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

M. Klost, S. Drusch



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1 Functionalisation of pea protein by tryptic hydrolysis – 2 characterisation of interfacial and functional properties

3 M. Klost^{a*} and S. Drusch^a

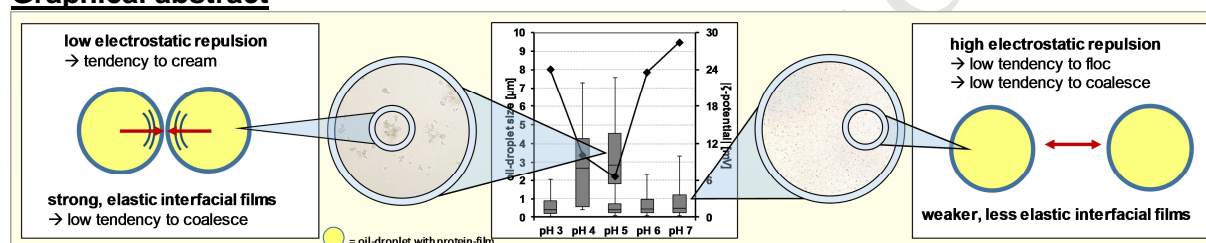
4 ^a *Technische Universität Berlin, Department of Food Technology and Food Material Science,*
5 *Königin-Luise-Str. 22, 14195 Berlin, Germany*

6 * Corresponding author: martina.klost@tu-berlin.de

7 **Highlights**

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

11 **Graphical abstract**



13 **Abstract**

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

27 **Keywords:** pea protein; hydrolysis; emulsion; interfacial properties

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