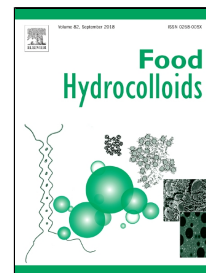


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On the reversibility of ethanol-induced whey protein denaturation

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1 **On the reversibility of ethanol-induced whey protein**

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6 **Abstract**

7 The functional properties of whey proteins after exposure to ethanol were studied. The
8 reversibility of the ethanol-induced whey protein denaturation was investigated using
9 different methodologies to remove ethanol, such as 10-fold dilution with water, oven-
10 drying and freeze-drying of whey protein mixed water/ethanol solutions. The effect of
11 ethanol on whey protein denaturation, before and after ethanol removal, was measured
12 by analysis of difference-UV spectra, rheological measurements, confocal microscopy
13 and differential scanning calorimetry. The results showed a retention of the denatured
14 character of whey proteins (27-34%) after removal of ethanol. The study of the
15 combined effect of ethanol and heat on whey protein denaturation at concentrations
16 ranging from 10 to 70%, revealed that at an ethanol concentration of 50%, the initial
17 extent of denaturation was maximum, while heat did not contribute any additional
18 denaturation effect. A whey protein mixture, previously incubated in 50% ethanol and
19 subsequently freeze-dried to completely remove ethanol, produced a gel in a cold-set
20 gelation procedure, where gelation was promoted by addition of glucono- δ -lactone,
21 without an initial heating step. The confocal microscope revealed significant
22 microstructural characteristics suggesting that whey protein solutions retain a
23 significant degree of denaturation even after ethanol removal. Differential scanning

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