WHAT IS CLAIMED IS:

1. A process for obtaining high purity trans-beta-cryptoxanthin from plant material comprising:

(a) saponifying an oleoresin of plant material comprising xanthophylls esters, washing with acidified water, and drying to obtain a carotenoid mass;

(b) stirring the carotenoid mass with a non-polar solvent, filtering, and concentrating to obtain a mass;

(c) subjecting the mass to silica gel chromatography and eluting with a non-polar solvent to remove beta-carotene;

(d) eluting the column with a non-polar solvent comprising about 2% polar solvent and concentrating the eluant to obtain a concentrate comprising about 10% by weight total carotenoids, of which trans-beta-cryptoxanthin comprises about 75% by weight;

(e) stirring the concentrate with ethanol, cooling, and filtering to obtain a semi-purified crystalline mass comprising about 40% by weight total xanthophylls, of which trans-beta-cryptoxanthin comprises about 98% by weight; and

(f) washing the crystalline mass with hexane comprising about 20% ethyl acetate, cooling, and filtering to obtain a high purity crystalline material comprising about 80% by weight total xanthophylls, of which trans-beta-cryptoxanthin comprises about 98.5% by weight.

2. A process for the preparation of a beta-cryptoxanthin enriched concentrate from plant material comprising about 10-80% by weight total xanthophylls, of which about 75-98% by weight is trans-beta-cryptoxanthin, the process comprising:

(a) mixing an oleoresin of plant material comprising xanthophylls esters with an aliphatic alcoholic solvent;

(b) saponifying the xanthophylls esters present in the oleoresin with an alkali at an elevated temperature;

(c) removing the aliphatic alcoholic solvent followed by addition of water to obtain a diluted resultant mixture;

(d) adding a diluted organic acid to the diluted resultant mixture to form a water layer and a precipitated xanthophylls mass;

(e) removing the water layer and washing the precipitated xanthophylls mass with a polar solvent;

(f) drying the precipitated xanthophylls mass to obtain a crude xanthophylls mass;

(g) washing the crude xanthophylls mass with a non-polar solvent and concentrating the non-polar solvent washings to obtain a concentrated crude xanthophylls mass;

(h) transferring the concentrated crude xanthophylls mass to a silica gel column and washing with a non-polar solvent;

(i) eluting the column with a mixture of non-polar and polar solvent and concentrating the elutions to obtain a trans-beta-cryptoxanthin-rich xanthophylls concentrate;

(j) admixing the trans-beta-cryptoxanthin-rich xanthophylls concentrate with an aliphatic alcohol and then cooling; and

(k) filtering and drying the trans-beta-cryptoxanthin-rich xanthophylls concentrate to obtain a purified trans-beta-cryptoxanthin concentrate.

3. The process of claim 2, wherein the xanthophylls esters in the oleoresin of plant material in step (a) are present at about 6-8% by weight.

4. The process of claim 2 or 3, wherein the aliphatic alcohol of step (a) or (j) is selected from the group consisting of ethanol, methanol, isopropyl alcohol, and mixtures thereof.

5. The process of any one of claims 2-4, wherein the ratio of oleoresin to alcohol in step (a) ranges from about 1:0.25 to about 1:1 weight/volume.

6. The process of any one of claims 2-5, wherein the alkali of step (b) is selected from the group consisting of sodium hydroxide, potassium hydroxide, and mixtures thereof.

7. The process of any one of claims 2-6, wherein the ratio of oleoresin to alkali in step (b) ranges from about 1:0.25 to 1:0.5 weight/weight.

8. The process of any one of claims 2-7, wherein the elevated temperature of step (b) ranges from about 75 to about 85 °C.

9. The process of any one of claims 2-8, wherein the addition of water in step (c) is about 5 times that of the oleoresin (weight/weight).

10. The process of any one of claims 2-9, wherein the diluted organic acid of step (d) is acetic acid or phosphoric acid.

11. The process of any one of claims 2-10, wherein the diluted organic acid of step (d) is a solution of about 20% to about 50% organic acid.

