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# STUDY ON THE USE OF GERMINATES WHEAT IN BREAD MAKING

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***Abstract***

*Obtaining a high nutritional value of bread and bakery products by replacing raw material: wheat flour with barley flour. This work reprezent an comparative study regarding organoleptical and physical – chemical modification of some bakery products in case of adding of wheat and barley maltificated at flour in ratio of 10, 20* and 30%.

**Key words** *bakery products, germinated barley, germinated wheat.*

## INTRODUCTION

In search of finding new indigenous raw materials to increase the nutritional value of bread and bakery products, the use of germinated cereals was attempted.

These, through increased intake of vitamins, proteins, free amino acids, mineral salts, sugars, some enzymes in the native state, etc. have led to the optimization of the nutritional qualities of the manufactured products. As an addition, barley and barley were used in the proportion of 10, 20 and 30% respectively of flour.

This substitution has been proposed because by applying special doughs obtained from barley flour, it has been possible to separate a gluten similar to wheat but which is very brittle.

However, it has succeeded in selecting and improving the production of barley varieties that produce high proportion of gluten, and the flour obtained from these varieties is suitable for the manufacture of bread.

## MATERIAL AND METHODS

Cereals used for addition were germinated for 5 days at 18-20 ° C after a pre-soaking of 40 hours (8 hours of wet soaking, 32 hours of dry soaking). The resulting green malt was dried at a temperature of less than 65 ° C to below 6% humidity (5,31% for wheat malt and 5,22% for barley malt).

They were further milled, and the wheat malt flour was added in full to the type 480 flour used to make the buns. In the case of barley malt flour, the flakes were removed and further added in the same proportions as wheat malt from white flour. Buns were made by direct method.

Thus, 4 rolls of flour were added without addition, 4 rolls with 10% germinated barley, respectively germinated wheat, 4 rolls with 20% wheat, respectively germinated barley and 4 rolls with 30% wheat respectively germinated barley. 1% yeast was added to the processed mixture, and the salt was added in a ratio of 1.2%.

Ingredients were kneaded for 20 minutes, kept for 25 minutes at 25 ° C for 40 minutes, the dough was further divided and molded. Buns were baked for 20 minutes at 180 ° C.

The products obtained after cooling were analyzed organoleptically and physico-chemically

**RESULTS AND DISCUSSION**

Following the organoleptic analyzes performed, the finished products were characterized as follows: samples with 10% germinated wheat or germinated barley have been well-grown, the well-developed core, the unifo rm porosity, slightly darker than the control, the pleasant taste; samples with 20% germinated cereal added were less elevated than samples with 10% germinated cereal added, the core well developed uniformly but with less elasticity than the first case, darker than the sample with 10% added and more pronounced to the witness; the 30% germinated cereal samples were less elevated, the core elasticity was lower, the porosity of the core was more uneven, the color of the core was closed, the malt flour, the slightly astringent taste.

In the case of the use of wheat malt as an addition, the samples showed superior qualities when the barley malt was added.

Table 1

*The physical and chemical properties of the bread samples produced with wheat or malted barley supplement*

| Analyzed sample | Gluten (%) | Hydration capacity (%) | Acidity (degrees) | Ratio H/D | Moisture (%) |
|---|---|---|---|---|---|
| Witness | 26,90 | 40,1 | 2,9 | 0,57 | 41,40 |
| 10% germinated wheat | 23,60 | 50,0 | 2,8 | 0,55 | 39,84 |
| 10% germinated barley | 22,64 | 42,5 | 1,44 | 0,47 | 36,34 |
| 20% germinated wheat | 20,16 | 53,5 | 1,84 | 0,50 | 36,62 |
| 20% germinated barley | 19,78 | 45,4 | 2,72 | 0,45 | 34,55 |
| 30% germinated wheat | 19,18 | 62,5 | 1,24 | 0,44 | 35,45 |
| 30% germinated barley | 14,94 | 46,6 | 3,2 | 0,42 | 31,73 |

Thereafter, the conductivity of the solutions obtained from the 5 g sample to be analyzed and 100 ml of distilled water was determined. Samples from the core and bark of the buns were made with 10, 20 and 30% wheat and germinated barley compared to a blank sample made from the shell or core of buns made only from white flour. Analyzes were also performed for samples of mixed flour with unmalted cereals before the dough was obtained.

The data obtained from the measurements are shown in Table 2.

Table 1 shows that by the addition of germinated cereals the gluten content decreases compared to the control with the increase in the percentage of malted cereals.

The decrease is more intense in the case of malt-added barley, which can be explained by the fact that gluten is present not only in barley but also in wheat.

The hydration capacity increases compared to the control sample with the increase of the addition and is more pronounced in the case of the addition of germinated wheat.

Humidity decreases compared to the control sample as the percentage of malt-enriched cereals increases; the humidity is lower in the case of germinated barley addition.

Table 2

*The values of conductivity in the case of analysed samples*

| **Sample analyzed** | **Conductivity (µS/cm)** |
|---|---|
| Distilled water | 26,76 |
| Core of bread | 1244 |
| Crust of bread | 1427 |
| Core of buns with 10% wheat germinated | 1353 |
| Crust of buns with 10% wheat germinated | 1451 |
| Core of with 20% wheat germinated | 1633 |
| Crust of buns with 20% wheat germinated | 1745 |
| Core of buns with 30% wheat germinated | 1735 |
| Crust of buns with 30% wheat germinated | 1748 |
| Core of buns with 10% germinated barley | 1873 |
| Crust of buns with10% germinated barley | 1949 |
| Core of buns with 20% germinated barley | 1573 |
| Crust of buns with 20% germinated barley | 1832 |
| Core of buns with 30% germinated barley | 858 |
| Crust of buns with 30% germinated barley | 1891 |
| Mix flour with10% wheat germinated | 319,3 |
| Mix flour with 20% wheat germinated | 334,1 |
| Mix flour with 30% wheat germinated | 554 |
| Mix flour with 10% germinated barley | 501 |
| Mix flour with 20% germinated barley | 513 |

| | |
|---|---|
| Mix flour with 30% germinated barley | 544 |
| White flour without addition | 275,4 |
| Germinated wheat | 830 |
| Germinated barley | 904 |

Conductivity depends on ion concentration and mobility as well as on all the factors that ion mobility depends on: temperature, pressure, solvent nature, etc.

The variation in the conductivity of biomaterials can be correlated with changes in physiological processes at the cellular level and can provide information on the mechanisms of these processes. In biological materials, conductivity is determined by the release of ions.

Conductivity can be correlated with changes taking place at the cellular level and in the structure of the membranes through which the transport of loads takes place.

In the case of the data in Table 2, it is observed that the conductivity value is higher for the samples taken from the core compared to those taken from the shell. This is maintained for the three percentages of malt-added cereals, both for wheat and malted barley.

**CONCLUSIONS**

The malted barley meal has a superior conductivity to malt wheat flour, but both conductivities are higher than white flour (control). Separately viewed, for the addition of germinated wheat, the conductivity values increase with the addition of both the core and the shell. In the case of barley, this order is no longer maintained. It can be said that in the case of shellfish samples the values are higher because it is richer in ionic species due to accumulated mineral substances and to the products resulting from the Maillard reaction.

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