

## **THE STUDY OF THE INDICATORS OF FRESHNESS OF THE BREAD SUPPLEMENTED WITH THE BREWERY MASH FLOUR**

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### **Abstract**

*The supplementing of the bakery products with the bioactive principles coming from bio wastes of the food industry represents a major preoccupation in the last period of time. Also, the innovation of some products supplemented with bioactive substances coming from one or more sources represent also a major interest. In this direction is going also this paper where we followed the effect of the supplementing of the flour with percentages between 5-25% brewery mash flour on the technological properties of the dough, finished product and on the term of their conservation. Based on the scores and data obtained regarding the main parameters of freshness was found that a supplementing of 10% of bakery products influences the technological parameters by the high content of fibers that replace the gluten proteins determining the decrease of the capacity of the dough to retain the fermentation gases by the quality of the finished products in the way of obtaining some products with decreased volume, dense aspect of the core, high humidity that favors the early ageing of the finished products.*

**Key words:** beer, bio-wastes, brewery mash, brewery mash flour

### **INTRODUCTION**

The bakery, a science in the field of food industry in continuous evolution, uses more and more different food supplements in order to obtain innovating products designated for the human consumption with higher nutritive properties compared to the classical products [1]. Bio wastes represent one of the resources from which you can isolate active biological compounds. The intense preoccupation from the last years for the reutilization of the agro-industrial wastes was and is higher and higher, thus obtaining, different products or services. In this context is placed also this paper, in which we used flour obtained from brewery malt, byproduct resulted from the industry of beer, the latter being one of the industries that produce the higher quantity of bio wastes annually. The fresh brewery mash obtained is difficult to store due to the high content of water, approximately 75%, of the high potential of antioxidants and due to a strong enzymatic activity, thus, is imposed its fast exploitation. [8].

Mussatto, Dragone and Roberto, 2006 in their paper specified that the brewery malt represents the main byproduct of the industry of beer, being accumulated in quantities of approximately 85% of the total of waste

generated. Also in this regard, in Eurostat data 2005, quoted by Farcas A, 2014 are presented data regarding the industry of beer that generate annually a quantity of approximately  $3.4 \times 10^6$  t of brewery malt in the European Union. Mussatto and Solange, 2013 in their paper specified that on the global level the production was estimated to  $38.6 \times 10^6$  t. The brewery mash is valuable also by its content in substances with anti-oxidant nature like polyphenols and flavonoids. The polyphenol substances are located in the layer of the barley grain which is rich in lignin and less rich in endosperm [6]. Thus, the brewery malt, being in a large part made of cellular walls that remain after the extraction of the fermentable substances from endosperm in the process of obtaining the beer wort, is by default richer in phenolic compounds [4]. Goupy and the collaborators in the paper published in 1999, specifies that approximately 80% of the phenolic compounds present in the beer come from malt and the rest come from hop. These compounds represent a real source of natural antioxidants, capable to prevent and treat different inflammatory affections, cardiovascular, neurodegenerative diseases, even cancer, presenting an antitumor activity characterized by the inhibiting of the proliferation of a variety of cancer cells.

#### **MATERIAL AND METHOD**

Due to the high content of water and due to the strong enzymatic activity, the brewery mash is preserved very hard, thus being necessary its fast exploitation. In this regard in order for it to be able to be introduced easily in the composition of the premixes, the brewery malt was dried in the oven for 6 hours, at the temperature of  $78^{\circ}\text{C}$ , up to a content of 10%, was milled, and then were made the 5 premixes, made of white flour and different quantities of brewery mash flour, between 5-25%. The experimental versions were with insertion of brewery mash of 5%, 10%, 15%, 20% and 25% plus the witness sample obtained only of white flour. From them was prepared then bread from traditional recipes, being applied the same technological conditions, which then were submitted to the determinations of freshness.

#### **RESULTS AND DISCUSSIONS**

Regarding the indicators of freshness/ageing analyzed in the bread made from premixes including white flour and different quantities of brewery mash flour (5%, 10%, 15%, 20% and 25%), 5 repetitions from each version, analyzed according to the method of the points but also from the point of view of the form and external aspect, by a number of 40 tasters. The fortification of the bread with brewery mash flour produces modifications of

the technological parameters, which implicitly will be found in the characteristics of quality of the finished products.

Analyzing the results obtained for taste and flavor was remarked that the supplementing with brewery mash flour is placing a significant stamp on the taste, the versions with 5% and 10% being better tolerated and accepted compared to the other versions. About the smell we can say that the insertion of mash flour in the bakery products brings also a significant change of the smell of the analyzed versions. If the versions with insertion of 5-15% are accepted for the other there is reluctance for tasting, due to the strong smell unleashed. The flavor identified by the tasters was present as being that of mash, thus confirming the fact that, the differences in relation to the witness sample are associated to the supplementing of the bread. The flavor identified by the tasters once the time was passing was more and more pronounced, after 36 h of preservation at the room temperature it appeared also a bitter smell which was identified once the time was passing especially in the versions supplemented with the larger quantity of brewery mash flour.

Regarding the aspect and elasticity of the core you can say that an insertion of 5% of brewery mash flour doesn't bring modification regarding these indicators but once the percentage added increases gradually appear also structural modification but also of their aspect. Thus, once the percentage of brewery mash flour increases you can observe a gradual change of color of the core to brown-ruddy, aspect that didn't bother the tasters, but once the content of brewery mash flour increases the elasticity of core decreases gradually, becoming denser. This aspect can be assigned to the large quantity of fibers from it, which, by the repeated mechanical actions exercised during the obtaining, determined the deterioration of the gluten membranes. It can also be explained by the studies of microscopocity accomplished by Bordei in 2003 that showed the fact that, in the bread with fibers, the fine structure of the core, made of thin filaments and membranes characteristic for the bread without fibers, is absent.

Beside the indicators present were considered also other indicators: form, volume, color and aspect of the crust. About the volume of the bread from experimental version we can say that once the percentage of supplemented brewery mash flour increases its volume decreases leading the sample with 25% insertion of brewery mash flour to be of 265.62 cm<sup>3</sup>/100g compared to 331.46 of the witness sample. The decrease in volume is due to the increase of the fiber percentage from premix and the decrease of the content of gluten from the premix, aspect reflected in the incapacity of the dough to retain the fermentation gases. Laurikainen 1998, citat Farcaș, 2014 in their studies reaffirmed that an addition larger than 7% of brewery mash flour in the products of bakery determined the decrease of

the volume of the products due to the decrease of the content in gluten proteins. Another hypothesis suggests the fact that, in the presence of fibers, due to the competition for water from the dough, the gluten proteins don't hydrate enough, so that the gluten network is created in a smaller percentage [4]. The aspect of the crust of the bread in which was introduced quantities of over 15% of brewery mash flour presented the defect of cracking of the crust even from the phase of fermenting, being maintained afterwards also in the finished product. The larger the percentage of brewery mash flour in the composition of the premix the more pronounced was this defect. Also here you can mention the fact that the color of the crust of the bakery products is different varying a lot between the versions depending on the quantity of brewery mash flour introduced in the premix, this becoming darker once the supplemented percentage increases.

## CONCLUSIONS

Supporting the scores and data obtained you can say that the tasters have given data that position the first two version with 5% and 10% insertion of brewery mash flour among their preferences. Also, from the point of view of the freshness, considered by the determination of the ageing parameters of the products in 28h you can say that the supplementing of the bakery products with different quantities of brewery mash flour produces also benefits by increasing the content of fibers in the products but produces also secondary effects on the quality of the products but also on the period of their preservation.

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