

## USE OF NETTLE ROOTS TO MANUFACTURE BAKERY PRODUCTS

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**Abstract:** it was carried out the study regarding the influence of nettle root addition on physico-chemical indicators and organoleptic indices of wheat bread first quality to different percentage of vegetal addition 1, 3, 5, and 7 % reported to mass of flour. As a result of the calculations performed on the bread with the addition of nettle root flour, it is recommended to produce bread by the percentage of 3 % relative to the mass of the flour. Bakery products containing nettle root with biological value increased, has beneficial effects on bakery products, namely on the rheological properties and quality indices.

**Keywords:** wheat flour, flour of nettle root, quality, control sample.

### Introduction

Scientific and technical developments of recent years visibly influences the life style of the current generation. These influences are reflected in the manner of the modern human diet. The increasing incidence of eating disorders and treatment costs allocated to them, has alerted authorities and nutritionists. The combat is even harder and more expensive as the effects of dietary imbalances are present among children [1].

Lately there have been made various researches in the field of nutrition to create natural food that would increase the nutritional value of products and should compensate functional elements needed to feed the population.

At the same time, nettle can be used prophylactically, antianemic, antidiarrheal properties, hypoglycemic, emollient, cough suppressants, regulating voltage, etc. [3].

A solution in this problem could be the use of reprocessed products from non-plant material, such as nettle root, due to the presence in it of a large number of nutrients: dietary fiber, pectin, vitamins, organic acids, polyphenols, macro-and macroelements [2].

The goal of the research is the development of manufacturing technology of high-quality bakery with establishing optimal dose of powdered root added nettle.

### Materials and methods

Conducting the surveys has been used wheat flour of first quality with the following physical and chemical indicators: humidity  $8.7 \pm 0.2\%$  [3], the acidity  $3.1 \pm 0.1$  degrees [3] retention capacity of 45 min [4], ash content  $0.695 \pm 0.003\%$  [4], the "power" of the flour  $73.25 \pm 0.06\%$  [4] wet gluten content of  $18.3 \pm 0.2\%$  [4], indicate the strain of gluten 7.2 mm [4]. Compressed yeast, salt pans and drinking water have presented the organoleptic standard [5, 6, 7]. There have been used physico-chemical methods and organoleptic to determine the quality of bakery items [8].

For research of autochthonous nettle roots were harvested during spring 2012, which were cleaned and washed, then dried at  $50\text{ }^{\circ}\text{C}$  to  $11.0 \pm 0.5\%$  humidity.

The dried roots were ground up to the state of powder with  $45\text{ }\mu$  demissions and stored at room temperature in a dark container. It was used the classical unified recipe

for bakery products from wheat flour of the first quality with the application of the single-phase [9].

All scientific results presented in this study were statistically processed with the appreciation of average values and standard deviations.

### Results and discussions

Table 1 presents the physico-chemical indicators of flour quality made from dried roots of nettle.

*Table 1.* The organoleptic and physico-chemical characteristics of nettle root flour [10]

Characteristics	Flour of nettle root
<b>organoleptic</b>	
<b>Color</b>	Grayish beige
<b>Taste and smell</b>	Characteristic to the product of nettle, slightly astringent
<b>Smell</b>	Characteristic to the product, of roots have a less perceivable odor of tuber of potato, no extraneous flavors
<b>Mineral impurities</b>	From the chewing should not feel gnashing
<b>physico-chemical</b>	
<b>Moisture, %</b>	11.0±0.5%.
<b>Ash content, %, max</b>	8.0±0.3%

In order to determine the influence of root nettle flour on physico-chemical indicators and organoleptic indices have been introduced in the recipe for making wheat bread first quality different doses of root nettle flour: blank test (PM (no added) 1, 3, 5 and 7 % in relation to the mass of wheat flour (r.m.w.f.).

In Table 2 are presented physico-chemical indicators of obtained bread samples.

There is an increase of the product moisture with the increasing of content of nettle root flour, this is explained by the fact that the root of nettle is richer in soluble fiber than insoluble ones, these having water-binding properties lower compared to insoluble fibers, so it will not increase the capacity of water absorption, and therefore, the product will be with a higher moisture content.

