



## STUDY CONCERNING PRODUCT QUALITY ON FROZEN BREAD DOUGH FORTIFIED WITH LENTIL FLOUR

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**Abstract:** *The current trend of food production obviously justifies the need to develop - innovate novel food products with functional properties characteristic of functional foods. One of the most consumed products - bread suffers today numerous transformations to be in acceptance and to the benefit of consumers. In this context, the present study aims at developing a new type of frozen dough bread enriched with lentil flour. Two experimental variants were used in which different proportions of wheat flour (15, 30%) were substituted with lentil flour and a control sample. The obtained dough was subjected to the freezing process at -22 ° C for 24 hours. The obtained products were subjected to a set of physico - chemical and sensory analysis according to STAS 91-2007. It was observed that there is an increase in the demand for technological water as the amount of added lentil flour increases. The bread volume is diminished insignificantly in relation to the control sample.*

**Keywords:** *wheat flour, lentil flour, bread quality, freezing.*

### 1. INTRODUCTION

The trend towards safe, healthy and fresh food is obviously expressed in consumer attitudes towards the current market evolution. Thus, from the point of view of bakery products, consumers prefer safe and healthy bread and bakery products with high fiber content (Canja, 2016), products that help to maintain health and reduce the effects of diseases such as cardiovascular diseases, digestive diseases, various forms of cancer, etc. [13] Frozen products have invaded the bakery market, consumers face a dilemma - fresh and healthy or not ?. Some studies in the field specify that frozen dough bakery products have some drawbacks due to the large amount of iodized salt added. According to a study developed by the Center for Disease Control and Prevention, Atlanta, USA, a frozen food product contains more sodium than the same type of fresh product, which poses a risk to the health of the consumer, is a determining factor in heart disease and stroke. [2] According to a study provided by the publication "Dietary Guidelines for Americans, 2015-2020", frozen products are considered to have a very high fat content. Because fat is considered to have a double quantity of calories compared to carbohydrates or proteins, it makes frozen products, evidently, high in calories. [3] In view of these considerations, in order to support consumers, the purpose of this paper is to create new food products with a high nutritional potential by capitalizing on the chemical composition of lentil flour. Flour meal is an important source of food fibers (15.64g / 100g), proteins (8.2g / 100g), carbohydrates (12.6g / 100g). Its multivalent character is also reflected in vitamin B content (B1 - 0.12 mg, B2 - 0.06 mg, B3 - 0.66 mg, B5 - 0.47 mg, B6 - 0.169 mg, B9 - 56.8 µg) and C (1.75 mg). [10], [11]

### 2. PURPOSE AND OBJECTIVES

The present study aims to determine the optimal percentage of lentil flour that can be substituted by the mass of wheat flour, so as to obtain a bakery product that meets the quality standards imposed by consumers and how low temperatures ( -22 °C) influence the quality characteristics mentioned above.

### 3. MATERIALS AND METHODS

The lentil flour used was obtained at the Faculty of Food and Tourism, Braşov from bean lentils purchased from a specialized store. The wheat flour comes from a traditional mill, it contains no additives and taking into

account laboratory tests it has been found to meet the quality characteristics of wheat flour marketed in Romania (acidity 2.73°T, wet gluten content 31.9%, hydration capacity 68, 9%, humidity 14.6%, etc.)

According to the manufacturing recipe, 20% iodized salt, 50% frozen yeast (25%) and 550 ml, 575 ml, 600 ml drinking water were also used as raw and auxiliary materials.

The raw and auxiliary materials used were prepared according to technological specifications and dosed so as to be directly incorporated to form the dough. The bakery products subjected to the research of this study were carried out respecting the technological flow in Figure 1.



**Figure 1.** Technological flow of products obtaining

As working methods, the direct bread making method in which the raw and auxiliary materials were subjected to mechanized kneading for 8 ... 10 minutes was used in laboratory conditions. After formation, the dough was subjected to an initial fermentation for 30 minutes at 35° C and the relative humidity of the air 78% in the fermentation chamber. At the end of the fermentation process, the dough was split and molded round (50 g/ piece) and then frozen for 24 hours at -22 ° C.

The dough pieces thus obtained are thawed at ambient temperature for 1h, after which they are introduced into the oven preheated to 190° C where they are kept for 20 minutes.

The finished products are subjected to a set of laboratory analyzes according to Romanian standards SR 91 - 2007. Thus, determinations of volume, porosity, elasticity, acidity and relative humidity were determined. The data obtained are shown in Table 1 and plotted in Figure 2.

In order to check the acceptability of such a product by consumers, a series of tasting with 9 panellists was organized, the results being counted in Table 2. For qualitative grading of bakery products in order to stimulate a higher quality, it was introduced the method of applying a hedonic score scale to assess quality based on a 30-point scheme.

