

## Production opportunities of a functional product – barley – vegetable snack

Within framework of the project "**Hulless barley variety Kornelija – high-quality whole grain raw material for development of niche and functional products**"

### Work assignments

1. Determination of biologically active compounds in the hulless barley variety ‘Kornelija’, and in barley flour;
2. Determination of anti-radical activity in the hulless barley variety ‘Kornelija’, and in barley flour;
3. Evaluation of barley grain/flour suitability in the production process of a functional product, namely barley – vegetable snack;
4. Development of a recipe for a functional product – barley-vegetable snack;
5. Sensory evaluation of a functional product, namely barley – vegetable snack.

In this period, hulless barley variety ‘Kornelija’, as well as samples of barley flour, were tested. Certain biological active compounds were determined: total content of phenols, flavonoids and tannins, as well as antioxidant activity of antioxidants with 2.2 diphenyl-1-picrihydrazil reagent (DPPH). The test results of the samples are summarized in Table No. 1

Content and anti-radical activity of the biologically active compounds of the hulless barley variety ‘**Kornelija**’ and their flour

Table No. 1

Samples	Total phenol content, mg 100 g <sup>-1</sup> (expressed as gallic acid)		Flavonoid content mg 100 g <sup>-1</sup> (expressed as quercetin)		AOA (DPPH*) mmol TE 100g <sup>-1</sup> (trolox equivalent)		Tannin content mg 100 g <sup>-1</sup> (tanine acid)	
	Mean	Standard	Mean	Standard	Mean	Standard	Mean	Standard
Grain ‘Kornelija’	305.95	17.6	275.12	18.4	555.06	18.59	2.75	0.07
Flour ‘Kornelija’	273.14	7.93	290.25	7.17	493.15	5.21	1.25	0.03
Grain ‘Kornelija’II	212.55	7.65	237.26	11.0	501.66	7.80	1.40	0.16

Prior to development of the recipe of the functional product, namely – barley – vegetable snack, literature was assessed and evaluated in regard to the content of protein, amino acids and fibre of the hulless barley variety ‘Kornelija’, as well as in regard to the content and antiradical activity of biologically active compounds. After assessment of the content and antiradical activities of biologically active compounds of barley variety ‘**Kornelija**’, conclusions are drawn that these grains are suitable for the production process of a functional product, namely – barley – vegetable snack.

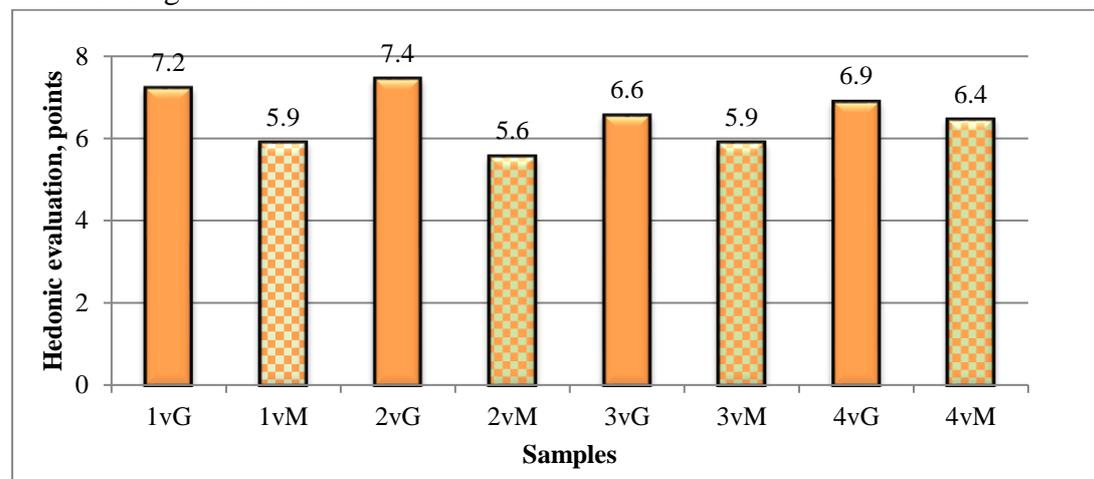
Four recipes and selected raw materials have been developed for the production of a functional product of hulless barley variety Kornelija – barley – vegetable snack (bar). Description of raw material preparation:

- Beets, carrots: cooked raw materials used. Peeled, grated, dried, powdered;

- Plums, dates: dried, chopped raw materials used;
- Quince syrup with Sukrin: made from quince juice with the addition of the sweetener Sukrin; Quince syrup: made from quince juice with added sugar;
- Blackcurrants: frozen blackcurrants, dried, ground;
- Quince concentrate: evaporated quince juice.

Four variants of germinated barley grain ‘Kornelija’ bars have been prepared, namely – 1vG; 2vG; 3vG; 4vG, and four variants of barley flour made from ‘Kornelija’ variety – 1vM; 2vM; 3vM; 4vM.

The produced **Kornelija barley-vegetable bars** were subjected to hedonic sensory evaluation in order to obtain the opinion of the evaluators on the degree of liking of the given product. The results of sensory evaluation are summarized and shown in Figure No. 1.



1. fig. Hedonic evaluation of hulless barley ‘Kornelija’ bars

After summarizing and evaluating of the comments that were in the questionnaires below the results of the hedonic evaluation, it can be concluded that the highest evaluation was received for hulless barley grain barley ‘Kornelija’ bars, which were prepared according to the **2vG** recipe. These bars had a good taste and were sweet enough, as noted in the comments of the sensory evaluation questionnaires. The bars **2vG** the bars contained honey (Table No. 2, recipe), which created a pleasant taste bouquet for the sample. The evaluators preferred as best the bars made from ground hulless barley grain ‘Kornelija’, instead of flour. The consistency of the bars made from flour was drier and supposedly more crumbly, and the aftertaste of these bars (from flour) was bitter, according to the evaluators.

In many sensory evaluation questionnaires, a comment was made that 3vG and 4vG bars should be added with chocolate because their taste was too strong and too sour. The prepared bars 3vG and 4vG were topped with Belgian Dark Chocolate Noir Selection C501/J. The taste of these bars after pouring (topping) them with chocolate is very good, but the disadvantage is that they melt in a very warm room, which means another chocolate must be chosen.

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