Changes in the Physicochemical Properties of Rapeseed-derived Protein Complexes During Enzyme-Assisted Wet Milling

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Abstract

Oilseeds need to be exploited not only for the oil but also as a source of functional protein-rich ingredients for food. This work evaluated the physicochemical properties of the colloidal fraction resulting from wet milling of rapeseed, used as model oilseed. The extraction was conducted either at natural pH (5.7) or at alkaline pH (8.5), with or without addition of a commercial pectinase. The slurry was mixed for 4 h at room temperature, and then pressed at the same pH or after shifting to alkaline/acidic pH. The resulting extract, rich in oil and protein particles, showed differences in particle size, microstructure and composition. The oil and protein yields in the extract (in relation to the amount originally in the oilseed) ranged between 60 and 70 %, with a significant increase in protein recoveries with addition of pectinase, regardless of the pH. A protein concentrate, containing between 25 and 42 % protein on dry matter, depending on the treatment was obtained after centrifugation, together with a fiber precipitate and an oil fraction. The composition of the concentrates varied, with the highest purity found for extracts at pH 5.7, showing a nearly complete physical separation of the oleosomes by low speed centrifugation. All concentrates showed similar protein composition, as analyzed by gel electrophoresis. The amino acid composition was also similar amongst the treatments. This work evidences the critical role played by biopolymers' interactions in forming different colloidal structures, with clear consequences on the functionality of the final ingredient.

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