Claims

1. A method of preparing an extract from edible bird's nest, the method comprising:
   (a) preparing an edible bird's nest (EBN) mixture; and
   (b) contacting the mixture with an extraction solution to bind a molecule in the mixture, wherein the extraction solution comprises at least one binding moiety selected from the group comprising an opsonin binding moiety, a complement protein binding moiety, a lectin binding moiety, a ficolin binding moiety, a collectin binding moiety, and a pentraxin binding moiety.

2. The method according to claim 1, wherein the mixture further comprises seaweed and/or hasma.

3. The method according to any one of claims 1 to 2, wherein the opsonin binding moiety has a molecular weight of 10 kDa to 750 kDa.

4. The method according to any one of claims 1 to 3, wherein the opsonin binding moiety comprises SEQ ID No. 1.

5. The method according to any one of claims 1 to 4, wherein the complement protein binding moiety has a molecular weight of 20 kDa to 7000 kDa.

6. The method according to any one of claims 1 to 5, wherein the complement protein binding moiety comprises SEQ ID No. 2.

7. The method according to any one of claims 1 to 6, wherein the lectin binding moiety has a molecular weight of 20 kDa to 1000 kDa.

8. The method according to any one of claims 1 to 7, wherein the lectin binding moiety comprises SEQ ID No. 3.

9. The method according to any one of claims 1 to 8, wherein the ficolin binding moiety has a molecular weight of 15 kDa to 900 kDa.

10. The method according to any one of claims 1 to 9, wherein the ficolin binding moiety comprises SEQ ID No. 4.

11. The method according to any one of claims 1 to 10, wherein the collectin binding moiety has a molecular weight of 15 kDa to 900 kDa.

12. The method according to any one of claims 1 to 11, wherein the collecting binding moiety comprises SEQ ID No. 5.

13. The method according to any one of claims 1 to 12, wherein the pentraxin binding moiety has a molecular weight of 20 kDa to 1000 kDa.

14. The method according to any one of claims 1 to 13, wherein the pentraxin binding moiety comprises SEQ ID No. 6.

15. The method according to any one of claims 1 to 14, wherein the at least one binding moiety comprises any one selected from:

i) the lectin binding moiety and the opsonin binding moiety;

ii) the lectin binding moiety, the complement protein binding moiety, the opsonin binding moiety, the ficolin binding moiety, the collectin binding moiety, and the pentraxin binding moiety;

iii) the lectin binding moiety, the complement protein binding moiety, and the opsonin binding moiety;

iv) the opsonin binding moiety, and the pentraxin binding moiety;

v) the ficolin binding moiety, the collectin binding moiety, and the pentraxin binding moiety;

vi) the complement protein binding moiety, the ficolin binding moiety, and the collectin binding moiety; and

vii) the lectin binding moiety, the opsonin binding moiety, and the collectin binding moiety.

16. The method according to claim 15, wherein the at least one binding moiety comprises any one selected from:

i) 70 % lectin of the binding moiety and 30 % opsonin of the binding moiety;

ii) 20 % lectin of the binding moiety, 20 % complement protein of the binding moiety, 20 % opsonin of the binding moiety, 20 % pentraxin of the binding moiety, 10 % ficolin of the binding moiety, and 10% collectin of the binding moiety;

iii) 50% complement protein of the binding moiety, 25 % lectin of the binding moiety and 25 % opsonin of the binding moiety;

iv) 50% opsonin of the binding moiety and 50% pentraxin of the binding moiety;

v) 40% ficolin of the binding moiety, 30% collectin of the binding moiety and 30% pentraxin of the binding moiety;

vi) 10% ficolin of the binding moiety, 20% collectin of the binding moiety and 70% complement protein of the binding moiety; and

vii) 70% collectin of the binding moiety, 20% opsonin of the binding moiety and 10% lectin of the binding moiety.

17. The method according to any one of claims 1 to 16, wherein preparing the EBN mixture comprises washing the mixture, and filtering the washed mixture.

18. The method according to claim 17, wherein the washing step comprises exposing the mixture to a first enzyme solution, and soaking the mixture and the first enzyme solution in water.

19. The method according to claim 18, wherein the first enzyme solution comprises a nitrite reductase.

20. The method according to any one of claims 17 to 19, wherein preparing the EBN mixture comprises dipping the EBN mixture in oil prior to the contacting step.

21. The method according to any one of claims 17 to 20, wherein preparing the EBN mixture further comprises sterilising the washed EBN mixture prior to the contacting step.