The values of the acidity increases with the increasing of nettle root flour, because it has a higher acidity than wheat flour.

It is observed slightly diminishing with the increasing content of root nettle flour, because the nettle root flour does not contain gluten, and does not contribute to refining of product, another cause is that the nettle has a higher ash – 7.7, and the yield of quality I is greater, this having a negative effect on the fermentative activity of the yeast.

Once with the increasing of the content of root nettle flour is slightly reduced the volume of bread samples, because the flour of root does not contain gluten, but it contains a large amount of fibers, which have the property to decrease the volume of the finished product, therefore, the manufacture of root nettle flour products is recommended to use wheat flour with high gluten content.

**Table 2.** The influence of the addition of nettle root flour on physico-chemical quality indices of bread

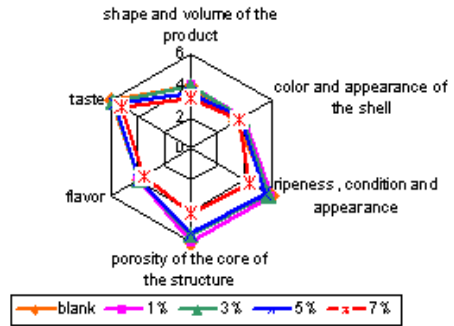
Quality indices	Blank test, PM	Samples with the addition of nettle root, % r.m.w.f.			
		P1	P3	P5	P7
Moisture, %	42.0±0.8	43.0±0.7	43.0±0.6	44.0±0.9	45.0±0.4
Acidity, degrees	3.0±0.1	3.2±0.2	3.8±0.1	3.9±0.2	4.2±0.15
Porosity, %	68.0±2	67.0±2	67.0±1	67.0±1.5	66.0±1
Mass of product, g	568±0.9	565±1.1	569±1.1	568±1.5	571±1.0
Bread volume, cm <sup>3</sup>	1860±10	1860±10	1855±10	1850±10	1780±10
The specific volume, cm <sup>3</sup> / 100 g	3.3±0.1	3.3±0.1	3.2±0.2	3.2±0.1	3.1±0.15

As a result of baking bread, under laboratory conditions, with nettle root flour were carried out the following finished products, shown in Figure 1. The sensory analysis is shown in Figure 2.



**Fig. 1.** Samples of baking bread:

1 - PM – blank test; 2 - bread flour 1% of nettle root; 3 - 3% bread flour nettle root; 4 - 5% bread flour nettle root; 5 - 7% bread flour nettle root



**Fig. 2.** Organoleptic assessment of bread samples

Sensory analysis of bread has been made by a group of six tasters, who have determined the following characteristics: the form and volume of the product; the color and appearance of the shell; the degree of ripeness, condition and appearance of the core; porosity and pore structure of the core; flavor; taste. Rating the sensory quality of the bread was made by the method of 30-point scale [4].

After analyzing the score and evaluations can be noted that all samples of bread had suitable form, without cracks, with a volume well developed, with a smooth skin, slightly soft and uniform golden yellow color, these being arguments that the parameters production of bread have been respected. The colour of the crumb in all samples is characteristic white bread, but bread with the addition of 7% the crumb has a more brown color, smooth and dry to the touch. The products obtained have a developed porosity, with small and medium pores evenly distributed. The products have

elastic crumb/core, so, in such a way, when you press your finger returns to baseline. Samples show a pleasant, pronounced aroma, characteristic of well baked bread and the product taste is pleasant, sweetish. The product with a higher amount of added nettle root flour of 7% has a strange flavor.

### Conclusion

After analyzing of baking samples with the addition of root nettle and score obtained after tasting it can be also mentioned that all the samples were of very good quality except with the addition of nettle more than 7% at which tasters seized faults as: smell and strange taste, reduced volume, poorly developed porosity,, core/crumb and crust darker, and other samples of baking flour with added nettle root not differ essentially of blank taste.

According to the results obtained from organoleptic and physico-chemical determinations on bread with nettle root flour, it would be advisable the bread production with optimal percentage of 3% of nettle root.

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