**Table 1. The analysis of the obtained products**

Sample coding	PM	P 1.1. 15%	P 2.1. 30%
Volume (cm <sup>3</sup> )	296	265	260
	298	265	260
	295	263	261
Porosity (%)	85,3	75	70
	85	75	71,5
	85	76	70
Elasticity (%)	90	91	90,3
	90,2	91,3	90,3
	90,3	91	90
Humidity (%)	40	43,5	42,5
	41	43,6	43
	41,5	43,6	43
Acidity (°T)	2,8	2,8	2,9
	2,9	2,8	3
	2,8	2,9	3

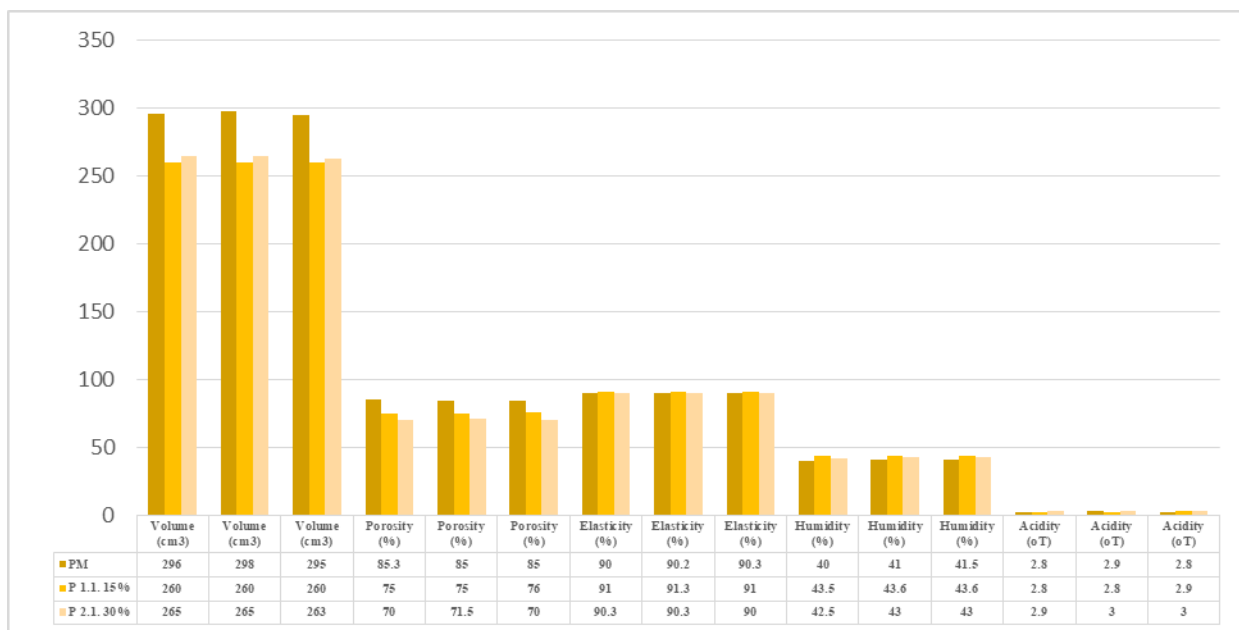


Figure. 2. The physico – chemical analysis of the obtained products

Table 2. Sensory analysis of the obtained products

Sample coding	Points obtained	Maximun value
PM	28	30
	28	
	28	
P 1.1. 15%	29	
	28	
	29	
P 2.1. 30%	27	
	27	
	26	

#### 4. RESULTS AND DISCUSSIONS

From the above results, it appears that the bread enriched with lentil flour obtained from frozen dough had a high degree of acceptability, exhibited organoleptic characteristics specified in Table 2.

From a physicochemical point of view, there are slight deviations from standard bread sample values. Thus, it is found that the volume obtained for sample 1.1 is the closest to the standard value, recording an average of the obtained values of 264.3 cm<sup>3</sup>. In contrast, sample 2.1 recorded average values of 260.5 cm<sup>3</sup>. The decrease in volume values is due to the fiber - rich structure of lentil flour, which once introduced into the mass of the product diminishes the proportion of embedded air, thus affecting the volume of the products. Determination of the porosity of the bread crumbs confirms that the addition of lentil flour contributes to the diminution of the air incorporation and retention capacity, the texture of the fibers contained in the lentil flour having anaerobic valences. Thus, sample 1.1 obtained values of 75.5% and sample 2.1. provided values of 70.5%. It can be seen how the porosity of the samples decreases with the increase in the amount of added lentil flour. [5], [9]

Another quantified parameter - the core elasticity gave an average of 91% for sample 1.1 and 90.2% for sample 2.1. Compared with the control sample, the values obtained are higher than those obtained, confirming that the addition of lentil flour increases the elasticity of the core. The percentage relative humidity of the core is higher than that of the control sample due to the fiber capacity of lentil flour to retain the percentage of moisture in the mass of the product.

The acidity of the product is increased to almost insignificant in relation to the control sample in the case of sample 1.1 - 2.8<sup>o</sup>T, increasing if the proportion of added lemon flour is higher - 2.9<sup>o</sup>T.

## 5. CONCLUSIONS

The obtained bread products presented quality characteristics that can be framed in the set of values provide by the Romanian standards in force.

Bread with the addition of 15% lentil flour showed characteristics that attracted the most analysts, with volume values according to SR 91 - 2007.

As a general conclusion, it can be said that the addition of lentil flour produces positive effects on the bakery products from both organoleptic and physico-chemical and nutritive point of view. This product can be produced on an industrial scale and offered to the population for the benefits it brings.

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