

Claims

1. A method of forming a protein feedstock comprising modified lupin protein that has a decreased thermal stability compared to unmodified lupin protein, the method comprising:
 - providing a solution of lupin protein concentrate, wherein the lupin protein concentrate has a purity > 70%;
 - passing high-intensity ultrasound waves through the solution of lupin concentrate in a manner to form the modified lupin, wherein the solution of lupin protein has a pH approximately 7.0 when subjected to ultrasound waves; and
 - collecting the modified lupin protein.
2. A method as claimed in claim 1, wherein the modified lupin protein has an increased proportion of β -sheets compared to unmodified lupin protein.
3. A method as claimed in claim 1 or 2, wherein the high-intensity ultrasound waves have a frequency of 20kHz and a power ranging from about 5W/cm² to about 50W/cm².
4. A method as claimed in any one of claims 1 to 3, wherein a temperature of the solution of lupin protein is maintained below about 35°C when subjected to high-intensity ultrasound waves.
5. A method as claimed in any one of claims 1 to 4, wherein the solution of lupin protein is subjected to high-intensity ultrasound waves for a period of 60 minutes or less.
6. A method as claimed in any one of claims 1 to 5, wherein the solution of lupin protein has a protein concentration of about 10% (w/w).
7. A method as claimed in any one of claims 1 to 6, further comprising a purification step to purify the solution of lupin protein and/or to purify the modified lupin protein.
8. A method as claimed in any one of claims 1 to 7, wherein after forming the modified lupin protein, the method further comprises:
 - adjusting a pH of a solution comprising the modified lupin protein to an isoelectric point of the modified lupin protein; and
 - heating the solution comprising the modified lupin protein to a temperature to induce aggregation of the modified lupin protein and then cooling the solution comprising the modified lupin protein to form a gel.

9. A method as claimed in claim 8, wherein the isoelectric point is approximately pH 4.5.
10. A method as claimed in claim 8 or 9, wherein the solution comprising the modified lupin protein is heated above 70°C.
11. A method as claimed in any one of claims 8 to 10, wherein the solution comprising the modified lupin protein is maintained at the temperature to induce aggregation of the modified lupin for 60 minutes or less.
12. A method as claimed in any one of claims 8 to 11, wherein, after heating the solution comprising the modified lupin to the temperature to induce aggregation, the solution comprising the modified lupin protein is cooled to room temperature to form the gel.
13. A method as claimed in any one of claims 8 to 12, further comprising forming a solution of modified lupin protein prior to adjusting the pH of the solution comprising the modified lupin protein to the isoelectric point of the modified lupin protein.
14. A method as claimed in any one of claims 1 to 7, wherein the modified lupin protein is collected as a powder.
15. A method as claimed in any one of claims 1 to 14, wherein the modified lupin protein is collected as a modified lupin protein isolate.
16. A protein feedstock comprising modified lupin protein prepared using the method as claimed in any one of claims 1 to 15.
17. A protein feedstock comprising modified lupin protein, the modified lupin protein having a decreased thermal stability compared to unmodified lupin protein, wherein the modified lupin protein is formed by subjecting a concentrate of unmodified lupin protein having a purity > 70% and a pH of approximately 7.0 to high-intensity ultrasound waves.
18. A protein feedstock as claimed in claim 17 wherein the modified lupin protein has an increased proportion of β -sheets compared to unmodified lupin protein.
19. A protein feedstock as claimed in claim 17 or 18, wherein the purity is >70%.

20. A protein feedstock as claimed in any one of claims 17 to 19, wherein the modified lupin protein is an isolate.
21. A protein feedstock as claimed in any one of claims 17 to 20, wherein the protein feedstock is in the form of a powder.
22. A protein feedstock as claimed in any one of claims 17 to 20, wherein the protein feedstock is in the form of a gel.
23. A protein feedstock as claimed in claim 22, wherein the gel has a Bloom number ranging from 20 to 220.
24. A protein feedstock as claimed in claim 22 or 23, wherein the gel has a water holding capacity ranging from 20% to 75%.
25. A protein feedstock as claimed in any one of claims 22 to 24, wherein the gel is a cold-set gel.
26. A composition comprising the protein feedstock as claimed in any one of claims 16 to 25.
27. A food product comprising the protein feedstock as claimed in any one of claims 16 to 25.