WHAT IS CLAIMED IS :

1. A composition comprising:
   iron; and
   a carrier comprising calcium depleted denatured whey protein,
   wherein the denatured whey protein contains less than 1% calcium (w/w),
   wherein the composition releases less than 50 wt% of the total iron content as ferrous iron over the course of one hour in simulated gastric fluid at pH 1.6 and
   wherein the composition, when administered orally to a human, has a relative bioavailability of at least 120% that of an equimolar dose of an orally administered solution of ferrous sulfate in acidified water.
2. The composition of claim 1, wherein the iron: protein ratio, by weight, is 1:500 to 1:5.
3. The composition of claim 1, wherein the iron: protein ratio, by weight, is 1:100 to 1:5.
4. The composition of any preceding claim, wherein the composition is largely amorphous.
5. The composition of any preceding claim, where in the total iron content is 1% - 2.5% as a dry weight %.
6. The composition of any preceding claim, wherein the denatured protein is at least 50%, 80% or 90% denatured.
7. The composition of any preceding claim, wherein the denatured protein contains at least 50%, 80% or 90% denatured beta lactoglobulin.
8. The composition of any of any preceding claim, wherein the moisture content of the composition is less than 10 % by weight.
9. The composition of any of any preceding claim, wherein the carrier comprises a core and a skin, wherein skin comprises a denatured aggregated protein.
10. The composition of claim 9, wherein the skin further comprises a gelling agent.
11. The composition of claim 9, wherein the core comprises a denatured aggregated protein matrix.
12. The composition of any preceding claim, wherein the denatured protein contains, excluding iron, less than 1% divalent metal ions (w/v).
13. The composition of any preceding claim, wherein the composition, when administered orally to a human, has a relative bioavailability of at least 130%, 140% or 150% that of an equimolar dose of an orally administered solution of ferrous sulfate in acidified water.
14. The composition of any preceding claim, wherein the composition releases less than 50 wt% of the total iron content as ferrous iron over the course of 30 minutes in simulated gastric fluid at pH 1.6.
15. The composition of any preceding claim, wherein the composition releases less than 20 wt% of the total iron content as ferrous iron over the course of 30 minutes in simulated gastric fluid at pH 1.6.

16. The composition of any preceding claim, wherein the composition releases less than 15 wt% of the total iron content as ferrous iron over the course of one hour in simulated gastric fluid at pH 1.6.

17. The composition of any preceding claim, wherein the composition releases more than 10 wt%, 20 wt%, 30 wt% or 40 wt% of the total iron content over the course of one hour in simulated intestinal fluid at pH 6.6.

18. The composition of any preceding claim, wherein the composition releases more than 80 wt% of the total iron content over the course of 2 hours in simulated intestinal fluid at pH 6.6.

19. The composition of any preceding claim, further comprising a stabilizer.

20. The composition of claim 19, wherein the stabilizer comprises ascorbic acid, ascorbate, or a combination thereof.

21. The composition of claim 20, wherein the iron : protein ratio is 1:20 to 1:5.

22. The composition of 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.

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

24. The composition of claim 22, 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 ambient conditions.

25. The composition of any preceding claim, wherein the denatured protein comprises denatured whey protein, denatured whey protein isolate, denatured beta lactoglobulin, or combinations thereof.

26. An edible formulation comprising the composition of any of claims 1-25, wherein the edible formulation is a powder, prenatal vitamin formulation, multivitamin formulation, supplement, chewable supplement, gummy, food, beverage, animal feed, tablet, capsule, or suspension.

27. A composition comprising:

    iron; and

    a carrier comprising calcium depleted denatured whey protein,

    wherein the denatured whey protein contains less than 1% calcium (w/w),

    wherein the iron : protein ratio, by weight, is 1:100 to 1:5,

    wherein the denatured protein contains, excluding iron, less than 1% divalent metal ions (w/v),

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

    wherein the carrier comprises a denatured aggregated protein matrix and a denatured aggregated protein skin,

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

wherein the composition releases less than 20% of the total iron content as ferrous iron over the course of 30 minutes in simulated gastric fluid at pH 1.6, and
wherein the composition, when administered orally to a human, has a relative bioavailability at least 150% that of an equimolar dose of an orally administered solution of ferrous sulfate in acidified water.

28. A composition comprising:
iron; and
a carrier comprising calcium depleted denatured whey protein,
wherein the denatured whey protein contains less than 1% calcium (w/w),
wherein the iron : protein ratio, by weight, is 1:100 to 1:5,
wherein the composition releases less than 50% of the total iron content as ferrous iron over the course of one hour in simulated gastric fluid at pH 1.6,
wherein the composition, when administered orally to a human, has a relative bioavailability at least 120% that of an equimolar dose of an orally administered solution of ferrous sulfate in acidified water and optionally,
wherein the denatured protein contains, excluding iron, less than 1% divalent metal ions (w/v);
for use to increase the serum iron in a mammal in need thereof.

29. A composition comprising:
iron; and
a carrier comprising calcium depleted denatured whey protein,
wherein the denatured whey protein contains less than 1% calcium (w/w),
wherein the iron : protein ratio, by weight, is 1:1000 to 1:5,
wherein the iron content is 2.5% to 10% by weight of the protein,
wherein the composition releases less than 70 wt% of the total iron content as ferrous iron over the course of one hour in simulated gastric fluid at pH 1.6,
wherein the composition, when administered orally, has a relative bioavailability at least 120% that of an equimolar dose of an orally administered solution of ferrous sulfate in acidified water and optionally,
wherein the denatured protein contains, excluding iron, less than 1% divalent metal ions (w/v).

30. The composition of claim 29, wherein the denatured protein is at least 50%, 80% or 90% denatured.

31. The composition of claim 29 or 30, wherein the denatured protein contains at least 50%, 80% or 90% denatured beta lactoglobulin.

32. The composition of any of claims 29 - 31, wherein the moisture content of the composition is less than 10 % by weight.

33. The composition of any of claims 29 - 32, wherein the carrier comprises a core and a denatured aggregated protein skin.

34. The composition of claim 33, wherein the core comprises a denatured aggregated protein matrix.

35. The composition of any of claims 29 - 34, wherein the composition, when administered orally to a human, has a relative bioavailability at least 130%, 140% or 150% that of an equimolar dose of an orally administered solution of ferrous sulfate in acidified water.

36. The composition of any of claims 29 - 35, wherein the composition releases less than 60 wt% of the total iron content over the course of 2 hours in simulated intestinal fluid at pH 6.6.

37. The composition of any of claims 29 - 36, further comprising a stabilizer.

38. The composition of any of claims 29 - 37, 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.

39. The composition of any of claims 29 - 38, wherein the iron in the composition comprises at least 10%, 25%, 50%, 75%, 90%, 95%, 98% or 99% ferrous iron.

40. The composition of claim 38, 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 ambient conditions.

41. The composition of any of claims 29 - 40, wherein the denatured protein comprises whey protein, whey protein isolate, beta lactoglobulin, or combinations thereof.