22. The method according to any one of claims 1 to 21, wherein the contacting step is carried out in the presence of an ascorbic acid and a gold nanoparticle.

23. The method according to any one of claims 1 to 22, wherein the contacting step is carried out at between 4°C to 37°C for at least 20 minutes.

24. The method according to any one of claims 1 to 23, further comprising hydrolysing the bounded molecules with an acidic solution.

25. The method according to any one of claims 1 to 24, further comprising separating the at least one binding moiety and bounded molecules from the mixture; releasing the bounded molecules; and obtaining the released molecules by dialysis.

26. The method according to claim 25, further comprising treating the dialysed molecules with a second enzyme solution comprising a vegetable protease and/or a fruit protease.

27. The method according to claim 26, with at least one of the following conditions:
    (a) a concentration of the second enzyme solution is from about 10 μg/ml to about 100 μg/ml; and
    (b) treating of the isolated molecule with the second enzyme solution is carried out at 45°C for 60 minutes at pH 6.5 to 9.0, and denaturing the second enzyme solution.

28. The method according to any one of claims 1 to 27, further comprising drying the molecules.

~~29. A bird's nest extract obtainable by the method according to any one of claims 1 to 28.~~

~~30. A bird's nest extract comprising a plurality of molecules selected from at least two groups comprising: opsonins, complement proteins, lectins, ficolins, collectins, and pentraxins.~~

~~31. The bird's nest extract according to claim 30, wherein the plurality of molecules is any one selected from:~~

~~i) lectins and opsonins;~~

~~ii) lectins, complement proteins, opsonins, ficolins, collectins, and pentraxins;~~

~~iii) lectins, complement proteins, and opsonins;~~

~~iv) opsonins and pentraxins;~~

~~v) ficolins, collectins, and pentraxins;~~

~~vi) complement proteins, ficolins, and collectins; and~~

~~vii) lectins, opsonins, and collectins.~~

~~32.~~29. A bird's nest extract comprising a plurality of molecules selected from at least two groups comprising: opsonins, complement proteins, lectins, ficolins, collectins, and pentraxins~~The bird's nest extract according to claim 31~~, and wherein the plurality of molecules is any one selected from:

i) 70% of lectins, and 30% of opsonins;

ii) 20% of lectins, 20% of complement proteins, 20% of opsonins, 10% of ficolins, 10% of collectins, and 20% of pentraxins;

iii) 25% of lectins, 50% of complement proteins, and 25% of opsonin;

iv) 50% of opsonins, and 50% of pentraxins;

v) 40% of ficolins, 30% of collectins, and 30% of pentraxins;

vi) 70% of complement proteins, 10% of ficolins, and 20% of collectins; and

vii) 10% of lectins, 20% of opsonins, and 70% of collectins.

~~33. The bird's nest extract according to any one of claims 30 to 32, wherein the molecules are hydrolysed by treatment with an acid solution and/or an enzymatic solution.~~

~~34. The bird's nest extract according to any one of claims 29 to 33, further comprising maltodextrin.~~

~~35.~~30. A composition comprising the bird's nest extract according ~~to any one of c~~laim~~s~~ 29 ~~to 34~~; and a pharmaceutically-acceptable carrier, excipient or diluent.

~~36.~~31.A nutraceutical for use in modulating an immune system of a subject, the nutraceutical comprising the bird's nest extract according to ~~any one of~~ claim~~s~~ 29~~ to 34~~.

~~37.~~32. The bird's nest extract according to ~~any one of~~ claim~~s~~ 29~~ to 34~~ for use in medicine.

~~38.~~33. The bird's nest extract according to claim ~~37~~ 32 for use in inhibiting dengue virus replication, or for use in modulating an immune system of a subject, or for use in inducing interferon regulatory factor 3 phosphorylation.

~~39.~~34. The bird's nest extract according to claim ~~38~~33, wherein modulating the immune system is by inducing production of inflammatory cytokines, or by induction of NF-κB pathway and/or MAPK pathway.

~~40.~~35. Use of the bird's nest extract according to ~~any one of~~ claim~~s~~ 29~~ to 34~~ in the manufacture of a medicament.

~~41. A method for inhibiting dengue virus replication, or modulating the immune system in a subject, or inducing interferon regulatory factor 3 phosphorylation, the method comprises administering the bird's nest extract according to any one of claims 29 to 34.~~