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Quality attributes of functional extruded lentil-based snacks fortified with nutritional yeast

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Lentil (*Lentis culinaris* L.) and other pulses are rich source of nutritious and healthy food components and considered original functional foods and superfoods that have great potential to enter the food pipeline in a convenient snack form, as ready-to-eat breakfast cereals and snacks-type foods. Nutritional yeast is grown from pure strains of *Saccharomyces cerevisiae*, on a purified nutrient source, specifically for its nutritional value. This study aimed to develop unique, healthy, crunchy extruded snack-type foods from lentil-based formulations fortified with nutritional yeast. Lentil flours and lentil-based formulations with and without nutritional yeast were extruded using a Clextral EVOLUM HT-32-H twin screw extruder, run at die temperatures of 140-160 °C and constant screw speed of 500rpm, to produce the snacks-type product. The specific mechanical energy (KWh/Kg) of the process significantly decreased ($p \leq 0.05$) with an increase in nutritional yeast addition to the formulation undergoing extrusion cooking. In general, the expansion ratio was proportional to values of SME. Shelf stability of the developed products was similar to those of dehydrated food products with water activity in the range of 0.44-0.50. Extrusion processing significantly increased ($p \leq 0.05$) the in vitro protein digestibility in the final extrudates. The incorporation of nutritional yeast into lentil-based formulations produced extruded snack-type products with enhanced textural characteristics and acceptability than control extrudate. The development of value-added expanded extrudates, formulated with lentil and nutritional yeast, have a great potential to provide the population with highly nutritional, healthy and convenient food.

Keywords: extrusion, extruded snacks, lentil, nutritional yeast

Biography

Jose De J Berrios completed his PhD from the Department of Food Science at Washington State University in 1995. He is a Research Food Scientist with the USDA-ARS-Western Regional Research Center where he has led the extrusion food program for 19 years. He is author and co-author of more than 100 publications; reviewer for 20 major national and international journals; invited speaker to more than 100 international and national conferences and symposia. Adviser and collaborator for a large number of national and international projects; Chairman of the Northern California Section of AACC-International and Member of the Legume Pulses Approved Methods Committee of AACC-International 2000-2014.

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