Claims

1. A miscible primary composition comprising at least the essential lipophilic and hydrophilic bioactive components of a whole fruit, vegetable and/or plant material, excluding insoluble fibers, in a milk or milk protein-containing carrier, wherein the fruit, vegetable and/or plant material is in the form of vegetables, leaves, flowers, fruits, seeds selected from corn, black rice, cocoa or coffee and other parts of the plant, or a mixture thereof, and wherein the milk is from animal or plant origin.

2. The primary composition according to claim 1, wherein the fruit, vegetable or plant material is a berry such as wolfberry, blueberry, cranberry, white currant, red currant, blackcurrant, mulberry, blackberry, gooseberry, raspberry, sea buckthorn, strawberry, arbutus berry, grapes, or any other flavonoid, polyphenol or carotenoid-rich fruit, vegetables, seeds, flowers or plant materials such as apples, melons, kiwi, cherries, red date, prunes, peaches, persimmons, citrus fruits such as mandarin, orange, tangerine, grapefruit, and chamomile, chrysanthemum, bitter orange, honeysuckle, jasmine and safflower, and tomato, spinach, celery, carrots, pea, kale, parsley, watercress, cabbage, broccoli, lettuce, brussels sprouts, collard greens, turnip greens, fennel, onions, tea, corn, cocoa, coffee, thyme or sweet red pepper.

3. The primary composition according to claim 1, wherein the essential lipophilic and hydrophilic bioactive components are lipids, alkaloids, proteins, carbohydrates, carotenoids, polyphenolic compounds such as flavonoids, vitamins or minerals.

4. The primary composition according to claim 3, in which the flavonoids are flavones such as apigenin, luteolin or diosmetin, flavonols such as quercetin, myricetin,

kaempferol, flavanones such as naringenin, and hesperidin, catechins such as epicatechin and gallocatechin, anthocyanidins such as pelargonidin, malvidin, cyanidin or isoflavones such as genistein, daidzein.

5. The primary composition according to claim 3, in which the carotenoids are carotenes and xanthophylls such as lycopene, carotene, phytofluene, phytoene, canthaxanthin, astaxanthin, beta-cryptoxanthin, capsanthin, lutein, zeaxanthin, or those in the form of fatty acid esters.

6. The primary composition according to any of claims 1 to 5, which is in the form of a powder, gel or liquid.

7. A process for the preparation of a composition according to claim 1, comprising the steps of:

i) mixing and milling at a temperature of from 40 to 95°C the fruit, vegetable and/or plant material in milk or milk protein-containing liquid medium, wherein the fruit, vegetable and/or plant material is in the form of vegetables, leaves, flowers, fruits, seeds and other parts of the plant, or a mixture thereof

ii) separating insoluble fibers to obtain an aqueous suspension

iii) optionally pasteurising the resulting suspension

iv) optionally add synthetic or natural bioactive components during the processing

v) and further optionally drying the suspension to obtain a powder.

8. A process for increasing miscibility or dispersibility in an aqueous system, stability, and bio-availability of bioactive compounds of a fruit, vegetable and/or a plant material using a primary composition according to one of claims 1 to 6 or process according to claim 7.

9. A process according to claim 7 or 8, in which the natural bioactive components are as amino acids, fatty acids, vitamins, minerals, carotenoids, polyphenols, etc.

10. An oral composition comprising the primary composition according to claims 1 to 6, in a foodstuff for oral administration, such as in a nutritional composition, a food supplement, a pet food product, a cosmetic preparation or in a pharmaceutical preparation.

11. An oral composition according to claim 10, which is a nutritional complete formula, a dairy product, a chilled or shelf stable beverage, a mineral or purified water, a liquid drink, a soup, a dietary supplement, a meal replacement, a nutritional bar, a confectionery, a milk or a fermented milk product, a yoghurt, a milk based powder, an enteral nutrition product, an infant formula, an infant nutritional product, a cereal product or a fermented cereal based product, an ice-cream, a chocolate, coffee, a culinary product such as mayonnaise, tomato puree or salad dressings or a pet food.

12. An oral cosmetic or pharmaceutical composition comprising the primary composition according to claims 1 to 6, which is a tablet, a capsule, a pill, a solution, a suspension, a syrup, a dried oral supplement, a wet oral supplement.

13. Use of a primary composition according to claim 1 to 6, for delivering the multi-nutrients of functional ingredients of fruits and plant material with improved bio-availability, miscibility and stability.

14. Use of a primary composition according to claim 1 to 6, for the preparation of an oral, cosmetic or pharmaceutical composition intended for improving skin health, in particular for photo protection of the skin or for protecting skin tissue against ageing.

15. Use of a primary composition according to claim 1 to 6, for the preparation of an oral, topical or pharmaceutical composition intended for eye health.

16. Use of a primary composition according to claim 1 to 6, for the preparation of an oral, cosmetic or pharmaceutical composition intended for stimulating the immune system.

17. Use of a primary composition according to claim 1 to 6, for the preparation of an oral, cosmetic or pharmaceutical composition for preventing or treating cardiovascular diseases or disorders or cancers or diabetes.