12. The process of any one of claims 2-11, wherein the polar solvent of step (e) is water.

13. The process of any one of claims 2-12, wherein the non-polar solvent of steps (g), (h), and (i) is selected from the group consisting of a hexane, a pentane, a heptane, and mixtures thereof.

14. The process of any one of claims 2-13, wherein the crude xanthophylls mass and non-polar solvent of step (g) are in a ratio of about 1:10 to 1:15 weight/volume.

15. The process of any one of claims 2-14, wherein the concentrated crude xanthophylls mass of step (g) comprises beta-carotene, trans-beta-cryptoxanthin, trans-capsanthin, zeaxanthin, and trace amounts of other carotenoids.

16. The process of any one of claims 2-15, wherein the concentrated crude xanthophylls mass and the non-polar solvent of step (h) are in a ratio of about 1:5 to 1:8 weight/volume.

17. The process of any one of claims 2-16, wherein a carotene concentrate is obtained by distilling the non-polar solvent washing of step (h).

18. The process of claim 17, wherein the carotene concentrate is beta-carotene.

19. The process of any one of claims 2-18, wherein the polar solvent of step (i) is selected from the group consisting of a propanone, a pentanone, and mixtures thereof.

20. The process of any one of claims 2-19, wherein the non-polar solvent and polar solvent of step (i) are in a ratio of about 95:5 to about 98:2.

21. The process of any one of claims 2-20, wherein the trans-beta-cryptoxanthin-rich xanthophylls concentrate of step (i) comprises at least about 10% by weight of total xanthophylls, of which trans-beta-cryptoxanthin content is at least about 75% by weight.

22. The process of any one of claims 2-21, wherein the cooling in step (j) is performed at a temperature of about 10 °C.

23. The process of any one of claims 2-22, wherein the purified trans-beta-cryptoxanthin concentrate of step (k) comprises at least about 40% by weight of total xanthophylls, of which trans-beta-cryptoxanthin content is at least about 90% by weight.

24. The process of any one of claims 2-23, further comprising a step (l): washing the purified trans-beta-cryptoxanthin concentrate with a mixture of non-polar and ester solvent and cooling for precipitation to obtain high purity trans-beta-cryptoxanthin crystals.

25. The process of claim 24, wherein the high purity trans-beta-cryptoxanthin crystals of step (l) comprises at least about 80% by weight of total xanthophylls, of which trans-beta-cryptoxanthin content is at least about 98% by weight.

26. The process of claim 24 or 25, wherein the ester solvent of step (l) is ethyl acetate and the non-polar solvent of step (l) is hexane.

27. The process of any one of claims 24-26, wherein the non-polar solvent and ester solvent of step (l) are in a ratio of about 80:20 to about 90:10.

28. The process of any one of claims 24-27, wherein the cooling in step (l) is performed at temperature of about -10 °C.

29. The process of any one of claims 2-28, wherein the total xanthophylls comprise by-products selected from zeaxanthin, trans-capsanthin, beta-carotene, trace amounts of other carotenoids, and any combinations thereof.

30. The process of any one of claims 1-29, wherein the plant material is selected from the group consisting of fruits, vegetables, and mixtures thereof.

31. The process of claim 30, wherein the plant material is from a capsicum.

32. A beta-cryptoxanthin concentrate obtained by the processes of any one of claims 2-31.

33. A process for the preparation of a beta-cryptoxanthin enriched concentrate from plant material comprising at least about 80% by weight total xanthophylls, of which at least about 98% by weight is trans-beta-cryptoxanthin, the process comprising:

(a) mixing an oleoresin of plant material comprising xanthophylls esters with ethanol, wherein the ratio of oleoresin to ethanol is about 1:1 weight/volume;

(b) saponifying the xanthophylls esters present in the oleoresin with potassium hydroxide without addition of water, wherein the ratio of oleoresin to potassium hydroxide is about 1:0.25 weight/weight;

(c) applying heat to the oleoresin to elevate the temperature up to reflux at about 80-85 °C;

(d) agitating the oleoresin for about 3 to 5 hours at about 80-85 °C;

(e) evaporating the ethanol under vacuum followed by addition of water at about 5 times that of the oleoresin (weight/weight) to obtain a diluted resultant mixture and agitating for about 1 hour;

