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EFFECTS OF THE ORGANIC FLOURS ON DIGESTIVE BAKERY PRODUCTS OBTAINED THROUGH FOOD BIOTECHNOLOGIES

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ABSTRACT. In Romania and in the European space, bakery companies process organic flours. It can be seen that the business environment tends to adapt to the needs of modern consumers in order to generate bakery products obtained through biotechnologies beneficial to the consumer's health. Thus, this research experiment aimed to identify the sensory, physical, chemical and microbiological characteristics of innovated bakery assortments, obtained from biotechnological recipes that used organic flour certified by the manufacturer as raw materials. The laboratory experiments gave the bread recipes, which used white flour T650 standard, Spelt flour, rye flour T1200, whole wheat flour, whole wheat & sorghum flour, oat flour free gluten, buckwheat flour obtained like a mix of nutritional flours and dietary flours, certified organic. The yeasts and lacto bacterial extract stimulators (biostimulators) used to improve the quality of the digestive bread assortments were selected by testing them in the laboratory. The results obtained related to the sensory qualities are significantly better than those found in classic assortments, and the physical characteristics: the volume has had values between 180-270 cm³/100 g, and the porosity, being 75,8-85.7% medium values in the innovative studied recipes. Extreme values were obtained to the Spelt flour 91,2% and to the Oat free gluten flour 65%. Regarding the use of lacto bacterial extracts, its effects were closely related to the organic flour used.

Keywords: organic flours vs digestive bakery products

Introduction

- Nutritional accreditations of flours important from whole grains: similar to wheat, with 13% protein, but lower in lysine and niacin, lower in the protein complex that forms gluten, a good source of P and Mg and a very good source of Mn, high in B vitamins, especially thiamine and folic acid. The triticale grains could be a food source that reduces obesity and complications of diabetes.[2] When preparing gluten-free bread or doughs, wheat and rye flours are replaced with corn, rice, buckwheat flours. These flours, due to the lack of gluten or mucilaginous substances, as in the case of rye flour, these flours, although nutritional, do not possess baking properties. Yeasts and extract cultures stimulate the growth in volume and porosity of bakery products. The enzymatic equipment released by yeasts and lacto bacterial extracts have special nutritional effects on the appearance, volume and taste of bakery products. The design of the use of bio starter cultures for bakery doughs creates new processing techniques in the bakery industry that will compensate by gradually eliminating food additives for leavening, porosity, development and volume.

Material and methods

- Moisture method.** Infrared drying was used to determine the moisture. The acidity of bakery products was checked by the titrimetric method. The porosity was obtained by the cube method and volume index of bakery products with the Fornet apparatus.
- Absorbance method.** The absorbance measurement of the samples was carried out with the UV spectrophotometer. The equipment used in molecular absorption spectroscopy was the Cecil CE 3021 3000 Series UV spectrophotometer. The light and color sensations perceived were between 400-750 nm in the visible range. The research methodology used the reference standards for determining the absorbance of sample by comparison with series of standard solutions.