Claims

1. A process for the preparation of a primary composition comprising at least the essential lipophilic and hydrophilic bioactive components of a whole fruit, vegetable and/or plant material, excluding insoluble fibers, in a milk or milk protein-containing carrier, comprising the steps of:

i) mixing and milling at a temperature of from 40 to 95°C the fruit, vegetable and/or plant material in milk or milk protein-containing liquid medium, wherein the fruit, vegetable and/or plant material is in the form of vegetables, leaves, flowers, fruits, seeds and other parts of the plant, or a mixture thereof

ii) separating insoluble fibers to obtain an aqueous suspension

iii) optionally pasteurising the resulting suspension

iv) optionally add synthetic or natural bioactive components during the processing

v) and further optionally drying the suspension to obtain a powder.

2. A process for increasing miscibility or dispersibility in an aqueous system, stability, and bio-availability of bioactive compounds of a fruit, vegetable and/or a plant material using a process according to claim 1.

3 A process according to claim 1 or 2, in which the natural bioactive components are as amino acids, fatty acids, vitamins, minerals, carotenoids, polyphenols, etc.

4. A miscible primary composition comprising at least the essential lipophilic and hydrophilic bioactive components of a whole fruit, vegetable and/or plant material, excluding insoluble fibers, in a milk or milk protein-containing carrier obtained by the process of claim 1, wherein the fruit, vegetable and/or plant material is in the form of vegetables, leaves, flowers, fruits, seeds selected from corn, black rice, cocoa or coffee and other parts of the plant, or a mixture thereof, and wherein the milk is from animal or plant origin.

5. The primary composition according to claim 4, wherein the fruit, vegetable or plant material is a berry such as wolfberry, blueberry, cranberry, white currant, red currant, blackcurrant, mulberry, blackberry, gooseberry, raspberry, sea buckthorn, strawberry, arbutus berry, grapes, or any other flavonoid, polyphenol or carotenoid-rich fruit, vegetables, seeds, flowers or plant materials such as apples, melons, kiwi, cherries, red date, prunes, peaches, persimmons, citrus fruits such as mandarin, orange, tangerine, grapefruit, and chamomile, chrysanthemum, bitter orange, honeysuckle, jasmine and safflower, and tomato, spinach, celery, carrots, pea, kale, parsley, watercress, cabbage, broccoli, lettuce, brussels sprouts, collard greens, turnip greens, fennel, onions, tea, corn, cocoa, coffee, thyme or sweet red pepper.

6. The primary composition according to claims 4, wherein the essential lipophilic and hydrophilic bioactive components are lipids, alkaloids, proteins, carbohydrates, carotenoids, polyphenolic compounds such as flavonoids, vitamins or minerals.

7. The primary composition according to claim 6, in which the flavonoids are flavones such as apigenin, luteolin or diosmetin, flavonols such as quercetin, myricetin, kaempferol, flavanones such as naringenin, and hesperidin, catechins such as epicatechin and gallocatechin, anthocyanidins such as pelargonidin, malvidin, cyanidin or isoflavones such as genistein, daidzein.

8. The primary composition according to claim 6, in which the carotenoids are carotenes and xanthophylls such as lycopene, carotene, phytofluene, phytoene, canthaxanthin, astaxanthin, beta-cryptoxanthin, capsanthin, lutein, zeaxanthin, or those in the form of fatty acid esters.

9. The primary composition according to any of claims 4 to 8, which is in the form of a powder, gel or liquid.

10. An oral composition comprising the primary composition according to claims 4 to 9, in a foodstuff for oral administration, such as in a nutritional composition, a food supplement, a pet food product, a cosmetic preparation or in a pharmaceutical preparation.

11. An oral composition according to claim 10, which is a nutritional complete formula, a dairy product, a chilled or shelf stable beverage, a mineral or purified water, a liquid drink, a soup, a dietary supplement, a meal replacement, a nutritional bar, a confectionery, a milk or a fermented milk product, a yoghurt, a milk based powder, an enteral nutrition product, an infant formula, an infant nutritional product, a cereal product or a fermented cereal based product, an ice-cream, a chocolate, coffee, a culinary product such as mayonnaise, tomato puree or salad dressings or a pet food.

12. An oral cosmetic or pharmaceutical composition comprising the primary composition according to claims 4 to 9, which is a tablet, a capsule, a pill, a solution, a suspension, a syrup, a dried oral supplement, a wet oral supplement.

13. Use of a primary composition according to claim 4 to 9, for delivering the multi-nutrients of functional ingredients of fruits and plant material with improved bio-availability, miscibility and stability.

14. Use of a primary composition according to claim 4 to 9, for the preparation of an oral, cosmetic or pharmaceutical composition intended for improving skin health, in particular for photo protection of the skin or for protecting skin tissue against ageing.

15. Use of a primary composition according to claim 4 to 9, for the preparation of an oral, topical or pharmaceutical composition intended for eye health.

16. Use of a primary composition according to claim 4 to 9, for the preparation of an oral, cosmetic or pharmaceutical composition intended for stimulating the immune system.

17. Use of a primary composition according to claim 4 to 9, for the preparation of an oral, cosmetic or pharmaceutical composition for preventing or treating cardiovascular diseases or disorders or cancers or diabetes.