(f) neutralizing the diluted resultant mixture with about 25% acetic acid to form a water layer and a precipitated xanthophylls mass;

(g) separating the water layer from the precipitated xanthophylls mass and washing the mass with water to remove soaps and other polar soluble materials;

(h) drying the precipitated xanthophylls mass under vacuum to obtain a crude xanthophylls mass;

(i) washing the crude xanthophylls mass with about 1:10 hexane (weight/volume) and concentrating the hexane washings to obtain a concentrated crude xanthophylls mass;

(j) transferring the concentrated crude xanthophylls mass to a silica gel column at a ratio of about 1:5 (weight/weight) and eluting with hexane to obtain a carotene fraction;

(k) washing the column with about 98:2 hexane to acetone and concentrating the washings to obtain a trans-beta-cryptoxanthin-rich xanthophylls concentrate;

(l) admixing the trans-beta-cryptoxanthin-rich xanthophylls concentrate with about 1:2 ethanol under stirring and then cooling at about 10 °C for about 8 hours;

(m) filtering and drying the trans-beta-cryptoxanthin-rich xanthophylls concentrate under vacuum to obtain a purified trans-beta-cryptoxanthin concentrate; and

(n) washing the purified trans-beta-cryptoxanthin concentrate with about 80:20 hexane:ethylacetate and cooling to about -10 °C for about 18 hours for precipitation to obtain high purity trans-beta-cryptoxanthin crystals.

34. A beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

35. The beta-cryptoxanthin concentrate of claim 34, wherein said concentrate comprises about 10-80% by weight total xanthophylls, of which about 75-98% by weight is trans-beta-cryptoxanthin.

36. The beta-cryptoxanthin concentrate of claim 34, wherein said concentrate comprises at least about 40% by weight total xanthophylls, of which at least about 90% by weight is trans-beta-cryptoxanthin.

37. The beta-cryptoxanthin concentrate of claim 34, wherein said concentrate comprises at least about 80% by weight total xanthophylls, of which at least about 98% by weight is trans-beta-cryptoxanthin.

38. The beta-cryptoxanthin concentrate of any one of claims 34-37, wherein the plant material is selected from the group consisting of fruits, vegetables, and mixtures thereof.

39. The beta-cryptoxanthin concentrate of claim 38, wherein the plant material is from a capsicum.

40. The beta-cryptoxanthin concentrate of any one of claims 34-39, wherein the concentrate is in a dosage form selected from beadlets, microencapsulated powders, oil suspensions, liquid dispersions, capsules, pellets, ointments, soft gel capsules, tablets, chewable tablets or lotions/liquid preparations.

41. The beta-cryptoxanthin concentrate of any one of claims 34-40, wherein the concentrate is added to a composition.

42. The beta-cryptoxanthin concentrate of any one of claims 34-41, wherein the total xanthophylls comprise by-products selected from the group consisting of zeaxanthin, trans-capsanthin, beta-carotene, trace amounts of other carotenoids and combinations thereof.

43. The beta-cryptoxanthin concentrate of any one of claims 2-41, wherein said concentrate is used in a dietary supplement for protection against the development of rheumatoid, inflammatory arthritis.

44. A composition comprising beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

45. The composition of claim 44, wherein the total xanthophylls comprise by-products selected from zeaxanthin, trans-capsanthin, beta-carotene, trace amounts of other carotenoids such as capsorubin or violaxanthin, and combinations thereof.

46. The composition of either claim 44 or 45, wherein the composition further comprises a pharmaceutically acceptable ingredient or a food grade ingredient.

47. A therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total

xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin, for use in the prophylaxis of the development of rheumatoid, inflammatory arthritis, or bone diseases in a patient in need thereof.

48. A therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin, for use in the strengthening of bone in a patient in need thereof.

49. A therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin, for use in inhibiting bone resorption in a patient in need thereof.

50. The concentrate of any one of claims 47-49, wherein the beta-cryptoxanthin concentrate is to be administered in an amount from about 0.0001 mg/kg to about 10 m/kg.