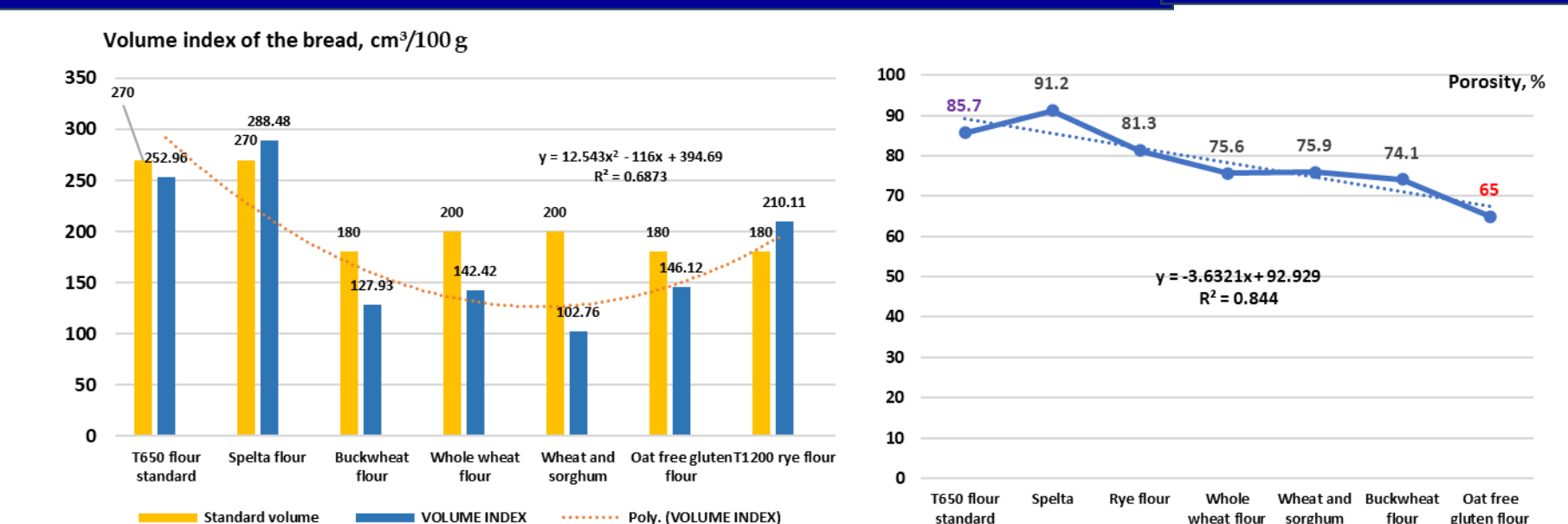
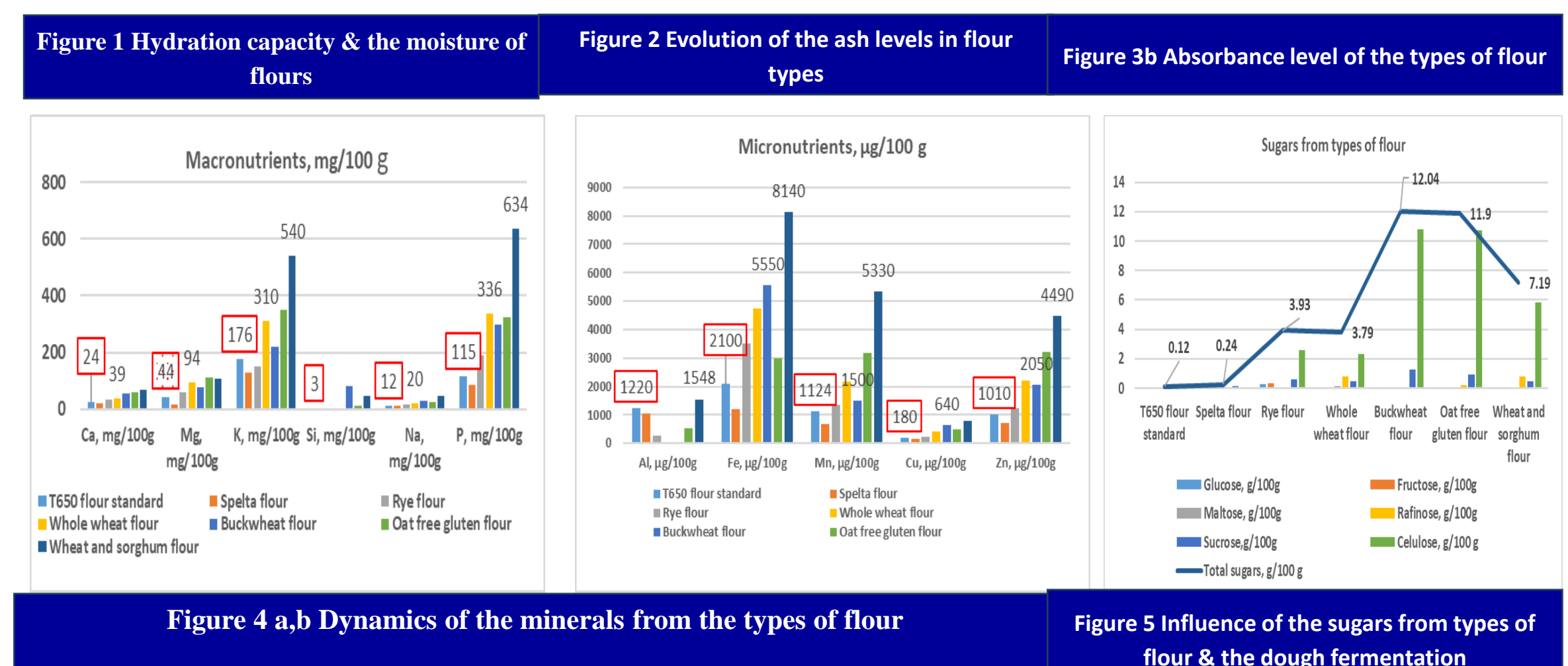
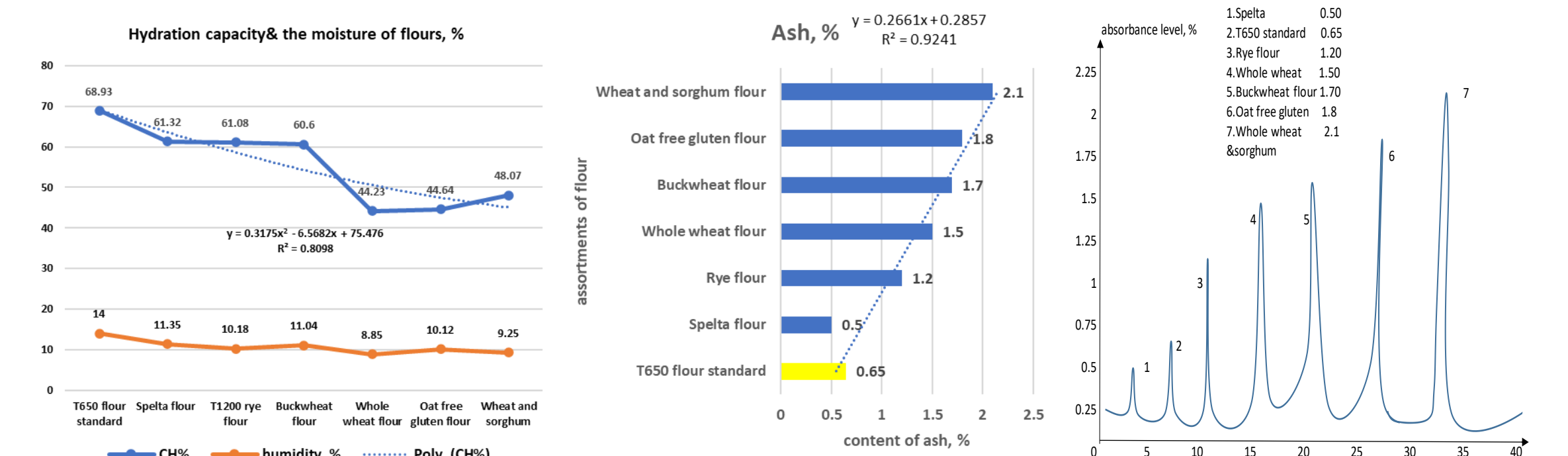
Results and discussion

