



Process development for the preparation of precipitated and soluble protein isolates from Oil Extraction industries residue

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In the present study, the chemical composition (protein, glucosinolate, phytic acid, phenolic acid, crude fiber and ash) of hexane-extracted meals from canola varieties (*Brassica napus*, cv. Quantum, PF 7045/91, Hyola 401) was investigated and compared with similar to commercial canola meal. The optimum pH for the protein alkaline extraction and isoelectric precipitation of this research samples and commercial canola meal was tested at pH values between 9.5-12.0 and between 3.5-7.5 in increments of 0.5, respectively. The effect of alkaline extraction, isoelectric precipitation, ultrafiltration followed by diafiltration and chemical composition as well as protein and solids yield of precipitated and soluble protein isolates were studied. pH had very significant effect ($P<0.01$) on the nitrogen extractability. The highest protein extractability was observed at pH 12.0 with all meals investigated. Values of protein extractability were between 37.5% (commercial canola meal) and 60.7 % (PF, hexane-extracted meal). There was very significant effect ($P<0.01$) among samples protein precipitation. The optimal pH for protein isoelectric precipitation was determined at pH-values between 4.5 and 6.0. Almost (more than 85%) of the proteins were recovered in three usable products: precipitated and soluble protein isolates (PPI and SPI) and a meal residue with about 35% protein, suitable for animal feed. The glucosinolate content of all protein isolates was below the detection limit (< 0.2 mg/g meal). The maximum yield of isolates (PPI and SPI) was prepared from PF variety samples. Precipitated protein isolates had about 85% protein, and there was no significant difference ($P<0.01$) among them, Although, significant differences ($P<0.01$) were observed among their phytic acid content. Acid soluble protein isolates showed high purity and protein content (91.0-94.5%), meanwhile, the SPI yield (solids and nitrogen) obtained from commercial canola meal was the least.

Keywords: Canola, Alkaline extraction, Isoelectric precipitation, Protein isolate, Ultrafiltration, Diafiltration

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