51. The use of a therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material in the manufacture of a medicament for the prophylaxis of the development of rheumatoid, inflammatory arthritis, or bone diseases in a patient in need thereof, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

52. The use of a therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material in the manufacture of a medicament for the strengthening of bone in a patient in need thereof, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

53. The use of a therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material in the manufacture of a medicament for inhibiting bone resorption in a patient in need thereof, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

54. The use of any one of claims 51-53, wherein the beta-cryptoxanthin concentrate is to be administered in an amount from about 0.0001 mg/kg to about 10 m/kg.

WHAT IS CLAIMED IS:

1. A process for the preparation of a trans-beta-cryptoxanthin enriched concentrate from plant material comprising at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin, the process comprising:

(a) mixing an oleoresin of plant material comprising xanthophylls esters with an aliphatic alcoholic solvent;

(b) saponifying the xanthophylls esters present in the oleoresin with an alkali at an elevated temperature;

(c) removing the aliphatic alcoholic solvent followed by addition of water to obtain a diluted resultant mixture;

(d) adding a diluted organic acid to the diluted resultant mixture to form a water layer and a precipitated xanthophylls mass;

(e) removing the water layer and washing the precipitated xanthophylls mass with a polar solvent;

(f) drying the precipitated xanthophylls mass to obtain a crude xanthophylls mass;

(g) washing the crude xanthophylls mass with a non-polar solvent and concentrating the non-polar solvent washings to obtain a concentrated crude xanthophylls mass;

(h) transferring the concentrated crude xanthophylls mass to a silica gel column and washing with a non-polar solvent;

(i) eluting the column with a mixture of non-polar and polar solvent and concentrating the elutions to obtain a trans-beta-cryptoxanthin-rich xanthophylls concentrate;

(j) admixing the trans-beta-cryptoxanthin-rich xanthophylls concentrate with an aliphatic alcohol and then cooling; and

(k) filtering and drying the trans-beta-cryptoxanthin-rich xanthophylls concentrate to obtain a purified trans-beta-cryptoxanthin concentrate.

2. The process of claim 1, wherein the xanthophylls esters in the oleoresin of plant material in step (a) are present at about 6-8% by weight.

3. The process of claim 1 or 2, wherein the aliphatic alcohol of step (a) or (j) is selected from the group consisting of ethanol, methanol, isopropyl alcohol, and mixtures thereof.

4. The process of any one of claims 1-3, wherein the ratio of oleoresin to alcohol in step (a) ranges from about 1:0.25 to about 1:1 weight/volume.

5. The process of any one of claims 1-4, wherein the alkali of step (b) is selected from the group consisting of sodium hydroxide, potassium hydroxide, and mixtures thereof.

6. The process of any one of claims 1-5, wherein the ratio of oleoresin to alkali in step (b) ranges from about 1:0.25 to 1:0.5 weight/weight.

7. The process of any one of claims 1-6, wherein the elevated temperature of step (b) ranges from about 75 to about 85 °C.

8. The process of any one of claims 1-7, wherein the addition of water in step (c) is about 5 times that of the oleoresin (weight/weight).

9. The process of any one of claims 1-8, wherein the diluted organic acid of step (d) is acetic acid or phosphoric acid.

10. The process of any one of claims 1-9, wherein the diluted organic acid of step (d) is a solution of about 20% to about 50% organic acid.

11. The process of any one of claims 1-10, wherein the polar solvent of step (e) is water.

12. The process of any one of claims 1-11, wherein the non-polar solvent of steps (g), (h), and (i) is selected from the group consisting of a hexane, a pentane, a heptane, and mixtures thereof.

13. The process of any one of claims 1-12, wherein the crude xanthophylls mass and non-polar solvent of step (g) are in a ratio of about 1:10 to 1:15 weight/volume.

14. The process of any one of claims 1-13, wherein the concentrated crude xanthophylls mass of step (g) comprises beta-carotene, trans-beta-cryptoxanthin, trans-capsanthin, zeaxanthin, and trace amounts of other carotenoids.

15. The process of any one of claims 1-14, wherein the concentrated crude xanthophylls mass and the non-polar solvent of step (h) are in a ratio of about 1:5 to 1:8 weight/volume.

