ENDOGENOUS YEASTS QUANTITY EFFECT ON BREAD QUALITY DURING THE PROCESS OF BREAD MAKING

Roxana **Margarit**

Valahia University of Targoviste, street AleeaSinaia, no.13, Targoviste, Romania
E-mail: roxanamargarit25@yahoo.com

Abstract
Bread is the base of our diet, this being part of the first group of recommended foods for consumption. Bread has important physico-chemical and gustatory properties, which are the base of their nutritional value and quality. In order to establish the quality of bread, its chemical composition is of great importance, as the substances that are part of it serve to obtain the energy needed by the human body, to form tissues and to regulate various processes of the body. In the case of bakery products, the content of dietary fiber, vitamins, minerals etc., as well as the rate of absorption of nutrients are determined by the type of flour and the technology used. Thus, bread made from wholemeal flour with endogenous yeasts is recommended.
Endogenous yeast bread is a leavened bread that, although it takes a long time to obtain, has advantages in terms of bread quality and health benefits. In this paper, different proportions of natural leaven were used (5%, 7%, 10%, 15%, 20%) to see how the Endogenous yeast influences the quality of the bread. The volume, porosity, elasticity, H / D ratio, acidity and humidity were determined for the bread obtained.

Key words: bread, endogenous yeasts**,**leaven, flour.

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1. INTRODUCTION

Bread, the product analyzed in this paper, was made from whole wheat flour, leavener, water, yeast and salt. The taste of yeast bread is slightly sour and has a distinct flavor. The dough leavened through fermentation provides products that have beneficial effects on the consumer's health.

However, the nutritional benefits of yeast bread are much more important. Yeast contributes to an increased predigestion of the macromolecular components of flour and dough and which, to a large extent, are found in bread.

In addition, the use of yeast helps to reduce the negative effects of phytic acid. Phytic acid prevents the absorption of certain important minerals from cereals, such as zinc and iron and to a lesser extent calcium and magnesium. Cereals contain a large amount of phytic acid. It is removed (to a small extent) by boiling, sprouting or fermentation with commercial yeast (approx. 50%) or endogenous yeast (approx. 70%).

Yeast bread also has a relatively low glycemic index, which translates into a gradual increase in blood sugar levels and not as sudden as in the case of regular white bread. Foods with a low glycemic index are associated with a healthy regulation of blood sugar and an increase in satiety after each meal (the latter explained in the case of mayonnaise bread by high acidity).

Yeastbread exerts a beneficial role for the intestinal microflora.

2. MATERIALS AND METHODS

2.1 Materials

The whole grain flour is obtained through integral grinding of the wheat grain.

Natural yeast is obtained from whole meal flour and water in the same proportion. The mixture of flour and water is called "culture", and in the end, when it can leaven a bread, it will be called "natural yeast". On the first day,

the culture to rest for 24 hours, then adding flour and water every 12 hours. After 5-7 days, the culture should double its volume in 8 hours, for a pleasant smell, slightly sour.

2.2 Methods

The farinograph method investigates the quality of flour on account of the main characteristics of the farinogram: development time, stability, softness, tolerance index. The farinograph is a record of the evolution of the dough in specific kneading conditions, after it has been brought to a standard consistency of 500 U.B (1). This method allows the determination of the hydrating capacity of the flour, considered to be the amount of water required for it to form a dough of standard consistency (500 U.B.). The development time is the time window required for the dough to reach standard consistency and shows how quickly the dough or gluten network forms. Stability expresses the time lapse the dough retains its maximum consistency, showing its tolerance to kneading. The softening shows the difference between the maximum consistency and the consistency after 12 minutes of kneading, measured from the moment of the end of its development (2).

To quantify the behavior of the dough when overheating, the tolerance index can be used, which represents the difference between the maximum consistency of the dough and the value of its consistency after a certain time (5 ', 10', 20 ').

Falling index Hagberg indirectly measures the activity of amylases, by rapid gelatinization of an aqueous suspension of whole wheat or flour meal, in boiling water bath, and the measurement of the liquefaction produced by α-amylase from the starch gel contained in the sample (3). This indicator is expressed in seconds and the optimal values are between 220 and 280 seconds (4). Values above 280 seconds indicate low amylolytic activity, and those below 220 seconds, intense amylolytic activity of flour.

Draminskianalyzer is a laboratory device equipped with up-to-date specifications and materials. Its modern and special design guarantees measurement accuracy.

The characteristics of the flour quality are automatically calculated after the measuring chamber is filled with the sample. Pressing the measurement key activates the sample measurement procedure. The Draminski analyzer analyzes the composition of the flour using the near infrared spectrum. The device is calibrated at the factory and stores all the information about the individual parameters in the internal memory.

Measuring bread volume with the FORNET device. The method is based on measuring with the Fornet device the volume of rapeseed displaced by the product to be analyzed and its reporting in percentage. The bread volume is calculated as the difference between the total volume of rapeseed and the volume of rapeseed displaced by the bread.

Determination of crumb porosity

Porosity is the pore volume found in 100g of core. The method is based on determining the specific mass of the pore-free core.

Determination of crumb elasticity

The method consists in pressing a piece of core of a certain shape, a given time and measuring the return to the initial shape after stopping the pressing.

