

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
5 comprising:
 - providing a solution of lupin protein;
 - passing ultrasound waves through the solution of lupin protein in a manner to form the modified lupin protein; and
 - collecting the modified lupin protein.
- 10 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 ultrasound waves are high-intensity
15 ultrasound waves.
4. A method as claimed in any one of claims 1 to 3, wherein the ultrasound waves have a frequency of 20kHz and a power ranging from about 5W/cm² to about 50W/cm².
- 20 5. A method as claimed in any one of claims 1 to 4, wherein a temperature of the solution of lupin protein is maintained below about 35 °C when subjected to ultrasound waves.
6. A method as claimed in any one of claims 1 to 5, wherein the solution of lupin protein
25 is subjected to ultrasound waves for a period of 60 minutes or less.
7. A method as claimed in any one of claims 1 to 6, wherein the solution of lupin protein has a protein concentration of about 10% (w/w).
- 30 8. A method as claimed in any one of claims 1 to 7, wherein solids that are used to form the solution of lupin protein have a lupin protein content >35%, such as >60%.
9. A method as claimed in any one of claims 1 to 8, wherein the solution of lupin protein has a pH of approximately 7.0 when subjected to ultrasound waves.
- 35 10. A method as claimed in any one of claims 1 to 9, further comprising a purification step to purify the solution of lupin protein and/or to purify the modified lupin protein.

11. A method as claimed in any one of claims 1 to 10, wherein after forming the modified lupin protein, the method further comprises:
adjusting a pH of a solution comprising the modified lupin protein to an
5 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.
- 10 12. A method as claimed in claim 11, wherein the isoelectric point is approximately pH 4.5.
13. A method as claimed in claim 11 or 12, wherein the solution comprising the modified lupin protein is heated above 70 °C.
- 15 14. A method as claimed in any one of claims 11 to 13, 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.
- 20 15. A method as claimed in any one of claims 11 to 14, 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.
- 25 16. A method as claimed in any one of claims 11 to 15, 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.
17. A method as claimed in any one of claims 1 to 10 or claim 16, wherein the modified
30 lupin protein is collected as a powder.
18. A method as claimed in any one of claims 1 to 17, wherein the modified lupin protein is collected as a modified lupin protein concentrate or isolate.
- 35 19. A protein feedstock comprising modified lupin protein prepared using the method as claimed in any one of claims 1 to 18.

20. 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 unmodified lupin protein to ultrasound waves.
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21. A protein feedstock as claimed in claim 20, wherein the modified lupin protein has an increased proportion of β -sheets compared to unmodified lupin protein.
22. A protein feedstock as claimed in claim 20 or 21, having a purity of modified lupin protein > 65%.
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23. A protein feedstock as claimed in claim 22, wherein the purity is >70%.
24. A protein feedstock as claimed in claim 22 or 23, wherein the modified lupin protein is a concentrate or isolate.
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25. A protein feedstock as claimed in any one of claims 20 to 24, wherein the protein feedstock is in the form of a powder.
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26. A protein feedstock as claimed in any one of claims 11 to 24, wherein the protein feedstock is in the form of a gel.
27. A protein feedstock as claimed in claim 26, wherein the gel has a Bloom number ranging from about 20 to about 220.
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28. A protein feedstock as claimed in claim 26 or 27, wherein the gel has a water holding capacity ranging from about 20% to about 75%.
29. A protein feedstock as claimed in any one of claims 26 to 28, wherein the gel is a cold-set gel.
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30. A composition comprising the protein feedstock as claimed in any one of claims 19 to 29.
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31. A food product comprising the protein feedstock as claimed in any one of claims 19 to 29.