16. The process of any one of claims 1-15, wherein a carotene concentrate is obtained by distilling the non-polar solvent washing of step (h).

17. The process of claim 16, wherein the carotene concentrate is beta-carotene.

18. The process of any one of claims 1-17, wherein the polar solvent of step (i) is selected from the group consisting of a propanone, a pentanone, and mixtures thereof.

19. The process of any one of claims 1-18, wherein the non-polar solvent and polar solvent of step (i) are in a ratio of about 95:5 to about 98:2.

20. The process of any one of claims 1-19, wherein the trans-beta-cryptoxanthin-rich xanthophylls concentrate of step (i) comprises at least about 10% by weight of total xanthophylls, of which trans-beta-cryptoxanthin content is at least about 75% by weight.

21. The process of any one of claims 1-20, wherein the cooling in step (j) is performed at a temperature of about 10 °C.

22. The process of any one of claims 1-21, wherein the purified trans-beta-cryptoxanthin concentrate of step (k) comprises at least about 40% by weight of total xanthophylls, of which trans-beta-cryptoxanthin content is at least about 90% by weight.

23. The process of any one of claims 1-22, further comprising a step (l): washing the purified trans-beta-cryptoxanthin concentrate with a mixture of non-polar and ester solvent and cooling for precipitation to obtain high purity trans-beta-cryptoxanthin crystals.

24. The process of claim 23, wherein the high purity trans-beta-cryptoxanthin crystals of step (l) comprises at least about 80% by weight of total xanthophylls, of which trans-beta-cryptoxanthin content is at least about 98% by weight.

25. The process of claim 23 or 24, wherein the ester solvent of step (l) is ethyl acetate and the non-polar solvent of step (l) is hexane.

26. The process of any one of claims 23-25, wherein the non-polar solvent and ester solvent of step (l) are in a ratio of about 80:20 to about 90:10.

27. The process of any one of claims 23-26, wherein the cooling in step (l) is performed at temperature of about 10 °C.

28. The process of any one of claims 1-27, wherein the total xanthophylls comprise by-products selected from zeaxanthin, trans-capsanthin, beta-carotene, trace amounts of other carotenoids, and any combinations thereof.

29. The process of any one of claims 1-28, wherein the plant material is selected from the group consisting of fruits, vegetables, and mixtures thereof.

30. The process of claim 29, wherein the plant material is from a capsicum.

31. A beta-cryptoxanthin concentrate obtained by the processes of any one of claims 1-30.

32. A process for the preparation of a trans-beta-cryptoxanthin enriched concentrate from plant material comprising at least about 80% by weight total xanthophylls, of which at least about 98% by weight is trans-beta-cryptoxanthin, the process comprising:

(a) mixing an oleoresin of plant material comprising xanthophylls esters with ethanol, wherein the ratio of oleoresin to ethanol is about 1:1 weight/volume;

(b) saponifying the xanthophylls esters present in the oleoresin with potassium hydroxide without addition of water, wherein the ratio of oleoresin to potassium hydroxide is about 1:0.25 weight/weight;

(c) applying heat to the oleoresin to elevate the temperature up to reflux at about 80-85 °C;

(d) agitating the oleoresin for about 3 to 5 hours at about 80-85 °C;

(e) evaporating the ethanol under vacuum followed by addition of water at about 5 times that of the oleoresin (weight/weight) to obtain a diluted resultant mixture and agitating for about 1 hour;

(f) neutralizing the diluted resultant mixture with about 25% acetic acid to form a water layer and a precipitated xanthophylls mass;

(g) separating the water layer from the precipitated xanthophylls mass and washing the mass with water to remove soaps and other polar soluble materials;

(h) drying the precipitated xanthophylls mass under vacuum to obtain a crude xanthophylls mass;

(i) washing the crude xanthophylls mass with about 1:10 hexane (weight/volume) and concentrating the hexane washings to obtain a concentrated crude xanthophylls mass;

(j) transferring the concentrated crude xanthophylls mass to a silica gel column at a ratio of about 1:5 (weight/weight) and eluting with hexane to obtain a carotene fraction;

