



Abstract

The Effect of Fiber Addition on Wheat Bread Staling [†]

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Bread is a staple grain product that many consumers eat every day. The quality and durability of bread depends, among other factors, on the recipe, the baking method, the bread cooling method after baking, and the way of packaging. Producers use a lot of techniques to extend the freshness of baking and delay the staling process. In order to extend the freshness of bread, producers add enzyme preparations, lipid compounds, emulsifiers or hydrocolloids to the recipe composition.

The purpose of the work was to determine the effect of three types of fiber (wheat, oat, potato) with two fiber lengths on bread staling process. Type 750 bread wheat flour and fiber addition with a specific length of fiber in the amount of 2%, 4%, and 6% (mass basis) were used to bake bread. Studies on the physical and chemical properties of flour were carried out. The bread volume, porosity and texture, crumb moisture, and bread staling using differential scanning calorimetry on the day of baking, after 24 h and 72 h, were determined.

Bread analysis was performed using a differential scanning calorimeter—DSC, Q200, Thermal Analysis Instruments. All measurements were made under a nitrogen atmosphere. The reference sample was an empty aluminum pan, hermetically sealed. The DSC curve of bread mass (10–15 mg) was obtained by heating the sample from −50 °C to 110 °C at a heating rate of 5 K/min. Samples were analyzed in triplicate.

The control sample (without fiber addition) was characterized by the lowest enthalpy. The highest enthalpy in the case of the addition of fiber with shorter fiber length was found in bread with 6% wheat and 6% potato fiber. At 24 h after baking, it was found that the enthalpy of the control sample decreased. The same result was obtained in the analysis with the addition of 2% potato fiber with a shorter fiber and 2% oat fiber with a longer fiber. The greatest loss of water was recorded for bread with the addition of 6% oat fiber with shorter fiber. At 72 h after baking, the test with the addition of 2% oat fiber with a shorter fiber, 6% potato fiber with a longer fiber, and the control sample were characterized by the highest loss of water. In the analysis with the addition of fiber with longer fiber length in the amount of 2% wheat, 6% potato and 4% wheat, there was an increase in water content in the crumb compared to the research after baking.

A significant effect of the fiber addition on the staling of wheat bread was found. Hardness of the crumb on the day of baking increased with higher fiber content. In the majority of samples with the addition of fiber, the moisture content of the crumb increased during storage.



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