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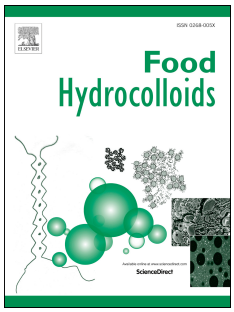

Functionalisation of pea protein by tryptic hydrolysis – characterisation of interfacial and functional properties

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Functionalisation of pea protein by tryptic hydrolysis – characterisation of interfacial and functional properties

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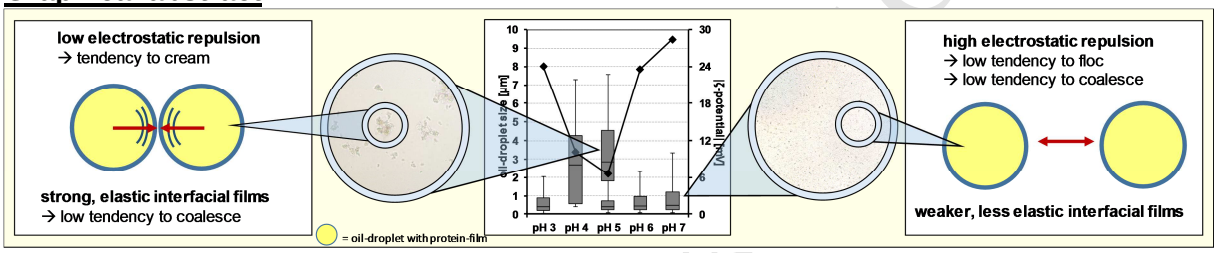
Highlights

- Tryptic hydrolysis increases strength and elastic proportions of interfacial films.
- All samples formed oil-droplets <1µm which are less likely to coalesce.
- Tryptic hydrolysates produce a biomaterial with improved functionality.

Graphical abstract



Abstract

With regard to applications in dispersed systems (i.e. emulsions), improving the poor solubility of pea protein in the pH-range applicable to foods (pH 3 to pH 7) is a prerequisite. To achieve this, a pea protein concentrate was produced on a lab scale using alkaline extraction and subsequent enzymatic hydrolysis to degrees of 2 and 4%. Solubility was improved and interfacial properties were influenced. All samples led to the formation of emulsions but displayed a tendency towards wider oil-droplet size distributions at pH close to the isoelectric point. Using microscopy, this increase could be attributed to the formation of aggregates, which in turn can be ascribed to lack of repulsion caused by the low absolute values of ζ-potentials. The same lack of repulsion led to stronger and more elastic interfacial films at pH 4 and 5 than at pH 7. Moreover, film strength increased significantly with increasing degree of hydrolysis. Dilatational experiments imply that hydrolysis enhances in-plane structural rearrangements. Thus, it is concluded that tryptic hydrolysis has the potential to improve the overall stability of emulsions.

Keywords: pea protein; hydrolysis; emulsion; interfacial properties