



University of Zabol

Faculty of Agriculture

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The Thesis Submitted for the Degree of M.Sc (in the field of Food industrial engineering, Food Microbiology Trend)

# **The effect of magnetic water on the quality characteristics of frozen dough and its produced bread**

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winter 2022

## **Abstract**

The frozen dough market has flourished in recent years due to the growing demand of consumers for high quality and suitable bread. The use of frozen dough allows the production, distribution and centralized storage of frozen dough on an industrial scale. Considering that one of the important factors on the quality of frozen dough is the size of water crystals in it, so the purpose of this study was to investigate the effect of magnetic water on the properties of frozen dough and in the next step to evaluate the quality characteristics of bread made from frozen dough. In this study, bread dough was prepared using flour with 21, 68 and 82% extractions from Sari Golden Cluster Company and also magnetic water was produced in Tesla 0.05, 0.1, 0.15, 0.2 and then frozen. . Characteristics of frozen dough and bread produced from it were performed by defrost tests of dough after freezing, farinograph, gasograph, bread weight, bread baking loss, bread texture measurement, staleness, color test (Hunterlab) and sensory properties. The results showed that the intensity of water magnetism depending on the degree of flour extraction has a significant effect on the amount of yeast gas production. Was. With increasing the degree of extraction and Tesla of magnetic water, the amount of defrost water per hour of frozen dough samples decreased so that the lowest amount of this index was measured for dough prepared with 82% flour and Tesla with 0.2 with a quantity of 0.72. Similar effects were observed for two-hour dough defrost water, while by increasing the two variables studied, the difference between the defrost water of these two times showed a sharp decrease compared to the control samples. The results of farinograph test also showed that the degree of extraction and the intensity of magnetic water consolation have a significant effect on the parameters of water absorption, dough spreading time, strength and loose dough time. With increasing the flour extraction percentage, the weight of bread produced increased significantly so that bread samples with 82 and 21 extraction percentages had the highest and lowest bread weight, respectively. Also, with increasing water magnetic intensity, the weight of bread produced per Extraction was associated with a significant increase and the highest value of this index was measured in Tesla 0.2. Contrary to the results of bread weight, the weight loss of bread samples decreased with increasing extraction percentage. The results of the analyzer texture showed well that the use of magnetic water in the preparation of bread can significantly improve the textural properties of bread. The results also showed that the percentage of extraction and the intensity of water magnetism have an important effect on the staleness of bread. And with the increase of these two variables, the water activity index of bread samples have a significant difference with each other so that in each degree of flour extraction with increasing the intensity of magnetism, the amount of water activity decreased significantly. The sensory test of the produced breads also showed that by using magnetic water with a Tesla intensity above 0.15, the sensory properties of the breads such as porosity, softness, chewability and even taste for each degree of extraction can be significantly improved. In the end. Delay the stagnation phenomenon.

**Key words:** Decreased cooking, defrost, stale, Hunter labs