PHYSICOCHEMICAL PROPERTIES, EXTRUSION PROPERTIES AND FRACTIONATION OF SELECTED VARIETIES OF PEAS AND LENTILS

Abstract

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Eleven green pea, five yellow pea, and six lentil varieties were analyzed for their composition, pasting and thermal properties. Based on the results, three green pea varieties (Ariel, Aragorn, and Daytona) and three yellow pea varieties (Carouse, Treasures, and Jetset) were selected to cover the range of properties, for further investigation in extrusion processing. Further, all twenty-two varieties were fractionated using a wet fractionation method, which combined sonication, alkaline extraction/isoelectric precipitation, and hydrochloride acid wash to understand the varietal impacts on the fractionation process.

Significant differences were observed in chemical compositions, pasting and thermal properties among varieties tested. This suggests that the current industry practice of selling peas and lentils in classes based on similarities in seed color and
size may lead to inconsistencies in end uses. Classifying peas and lentils based on variety or similar composition and functional properties will lead to consistent final products for the end user.

From the extrusion processing of peas, green pea variety “Daytona” showed significantly greater expansion ratios compared to other varieties (P < 0.05) within the extrusion conditions studied. Expansion was found to have a positive linear correlation with screw speed. The microstructure of extrudate cross-sections showed that the samples with greater expansion had more uniform and relatively small pore structures. The results show the importance of using specific varieties of peas for optimum expansion during extrusion.

The fractionation studies showed that starch and protein purity values were higher compared to others reported in literature. The green pea variety “Hampton” and the lentil variety “Pardina” resulted in higher starch purity, yield, and separation efficiency, suggesting it would be good varieties to use in wet starch fractionation. The yellow pea variety “Jetset” and the lentil variety “Brewer” showed significantly higher protein separation efficiencies and yield. These varieties could be good varieties to use in wet protein fractionation.