Determination of the bread height / diameter ratio. The product height and diameter are measured and their ratio is calculated. Height / diameter ratio = H / D (H-maximum height of the uncrated product, D-arithmetic mean of two perpendicular diameters, in centimeters).

Bread moisture measurement. The bread moisture represents the water content within its core. The principle of the method is to determine the loss of mass by heating at 130ºC±2ºC.

Bread acidity determination.

The aqueous extract of the test sample is titrated with 0,1 n sodium hydroxide solution, in the presence of phenolphthalein as an indicator, until a pale pink color appears, which persists for one minute.

3. RESULTS AND DISCUSSIONS

The properties of the flour used to obtain bread with natural yeast are displayed in table 1.

Table 1.

Whole grain flour			
Quality indicators	**M.U.**	**Value**	**Device**
Protein	%	12.9	Rapid DRAMINSKI analyzer
Moisture	%	13.5	Thermobalance PRECISA XM60
Gluten	%	28	STAS 90-88
Deformation index	mm	4.5	Thermostate NITECH
Sedimentation index	ml	65	Rapid DRAMINSKI analyzer
Falling index	sec	273	SASDKIEWCZ SWD-SZ
Development time	min	6.7	Farinograph BRABENDER
Stability	min	9.7	Farinograph BRABENDER
Degree of softening	F.U.	82	Farinograph BRABENDER
Hydration capacity	%	66	Farinograph BRABENDER

The flour chosen for this type of bread is a high-stable flour with relatively long development time.

Bread quality indicators of bread with 5% endogenous yeast (sample 1)

Indicator	M.U.	Result
Volume	(cm^3/100g)	260
Porosity	(%)	78
Elasticity	(%)	96
H/D	-	0.4
Acidity	(degree)	1.3
Moisture	(%)	42

Bread with 5% yeast (sample 1) is properly leavened with a volume of 260 cm^3/100 g, the pores are soft and flat (78 % porosity), the core is elastic, when pressed with the finger it returns to initial shape having 96% elasticity, the H / D ratio is 0.4, the taste is pleasant, the bread has a degree of acidity of 1.3, the core has 42% moisture.

Bread quality indicators of bread with 7% endogenous yeast (sample 2)

Indicator	M.U	Result
Volume	(cm^3/100 g)	270
Porosity	(%)	80
Elasticity	(%)	98
H/D		0.3
Acidity	(degree)	1.4
Moisture	(%)	44

Bread with 7 % yeast (sample 2) had the best results in terms of quality of the 5 analyzed samples. This sample had the largest volume (270 cm3/100 g), it's a well leavened bread with flat golden rust, pleasant taste and smell, 80% porosity, when pressed it returns to initial shape (98% elasticity). The degree of acidity of this sample was 1,4 and 44 % moisture.

Bread quality indicators of bread with 10 % endogenous yeast (sample 3)

Indicator	M.U	Result
Volume	(cm^3/100 g)	250
Porosity	(%)	76
Elasticity	(%)	94
H/D		0.32
Acidity	(degree)	1.5
Moisture	(%)	46

Bread with 10 % yeast (sample 3) is well leavened with a volume of 250 cm3/100g, soft and flat pores (76% porosity), elastic core, when pressed with the finger it returns to initial shape with 94% elasticity, H/D ratio is 0.32, slightly sour taste, degree of acidity 1,5, core has 42% moisture.

Bread quality indicators of bread with 15 % endogenous yeast (sample 4)

Indicator	M.U	Result
Volume	(cm^3/100g)	240
Porosity	(%)	70
Elasticity	(%)	90
H/D		0.3
Acidity	(degree)	1.7
Moisture	(%)	47

Bread with 15 % yeast (sample 4) has a 450 cm3/100g volume, 70 % porosity, 90% elasticity, degree of acidity of 1,7 and slightly wet core, with 46% moisture.

Bread quality indicators of bread with 20 % endogenous yeast (sample 5)

Indicator	M.U	Result
Volume	(cm^3/100g)	220
Porosity	(%)	77
Elasticity	(%)	90
H/D		0.3
Acidity	(degree)	1.9
Moisture	(%)	48

Slightly flattened bread was obtained, with lower volume, porosity and elasticity, namely 220 cm3 / 100 g volume, 77% porosity, 90% elasticity. The obtained bread has a sour taste, degree of acidity of 1.9 and wet core (48% core moisture).

Lately there has been a rising interest in obtaining yeast bread. The use of yeast gives bakery products high nutritional value and cost reduction in terms of yeast amount.

4. CONCLUSIONS

- The use of endogenous yeast in different proportions influenced the quality of the bread in terms of sensory properties, volume, porosity, elasticity, H / D ratio, acidity and humidity of the bread obtained.
- Following these tests, it resulted that, by adding 7% naturally yeast, high-quality bread was obtained, superior in terms of quality to the other tested versions, the indicators of the bread obtained fall within the quality standards in force.
- As the amount of naturally yeast was added in larger proportions, the acidity of the bread slightly increased, and the volume decreased, obtaining a flattened bread when adding 20% yeast.
- By adding naturallyyeast to the bread, the amount of added commercial yeast was reduced by 2%, and the final product had the same quality.

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