

Hempseed meal protein isolates prepared by different isolation techniques. Part I. physicochemical properties

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Abstract

Protein isolates from hemp seed meal were prepared using alkaline extraction/isoelectric precipitation (HPI) and micellization (HMI) procedures and compared in terms of their physicochemical properties and functionality. The micellization technique resulted in lower protein recovery than the isoelectric precipitation technique. Both HPI and HMI proteins had protein contents higher than 90%. The HMI protein powders were lighter in colour than the corresponding HPI isolates due to higher content of co-extracted [polyphenols](#) for the latter. The electrophoretic mobility and subunit composition, as well as amino acid composition of the isolates were not affected by the extraction procedure, indicative of similar protein composition. The HPI exhibited minimum protein solubility at pH 5.0, while for HMI it was shifted to pH 6.0. [Differential scanning calorimetry](#) indicated that highly alkaline conditions during HPI extraction led to partial protein denaturation which is reflected in lower transition [enthalpy](#) of HPI than HMI. FTIR spectra have also confirmed changes in HPI [protein secondary structure](#), i.e. lower intensity of the peak (1634 cm^{-1}) corresponding to native protein structural elements such as intramolecular β -sheets and higher intensities of peaks (1618 cm^{-1} , 1683 cm^{-1} and 1694 cm^{-1}) indicating enhanced [protein aggregation](#) compared to HMI. Protein conformational changes during alkali extraction resulted in higher water retention capacities of HPI in comparison to HMI.