10 wt%, 20 wt%, 30 wt%, 40wt%, 50wt% or 60wt% of the total iron content over the course of 15 minutes, or 30 minutes, or 45 minutes, or 60 minutes in simulated intestinal fluid at pH 6.6; and/or the composition may release more than 80 wt% of the total iron content over the course of 15 minutes, or 30 minutes, or 45 minutes, or 60 minutes in simulated intestinal fluid at pH 6.6.

18. The composition according to any preceding claim wherein the composition further comprises a stabilizer, such as ascorbic acid, ascorbates, for example a stabilizer selected from L-ascorbic acid, sodium L-ascorbate, calcium L-ascorbate, ascorbyl palmitate (palmitoyl L-ascorbic), erythorbic acid (D-isoascorbic acid), and sodium erythorbate (sodium D-isoascorbate) or combinations thereof.

19. The composition according to any preceding claim wherein the iron : protein ratio is 1:20 to 1:3, for example 1:40 to 1:3, such as 1:15 to 1 to 4 such as 1:6 to 1:12.

20. The composition according to any preceding claim wherein the composition consists of particles having an average particle size of 2000 microns or less, 1000 microns or less, 600 microns or less,

500 microns or less, or 300 microns or less, or 100 microns or less or 80 microns or less or 60 microns or less, or 40 microns or less or 20 microns or less.

21. The composition according to any preceding claim wherein the iron in the composition comprises at least 10%, 25%, 50%, 75%, 90%, 95%, 98% or 99% ferrous iron.

22. The composition according to any preceding claim wherein the composition is stable with respect to ferrous iron content and microbiological burden, for at least 6 months when stored in a sealed container at accelerated storage conditions (40 °C and 75% Relative Humidity).

23. The composition according to any preceding claim wherein the composition is stable with respect to ferrous iron content when stored in a sealed container at ambient conditions for at least 24 months.

24. The composition according to any preceding claim wherein, the denatured protein comprises denatured whey protein, denatured whey protein isolate, denatured beta lactoglobulin, or combinations thereof.

25. The composition according to any preceding claim wherein the composition comprises (as buffering agent or pH modifier) a salt, for example a salt of a short chain fatty acid, such as a salt of a C_2 to C_5 fatty acid.

26. The composition according to any preceding claim wherein the composition comprises (as buffering agent or pH modifier) at least one of phosphoric acid, a salt, including a salt selected from acetates, propionates, butyrates, phosphates, and citrates including a monovalent salt such as a sodium salt.

27. The composition according to any preceding claim wherein the denatured protein contains less than 500mg Calcium per 100g of total protein, 300mg Calcium per 100g of total protein, for example, less than 200mg Calcium per 100g of total protein, for example less than 100mg Calcium per 100g of total protein.

28. The composition according to any preceding claim comprising a core of dehydrated iron protein hydrogel.

29. A composition comprising:

iron; and

a carrier comprising denatured whey protein,

wherein the iron : protein ratio, by weight, is 1:50 to 5:1,

wherein the denatured protein contains, excluding iron, less than 500 mg divalent metal ions per 100g protein, such as less than 300mg divalent metal ions per 100g protein, for example less than 100mg divalent metal ions per 100g protein,

wherein the water content of the composition is less than 10 % by weight,

wherein the carrier comprises a denatured aggregated protein matrix core,

wherein at least 50, 60, or 70 wt% of the iron is ferrous iron,

wherein the composition is coated with a pH modifier comprising sodium acetate and acetic acid,

wherein the composition, when administered orally to a human, has a relative Trough to Peak ratio of serum iron over 2 hours of at least 150% that of an equimolar dose of an orally administered immediate release ferrous sulfate composition;

wherein the composition has a total iron content of 2.5% to 50% by weight, the denatured protein is present in an amount from 5% to 80% by weight, the pH modifier is present in an amount of 6% to 20% by weight;

wherein the iron is trapped in the matrix core;

wherein the composition is in the form of microbeads.

30. A composition for use in a method of increasing the serum iron in a mammal in need thereof, wherein the composition is to be administered to the mammal, the composition comprising

iron; and

a carrier comprising denatured protein,

wherein the iron : protein ratio, by weight, is 1:50 to 1:3,

wherein the composition, when administered orally to a human, has a relative Trough to Peak ratio of serum iron over 2 hours of at least 150% that of an equimolar dose of an orally administered (immediate release) ferrous sulfate composition and optionally,

wherein the denatured protein contains, excluding iron, less than 500 mg divalent metal ions per 100g protein, such as less than 300mg divalent metal ions per 100g protein for example less than 100mg divalent metal ions per 100g protein;

wherein the composition has a total iron content of 2.5% to 50% by weight, the denatured protein is present in an amount from 5% to 80% by weight, the composition further comprises a pH modifying in an amount of 6% to 20% by weight and comprising acetate and acetic acid;

wherein the denatured protein forms a matrix and the iron is trapped in the matrix;

wherein the composition is in the form of microbeads; and

wherein the water content of the composition is less than 10% by weight.

31. A composition comprising a denatured protein, iron and a buffering agent, wherein the composition releases at least 70% for example at least 71% of the total load of iron as ferrous iron over the course of 30 minutes in simulated gastric fluid at pH 1.6, and wherein the composition when placed in simulated gastric fluid at pH 1.6 buffers the pH to at least 2, and wherein the composition when placed in the simulated intestinal fluid at pH 6.6 buffers the solution to at most pH 5.5, and wherein the composition, when administered orally to a human, has a relative Trough To Peak Ratio of serum iron over 2 hours of at least 120% that of an equimolar dose of an orally administered immediate release ferrous sulfate composition;

wherein the composition has a total iron content of 2.5% to 50% by weight, the denatured protein is present in an amount from 5% to 80% by weight, the buffering agent is present in an amount of 6% to 20% by weight and comprises acetate and acetic acid;

wherein the denatured protein forms a matrix and the iron is trapped in the matrix;

wherein the composition is in the form of microbeads; and

wherein the water content of the composition is less than 10% by weight.

32. The composition according to claim 31 further comprising any of the features of Claims 1 to 30.

33. A method for forming the composition of any of the preceding claims, the method comprising the following steps:

a) preparing a curing solution of Ferrous Sulfate, and Sodium Acetate;

b) heating the curing solution heated to 40°C;

c) preparing a denatured protein solution;

d) adding the denatured protein solution to the heated curing solution to form a gel;

e) agitating the gel at a high speed, optionally 15,000 rpm for 2 minutes;

f) curing the gel by agitating at a low speed, optionally 100 rpm for 60 minutes to create a more viscous gel;

g) drying the particles, optionally by heating the gel to 80°C, filtering the hot gel and leaving to dry on a tray at 80°C.