

ABSTRACT

PROCESSING PARAMETERS FOR THE PRODUCTION OF LEGUME PROTEIN ISOLATES

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The following six legumes were selected for analysis: Black-Eye Pea, Channa, Lentil, Pigeon Pea, Red-Kidney Beans and Split Pea. Protein was recovered from all six legume samples using precipitation methods, chromatographic techniques and partitioning in an aqueous two phase (ATPS) system.

The maximum recovery obtained by using chromatographic techniques was 78%. With ATPS, partition coefficients obtained were in the range of 2.0-7.0. Precipitation methods involved the use of alkali precipitation which gave yields in the range of 85-95%, salting out which gave yields in the range 60-90% and ethanol precipitation which gave yields in the range 92-98%.

Individual protein recovery techniques were combined to develop continuous processes for industrial application. Three such processes were developed of which the process consisting of precipitation methods was the most successful. The protein digestibility corrected amino acid score of the protein isolates produced by the continuous precipitation process varied between 0.48 - 1.0.

Pigeon Pea protein was considered to be the best of the six legumes analyzed. This protein was used to make a high protein bread in which the protein content was increased from 8.7% to 10%. Sensory evaluation showed that there was no difference between the high protein bread and normal bread.

The isoflavone content of pigeon pea protein isolate was determined. The concentration of isoflavones was as follows: daidzein - 0.171 mg/g protein, genistin - 1.167 mg/g protein & genistein - 0.322 mg/g protein. The phytic acid content of the pigeon pea isolate was found to be 3.35 mg/p protein.

Keywords: Protein Recovery, Precipitation Methods, Chromatographic Techniques and Partitioning in an Aqueous Two Phase (ATPS) System