Effects of treated and untreated bran in dough dynamic rheology

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Effects of treated and untreated bran in dough dynamic rheology

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Abstract
Grains of the wheat variety Tajan were milled into straight-run flour and bran. Proximate analysis, farinograph experiments and rheological characteristics were conducted. Two types of bran (hydrothermal treated and untreated) at three levels (0%, 5%, 10%) were added to the parent flour. Proximate analysis and farinograph experiments of these flours were conducted. The effects of adding treated and untreated bran in linear (strain/0.1%) and non-linear limits (strain =1%, 5%, 10%) have been determined by dynamic oscillatory tests. Results show that, in the linear limit, the $G'$ value for the untreated bran sample is very close to parent flour while the $G'$ value of treated bran flour is lower than that of parent flour. The same changes occur in $G''$ values. In the non-linear limit, the $G'$ values for both treated and untreated bran samples were higher than parent flour while the $G'$ value for untreated bran samples had no significant difference from the parent flour. The loss tangent for untreated bran flour in the non-linear limit was higher than that of the parent flour, while for treated bran flour it is lower than parent flour. It can be concluded that untreated bran weakens the gluten matrix. On the other hand, adding treated bran, to some extent, strengthens the protein matrix.

Keywords: Treatment, bran, dynamic rheology, flour, gluten

Introduction
Brown bread is an important staple food in many countries (Kock et al. 1999; Basman and Koksel 2001). It accounts for more than 50% of the bread sold. The high production of brown bread can be attributed to an increase in demand for food products containing elevated levels in dietary fiber (Kock et al. 1999). A diet low in dietary fiber is associated with a spectrum of degenerative diseases such as obesity, coronary disease, diabetes, and so on; it is a well-established fact that the consumption of adequate amounts of dietary fiber reduces the risk of these diseases (Sidhu et al. 1999, Sudha et al. 2006). The water-soluble component of fiber has been reported to be effective in lowering the blood cholesterol level and in regulating the blood sugar level. The insoluble fraction of fiber appears to be helpful in various disorders of the intestinal tract (Anderson et al. 1990).

Because of increased nutritional awareness, the production of high-fiber breads has increased during the past decade so that it now represents an important proportion of the total bread sales in many countries. The non-endosperm components of wheat...