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Cereal Chemistry
Bimonthly
ISSN 0009-0352

Abstract

January/February 2011, Volume 88, Number 1
Pages 80-86
<http://dx.doi.org/10.1094/CCHEM-05-10-0077>

Chemical Composition and Antinutritional Factors of Field Peas (*Pisum sativum*), Chickpeas (*Cicer arietinum*), and Faba Beans (*Vicia faba*) as Affected by Extrusion Preconditioning and Drying Temperatures

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Legumes are valuable plant sources of protein and energy and extrusion is one of the most common processing methods for manufacturing both human food and animal feeds. In the present study, three different legumes (field peas, chickpeas, and faba beans) were ground and processed in a pilot-scale extrusion line. Various preconditioning and dryer temperatures were applied to each legume separately that reflected or differed from standard manufacturing conditions. Although literature exists regarding the effects of extrusion temperature and moisture on legume antinutrients, no data are available on the respective effects of preconditioning and drying. The aim of the study was to evaluate the effects of processing on both nutritional and antinutritional factors for each processing combination. Proximate composition, starch, oligosaccharides, total nonstarch polysaccharides (NSP), soluble (S-NSP), and insoluble (I-NSP) levels were evaluated. The antinutritional factors phytic acid, tannins, and trypsin inhibitors were also determined. Chickpea and field pea NSP values were not drastically affected by processing, while for most processing conditions, total NSP, S-NSP, and I-NSP were slightly reduced in faba beans. Preconditioning before extrusion processing generally improved the nutritional value of the ingredients by significantly reducing trypsin inhibitor level. Phytate and total tannin levels were greatly reduced irrespective of the preconditioning and drying treatment. Wet preconditioning can be used in combination with extrusion to improve the nutritional value of legumes, while drying at 90–150 °C does not significantly further reduce antinutritional factor levels.

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