(k) washing the column with about 98:2 hexane to acetone and concentrating the washings to obtain a trans-beta-cryptoxanthin-rich xanthophylls concentrate;

(l) admixing the trans-beta-cryptoxanthin-rich xanthophylls concentrate with about 1:2 ethanol under stirring and then cooling at about 10 °C for about 8 hours;

(m) filtering and drying the trans-beta-cryptoxanthin-rich xanthophylls concentrate under vacuum to obtain a purified trans-beta-cryptoxanthin concentrate; and

(n) washing the purified trans-beta-cryptoxanthin concentrate with about 80:20 hexane:ethylacetate and cooling to about -10 °C for about 18 hours for precipitation to obtain high purity trans-beta-cryptoxanthin crystals.

33. A beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

34. The beta-cryptoxanthin concentrate of claim 33, wherein said concentrate comprises about 10-80% by weight total xanthophylls, of which about 75-98% by weight is trans-beta-cryptoxanthin.

35. The beta-cryptoxanthin concentrate of claim 33, wherein said concentrate comprises at least about 40% by weight total xanthophylls, of which at least about 90% by weight is trans-beta-cryptoxanthin.

36. The beta-cryptoxanthin concentrate of claim 33, wherein said concentrate comprises at least about 80% by weight total xanthophylls, of which at least about 98% by weight is trans-beta-cryptoxanthin.

37. The beta-cryptoxanthin concentrate of any one of claims 33-36, wherein the plant material is selected from the group consisting of fruits, vegetables, and mixtures thereof.

38. The beta-cryptoxanthin concentrate of claim 37, wherein the plant material is from a capsicum.

39. The beta-cryptoxanthin concentrate of any one of claims 33-38, wherein the concentrate is in a dosage form selected from beadlets, microencapsulated powders, oil suspensions, liquid dispersions, capsules, pellets, ointments, soft gel capsules, tablets, chewable tablets or lotions/liquid preparations.

40. The beta-cryptoxanthin concentrate of any one of claims 33-39, wherein the concentrate is added to a composition.

41. The beta-cryptoxanthin concentrate of any one of claims 33-40, wherein the total xanthophylls comprise by-products selected from the group consisting of zeaxanthin, trans-capsanthin, beta-carotene, trace amounts of other carotenoids and combinations thereof.

42. The beta-cryptoxanthin concentrate of any one of claims 1-40, wherein said concentrate is used in a dietary supplement for protection against the development of rheumatoid, inflammatory arthritis.

43. A composition comprising beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

44. The composition of claim 43, wherein the total xanthophylls comprise by-products selected from zeaxanthin, trans-capsanthin, beta-carotene, trace amounts of other carotenoids such as capsorubin or violaxanthin, and combinations thereof.

45. The composition of either claim 43 or 44, wherein the composition further comprises a pharmaceutically acceptable ingredient or a food grade ingredient.

46. A therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin, for use in the prophylaxis of the development of rheumatoid, inflammatory arthritis, or bone diseases in a patient in need thereof.

47. A therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin, for use in the strengthening of bone in a patient in need thereof.

48. A therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material, wherein said concentrate comprises at least about 10% by weight total

xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin, for use in inhibiting bone resorption in a patient in need thereof.

49. The concentrate of any one of claims 46-48, wherein the beta-cryptoxanthin concentrate is to be administered in an amount from about 0.0001 mg/kg to about 10 m/kg.

50. The use of a therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material in the manufacture of a medicament for the prophylaxis of the development of rheumatoid, inflammatory arthritis, or bone diseases in a patient in need thereof, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

51. The use of a therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material in the manufacture of a medicament for the strengthening of bone in a patient in need thereof, wherein said concentrate comprises at least about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

52. The use of a therapeutically effective amount of a beta-cryptoxanthin concentrate derived from plant material in the manufacture of a medicament for inhibiting bone resorption in a patient in need thereof, wherein said concentrate comprises about 10% by weight total xanthophylls, of which at least about 75% by weight is trans-beta-cryptoxanthin.

53. The use of any one of claims 50-52, wherein the beta-cryptoxanthin concentrate is to be administered in an amount from about 0.0001 mg/kg to about 10 m/kg.