EXTRACTION OF DIETARY FIBER FROM CORN SILK (*ZEA MAYS*) AND ITS APPLICATION IN FOOD PRODUCTS

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ABSTRACT

The purpose of this study is to investigate the possibility of extracting dietary fiber (DF) from corn silk which is one of the industrual waste products from corn milk processing in Thailand and to compare the difference in pre-treatment steps before extraction by studying its physico-chemical properties. The pre-treatment steps included overnight drying at 50°C and grinding. After alcoholic extraction, the physico-chemical properties of dietary fiber from dried (pretreated) corn silk (DDF) and dietary fiber from fresh corn silk (FDF), i.e. moisture content, pH, water activity, and particle size distribution were determined. In addition, the value of total dietary fiber (TDF), insoluble dietary fiber (IDF), soluble dietary fiber (SDF), water and oil holding capacity (WHC and OHC), emulsifying activity (EA), emulsion stability (ES), and color (L*, a*, b*) were analyzed. The results showed that the yield after extraction was high; 24.30% for DDF and 22.07% for FDF. The TDF content of DDF and FDF was 50.86 % and 76.94 %, IDF was 44.32% and 65.04% and SDF was 11.90% and 10.94%, respectively. WHC and OHC of DDF and FDF were significantly different ($p \leq 0.05$) with the values being 4.94 and 9.80 (g/g sample), respectively, for WHC and 2.84 and 5.41 (g/g sample), respectively, for OHC. EA of DDF and FDF was 2.08 % and 4.45%, while ES was 4.59% and 13.03%, respectively. The particle size of DDF was mainly between 100 and 120 mesh while that of FDF was around 60 and 80 mesh. The color value of DDF and FDF was dark yellowish brown. Water activity of DDF and FDF was 0.39 and 0.48 while the moisture content was 4.54 and 10.15%, respectively. The pre-treatment steps like heating and grinding before extraction significantly ($p \leq 0.05$) affected the physical properties of corn silk fiber. Overall, both DDF and FDF exhibited good potential as a fiber ingredient except EA and ES which were relatively low. The corn silk fibers were then applied in two types of food, namely cake and fried batter-coated chicken. Only FDF was useful when used to substitute for wheat flour in cake products at a 15% level. It increased the volume of cake while DDF fiber did not. Incorporation of corn silk fiber caused a much darker color product compared to the control, resulting in a decrease of overall acceptability score from the sensory evaluation. Nevertheless, the fiber-added cakes contained more than 10% of the daily recommendation of dietary fiber intake. Addition of 3% DDF and FDF fiber in batter-coated suspension for deep-frying chicken, did not increase yield and batter pick-up and did not reduce oil absorption while the sensory acceptability scores were not different from the control product. In conclusion, corn silk could be used as a raw material for the preparation of a fiber ingredient with good physicochemical properties. The corn silk fiber showed some potential for application in food products.

KEY WORDS: DIETARY FIBER / CORN SILK / CAKE / FRYING BATTER

115 pages