- The hydration capacity of flours varies depending on the ratio of starch, gluten and bran content in the flour, as well as the moisture content of the flour. So, the highest hydration capacity was for standard T650 flour, the control. The other samples Spelt, Buckwheat flour, Rye flour T1200 had hydration capacities of 60.60-61.32%, while whole wheat flours and other cereals oat, sorghum had much lower hydration capacities of 44.23-48.07%. (fig.1) The level of ash content in flours varies linearly from 0.5% for Spelt flour to 2.1% for whole wheat and sorghum flour. (fig.2)

- Minerals in the studied flours reflect the nutritional value of innovative bakery products. The appearance and colour are defining in the consumer's purchasing decision, as well as the digestibility of the products chosen by consumers for the level of mineral substances so necessary for metabolism. The lowest ash content was in Spelt flour, and the colour is the lightest and most absorbent with the lowest values. (fig.3b). For the doughs obtained from rye flour, whole wheat flour, an average ash level between 1.2-1.7 is observed. For dough obtained from whole wheat and sorghum flour, the ash level was 2.1 g/100 g, which significantly increases the mineral content of bread. The dough obtained from buckwheat flour had a reddish color because the content of Mg, Fe, Mn was increasing. (fig. 4 a,b).

- All nutritious flours have had a higher absorbance level than the standard T650 flour usually used in bakery. (fig. 3b) The higher cellulose content in bran in rye flour, whole wheat flour and whole wheat flour with sorghum, gluten-free oat flour does not flavour the fermentation process, and causes the volume and porosity to decrease in the experimentally obtained samples. (fig.5) The exception is the dough obtained from gluten-free oat flour where the volume index is significantly reduced to 127.93 cm³/100 g. (fig.6) The dynamics of the porosity of the bread assortments obtained from innovative recipes with the organic flours and biostimulators indicated a maximum porosity for bread with Spelt flour, average porosities for whole wheat flour, whole wheat and sorghum flour, rye flour and buckwheat flour.

Results and discussions



Conclusions

- The Spelt flour to which enzymes for bio fermentation were added gave the highest quality product, volume well above average limits.
- The bakery products obtained from the oat flour gluten-free have major disadvantages related to the volume, porosity 65% (the lowest) and a high specific flour consumption.
- The innovative products obtained from whole wheat flour, whole wheat with sorghum, rye flour, buckwheat flour obtained average values following the volume and acceptable sensory characteristics, but also increased nutritional values related to the level of mineral substances. Wheat flour with sorghum has the richest nutritional components.

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