

# BREAD SUPPLEMENTED WITH HERBAL BLEND VITALPLANT®



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**Abstract:** *With the aim of formulating novel bakery products with desired biological attributes, medicinal and aromatic herbs have been added to basic ingredients in various forms.*

*Pulverised herbal blend and extract VITALPLANT® intended for bodyweight regulation were included to bread formulation at recommended doses. The pulvis was added at 2% level and the extract was added at 8% level, flour basis.*

*In the paper it was investigated the effects of added herbal ingredients on the sensory properties of bread. The supplemented breads have specific aroma and colour which significantly distinguished them from standard white bread.*

*It was concluded that the pulverised herbal blend is much more suitable for bread making because it contributes to the increase of bread specific volume and improves bread crumb attributes.*

**Key words:** medicinal herbs, bread, sensory properties

## INTRODUCTION

Medicinal herbs have been widely applied in various industrial branches such as pharmaceutical, cosmetical, chemical, etc. Regarding food industry, medicinal herbs have been considered as the most usable resources for the development of nutraceuticals - functional foods (Arsić, 2003). Baked foods are objective points to nutraceutical development because of their nutritive value and their value as nutraceutical carriers. When consumed at the daily recommended intake levels, fortified bread as mass consumed food item can easily serve as an effective medium for administering a

daily dose of nutraceuticals. Guided by this idea, associates from the Institute for Medicinal Plant "Dr Josif Pančić", and the Institute for food technology in Novi Sad have developed a new formulation of bread supplemented with medicinal herbs (Brkić et al., 2001, Šimurina et al., 2000). Otherwise, herbs and spices are not being used as direct supplements in bread dough except for decorations (Neumann, 1999).

Medicinal and aromatic herbs not just influence the taste and flavour of the product but have a beneficial effect on human organism. Herbal extracts contain aetheric oils

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and other active substances such as tannins, organic acids, enzymes, resins, pigments, vitamins, minerals, mucous substances, etc. that enhance aroma and improve nutritive value of a product (Willbrandt, 1989).

The aim of the paper was to investigate the influence of commercial herbal blend VITALPLANT® for metabolism enhancement and body weight regulation in the proposed doses (2% pulvis flour basis, and 8% extract flour basis) on: specific volume, compressibility and crumb structure, taste, colour of crumb and crust.

## MATERIALS AND METHODS

The herbal blend VITALPLANT® was formulated in two forms: as a powder (pulvis) and liquid extract for production of specific breads. Medicinal raw material used for the production of the herbal blend was provided partially from spontaneous flora and cultivation, depending upon the species. According to the principles of Good Manufacturing Practice (GMP), which are applying in production of medicines and herbal preparations, herbal drugs were tested according to directions supplied by actual regulation in this field (Ph Jug 2000).

**Table 1.**

Qualitative characteristics of herbal drug constituents of Vitalplant®

Herbal drug	Sensory characteristics	Moisture content (%)	Ash content (%)	Essential oil (%)
<b>Frangulae cortex</b>	Correspond to Ph. Eur.	9,30	5,31	-
<b>Menthae pip. Folium</b>	Correspond to Ph. Eur.	12,03	10,87	2,26
<b>Carvi fructus</b>	Correspond to Ph. Eur.	5,73	4,95	2,35
<b>Petroselini fructus</b>	Correspond to Ph. Eur.	3,38	9,86	1,90

Quality control of all used herbal drugs covered: determination of sensory characteristics, determination of moisture content, determination of ash content as well as determination of aetheric oil content.

Pulverisation and sieving of single herbal drug was accomplished by the use of appropriate equipment (mills, sieves). This

way the processed pulverized plant drugs (<3 mm) were mixed in proportions given by defined prescription, giving final herbal blend with trade name VITALPANT® pulvis.

Plant extracts were prepared by double percolation method, using 45% propylene glycol (PG) E1520 as solvent. Ratio of herbal drug to solvent was 1:2.

**Table 2.**

Basic characteristics of single PG extracts

Extract	Sensory characteristics	Relative density (g/cm <sup>3</sup> )	Refractive index	pH
<b>Ext. Frangulae cortex</b>	Correspond to Ph. Eur.	1,0545	1,3916	4,96
<b>Ext. Menthae pip. folium</b>	Correspond to Ph. Eur.	1,0575	1,3913	5,89
<b>Ext. Carvi fructus</b>	Correspond to Ph. Eur.	1,0502	1,3869	6,59
<b>Ext. Petroselini fructus</b>	Correspond to Ph. Eur.	1,0506	1,3920	7,69

Herbal blend VITALPANT® as the final product (powder and extract) was also characterised according to directions supplied by

GMP, in the same way as original single herbal drugs (Table 3).

