Claims

1. A composition consisting of free amino acids, wherein the free amino acids comprise histidine, serine and lysine, wherein the histidine, serine and lysine together comprise at least about 25% of the total weight of the composition.

2. The composition of claim 1, wherein the histidine, serine and lysine comprise:

at least about 30%, at least about 55% or at least about 65% of the total weight of the composition;

between about 30% and 50% of the total weight of the composition; or

about 32% and 47% of the total weight of the composition.

3. The composition of claim 1 or 2, further comprising at least one of ornithine, glycine and aspartic acid, and/or at least one of glutamine, glutamic acid, leucine and aspartic acid.

4. The composition of claim 3, wherein the composition comprises:

histidine, serine, lysine, ornithine and glycine, wherein these amino acids comprise at least about 40% of the total weight of the composition;

histidine, serine, lysine, ornithine and glycine, wherein these amino acids comprise between about 50% and 80% of the total weight of the composition; or

lysine, glutamine and/or glutamic acid, leucine and aspartic acid, wherein these amino acids comprise at least about 35% of the total weight of the composition.

5. The composition of claim 3, wherein the histidine, serine, lysine, glutamine and/or glutamic acid, leucine and aspartic acid comprise between about 40% and 60% of the total weight of the composition.

6. A composition consisting of free amino acids, wherein the free amino acids comprise:

(i) histidine, serine, ornithine and glycine, wherein the histidine, serine, ornithine and glycine together comprise at least about 30%, at least about 60%, at least about 64%, or at least about 76% of the total weight of the composition;

(ii) histidine, serine, lysine, ornithine, glycine and aspartic acid, wherein the histidine, serine, ornithine and glycine together comprise at least about 80% of the total weight of the composition; or

(iii) histidine, serine, lysine, glutamine and/or glutamic acid, leucine and aspartic acid, wherein the histidine, serine, lysine, glutamine and/or glutamic acid, leucine and aspartic acid together comprise at least about 60% of the total weight of the composition.

7. The composition of any one of claims 1 to 6, wherein the composition is a dietary supplement.

8. The composition of any one of claims 1 to 7, wherein the composition promotes or assists recovery from exercise, illness or injury, assists survival in hot climates, promotes or assists exercise performance, increases haemoglobin and/or haematocrit levels, provides nutritive support for the elderly, or reduces fatigue.

9. The composition of any one of claims 1 to 8, wherein the composition is formulated as a powder, granule, effervescent tablet or other solid, a liquid, a gel or a paste.

10. A beverage, food or feed supplement comprising a composition according to any one of claims 1 to 9.

11. Use of a composition of any one of claims 1 to 9 in the manufacture of a medicament, beverage, food or feed supplement for promoting or assisting exercise performance, or recovery from exercise, illness or injury.

12. Use of a composition of any one of claims 1 to 9 in the manufacture of a medicament, beverage, food or feed supplement for assisting survival in a hot climate.

13. Use of a composition of any one of claims 1 to 9 in the manufacture of a medicament, beverage, food or feed supplement for increasing haemoglobin and/or haematocrit levels in the blood.

14. Use of a composition of any one of claims 1 to 9 in the manufacture of a medicament, beverage, food or feed supplement for providing nutritive support to the elderly.

15. Use of a composition of any one of claims 1 to 9 in the manufacture of a medicament, beverage, food or feed supplement for reducing fatigue.

16. A method for determining a dietary supplement to be administered to a subject, the method comprising:

a) having the subject exercise sufficiently to generate sweat;
b) determining the amino acid composition in said sweat;
c) determining a sweat-facilitated loss of amino acids profile for the subject based on the total amino acid concentration in said sweat, wherein an amino acid concentration of less than about 4,000 μmoles L^{-1} represents a 'low' profile, between about 4,000 and 10,000 μmoles L^{-1} represents an 'intermediate' profile and greater than about 10,000 μmoles L^{-1} represents a 'high' profile;

wherein stratifying the subject as low, intermediate or high sweat-facilitated loss of amino acids profile determines the supplement to be administered, and optionally the quantity or dosage of said supplement to be administered.

17. The method of claim 16, wherein the determination of a sweat-facilitated loss of amino acids profile for the subject further comprises determining individual amino acid concentrations in the sweat, wherein: (i) the 'low' profile is represented by serine, glycine, alanine and histidine comprising at least about 50% of the amino acids in the sweat, with serine being the major amino acid component of the sweat; (ii) the 'intermediate' profile is represented by ornithine, serine, histidine and glycine comprising at least about 70% of the amino acids in the sweat, with ornithine being the major amino acid component of the sweat; and (iii) the 'high' profile is represented by histidine, serine, ornithine and glycine comprising at least about 60% of the amino acids in the sweat, with histidine being the major amino acid component of the sweat.

18. The method of claim 16 or 17, wherein the supplement to be administered comprises a composition of any one of claims 1 to 9 or a beverage, food or feed supplement of claim 10.

19. The method of claim 16 or 17, wherein:

determination of a 'low' sweat-facilitated loss of amino acids profile indicates an amino acid supplement for the subject comprising serine, glycine, alanine and histidine, wherein the serine, glycine, alanine and histidine together comprise at least about 60% of the total weight of the composition;

determination of an ‘intermediate’ sweat-facilitated loss of amino acids profile indicates an amino acid supplement for the subject comprising ornithine, serine, histidine and glycine, wherein the ornithine, serine, histidine and glycine together comprise at least about 64% of the total weight of the composition; and

determination of a ‘high’ sweat-facilitated loss of amino acids profile indicates an amino acid supplement for the subject comprising histidine, serine, ornithine and glycine, wherein the histidine, serine, ornithine and glycine together comprise at least about 76% of the total weight of the composition.

20. A method for determining a requirement for dietary supplementation to be administered to a subject, the method comprising:

a) obtaining a plasma sample from the subject; and
b) determining total amino acid composition in said plasma, wherein an amino acid concentration of less than about 2,800 μmoles L^{-1} represents a ‘low’ operating level of amino acids indicating a need for supplementation.