

Due to this lack of desirable gel-forming property, little attention has been given to the use of lupin-based protein and the formation the lupin-based gels and instead attention has been focused on protein feedstocks and proteins derived from soybean. Because of this, soybean protein is very well understood and now accounts for a large portion the market for vegetable-based proteins, while lupin protein is poorly studied.

A problem with vegetable-based protein sources is that the required growing conditions of the plants means that they cannot be grown in all geographic locations, which can present food security issues for nations that are net importers of vegetable-based protein. Soybean, for example, requires higher amounts of water when compared to lupin thus lupin, unlike soy is most suited for production in Mediterranean climates.

It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or any other country.

Summary

The disclosure provides in an embodiment 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; passing high-intensity ultrasound waves through the solution of lupin protein to form the modified lupin protein in a manner such that the thermal stability of the modified lupin protein is decreased compared to unmodified lupin protein; and collecting the modified lupin protein.

Disclosed in an embodiment is 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 protein concentrate in a manner to form the modified lupin protein, wherein the solution of lupin protein has a pH of approximately 7.0 when subjected to ultrasound waves; and collecting the modified lupin protein.

The term “protein feedstock” is to be understood to mean a source of protein that is used in one or more further processes to form other products, such as in the food industry. For example, the method may be used to provide a modified lupin protein source that is used to form protein gels that are used, for example, in the manufacture of meat-substitute products or in food texturizing applications.

may be cooled below about 70 °C, such as cooling to room temperature, to form the gel. A maximum temperature reached during heating may be approximately 95 °C. The method may further comprise dehydrating the gel. An embodiment may further comprise 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.

The modified lupin protein may be collected as a powder. The modified lupin protein may be collected as a modified lupin protein isolate

The disclosure also provides a protein feedstock comprising modified lupin protein prepared using the method as set forth above.

The disclosure also provides a protein feedstock comprising modified lupin protein, the modified lupin protein having a decreased thermal stability compared to unmodified lupin protein. 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

The modified lupin protein may have an increased proportion of β -sheets compared to unmodified lupin protein. The protein feedstock may have a purity of modified lupin protein > 35%, such as about >70%. In some embodiments the purity may be >90%. In some embodiments, the modified lupin protein is provided as an isolate. The protein feedstock may be in the form of a powder.

In an embodiment, the protein feedstock is in the form of a gel. The gel may have a Bloom number ranging from about 20 to about 220. The gel may have a water holding capacity ranging from about 20% to about 75%. The gel may be a cold-set gel.

Also disclosed is a composition comprising the protein feedstock as set forth above.

Also disclosed is a food product comprising the protein feedstock as set forth above. The food product may be for humans or animals including aquaculture.

Brief description of figures

Embodiments of the disclosure will now be described by way of example only with reference to the following non-limiting Figures.