PRODUCTION OF VALUE ADDED PRODUCTS FROM SOME CEREAL MILLING BY-PRODUCTS

By

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B.Sc. Agric. Sci. (Food Science), Fac. Agric., Cairo Univ., 2004
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APPROVAL SHEET

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Date: 28 /3/ 2018

SUPERVISION SHEET

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Title of Thesis: Production of value added products from some cereal milling by-products
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Dr. Karsten Olsen
Department: Food Science **Branch:** Food Industry **Approval: 28 / 3 / 2018**

ABSTRACT

The present study was performed to evaluate the phytochemicals profiles proximate composition, functional characteristics and certain anti-nutritional factors in some cereal milling by-products such as wheat (bran, germ and shorts), rice (bran, germ and husk) and corn (bran, germ and germ meal) to assess their potentiality as source of protein, fat and dietary fiber as well as bioactive compounds. In addition, distilled water, ethanol, methanol, and acetone separately were used as a various solvents in the extraction of phytochemicals compounds. The antioxidant activity (AOA), total phenolics content (TPC), and total flavonoids content (TFC) of the extracts were investigated using various in vitro assays. The major findings of this study are as follows: crude protein ranged from 10.45- 29.90%, fat 3.90 -47.53%, total dietary fiber 20.20-41.13%, bulk density 0.25-0.79 g/ml, water absorption 122.71-510.02 g/100g, fat absorption 89.51-235.12 g/100g and free fatty acids 6.75-19.94%. Significant variations were observed with regard to the color of different cereal milling by-products. The results showed that tannins content was ranged from 113.4-389.5 (mg /100g sample).The study revealed that the TPC and TFC of cereal by-products extracts were significantly different by using various solvents ($P<0.05$), which TPC content varied from 366.1 to 1924.9 mg /100gm and TFC content varied from 139.3 to 681.6 mg/100gm. High carotenoids content was observed in corn germ meal and minimum in wheat bran. Distilled water, ethanol and methanol extracts showed significantly different in antioxidant activity. Significant variations observed with regard to AOA of different cereal by-products by using various solvents. The results concluded that ethanol and methanol were the best solvents to extract phenolic compounds and antioxidant activity, while acetone extracts reported less efficiency. Results also revealed that vitamin E content was varied from 175.50 to 335.73 μg/g of different cereal milling by-products. Cereal milling by-products i.e. wheat, rice and corn brans were processed into Nano-bioactive freeze drying extracts. The results showed that the antioxidant activity (AOA) (the efficiency of AOA) of Nano-freeze drying ethanolic extracts of were highly significantly different compared to cereal brans extracts being 412.90, 318.84 and 205.34 % RSA compared to 70.00, 59.00 and 49.00 % RSA for normal sample extract for corn, rice and wheat brans, respectively. The results also concluded that the addition of Nano-bioactive of cereal bran improved the oxidative stability of the emulsions.

Keywords: Phytochemicals ; Total phenolics content; Antioxidant activity; Cereal milling by-products; Anti-nutritional factors

DEDICATION

I would like to dedicate this work to my dear beloved parents, may Allah protect them. Their endless love and high expectations on me have constantly empowered me to overcome difficulties and frustrations in my career. Whenever I needed them, they were always there to patiently listen to me and give me encouragement. I also want to thank my brothers and sisters, who have always encouraged and supported me.

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