**Table 3.**  
Characteristics of herbal blends (powder and PG extract)

Characteristic	Vitalplant® pulvis	Vitalplant® extract
Moisture content (%)	7,91	-
Ash content (%)	6,71	-
Sieve analysis	0,75	-
pH	-	5,81
Refractive index	-	1,3919
Relative density	-	1,0559

The basic ingredient for the production of bread with the herbal blend was wheat flour type 500 which quality parameters are reported in Table 4. Other ingredients (fresh baker's yeast, salt and improver) were of commercial origin. The quality attributes of the ingredients were analyzed according to the current regulations (Kaluderski, et al. 1998, Regulation 74/1988, Regulation 52/1995).

On the basis of the quality of applied ingredients and desired optimal quality attri-

butes of the end product, processing procedures for dough mixing, handling and baking were elaborated.

The dose of herbal blend VITALPLANT® was selected to provide distinct aroma in bread but not to impair the sensory quality and acceptance of bread. The herbal blend VITALPLANT® pulvis was added in amount of 2% (flour basis) and the extract VITALPLANT® 8% flour basis. Other ingredients were dosed according to standard formula (yeast 3%, salt 2% and complex improver 0.3%).

**Table 4.**  
Processing quality of wheat flour

Quality parameter	Value
Water content, %	12.6
Ash content, % d.b.	0.47
Wet gluten content, %	29.0
<b>Farinogram</b>	
Water absorption, %	55.7
Departure, min.	15.0
15-min drop, B.U.	+15
Quality number	100
Quality group	A-1
<b>Extensigram</b>	
Extensigraph area, cm <sup>2</sup>	89
Resistance, B.U.	500
Extensibility, mm	117
Ratio	4.27
<b>Amylogram</b>	
Amylograph peak viscosity, B.U.	1055

Bake trials of 300-g pan breads were conducted under laboratory conditions using a straight dough process. After mixing in Diosna laboratory mixer at 85 r/min, the mass was fermented for 30 min. It was then divided into 340 g dough pieces, rounded and put into tin pans to ferment. The final fermentation lasted for 55-65 min at 30 °C. Baking was performed in a deck type oven "Termotehnika", Zagreb at 220 °C for 21-23 min.

Sensory properties of breads were determined 24 h after baking by 3 trained and

experienced panelists. The sensory analysis was performed in accordance with the official method of determining sensory properties of bread in the Republic of Serbia (Kaluderski et.al., 1998, Pravilnik 52/1995). The sensory analysis provided descriptive attributes regarding bread elasticity, crumb grain structure and flavour.

In addition to sensory analysis, instrumental parameters were also determined: Specific volume (ml/g) defined as a ratio of loaf volume and weight after 24 h.

- Crumb compressibility determined by penetrometer SUR PNR 6 (Jančić et al., 1979).
- Colour of the crust and crumb determined on a tristimulus photocolourimeter MOM Color 100. Colour parameters were presented in CIE-Lab system (Robertson, 1977).
- Bread firmness and springiness were measured on bread 24 h after baking using a TA-XT plus texture analyzer (Stable Micro Systems, England) with a standard 36 mm cylinder probe and a 5 kg load cell. The analysis was performed in four replicates per bread loaf. Two loaves of each bread type were analyzed.

The obtained data were processed using program Stat-graphic Plus V7.1. (Statistical graphic Corporation, UK).

## RESULTS AND DISCUSSION

The sensory properties of breads supplemented with herbal blends compared to that of the control standard bread are shown in Table 5.

Bread made with the VITALPLANT herbal extract did not significantly differ from the control sample in the specific volume whereas the powdered form gave an increase in loaf volume (Table 5).

The herbal blend VITALPLANT affected bread flavour providing a pleasant aroma associated with the used herbal drugs. The bread crumb was well developed and spongy. The elasticity and compressibility of bread made with the VITALPLANT pulvis were excellent and the pores were spongy with excellent melting-in-mouth. High values for penetrometer number additionally asserted that bread crumb was high quality. However, the bread made with the extract showed poorer sensory quality.

**Tab. 5.**  
Sensory properties of bread supplemented with herbal blends

Quality parameters	Control sample	Bread with powdered herbal blend	Bread with liquid herbal extracts
Specific volume, ml/g	4,6 <sup>a</sup> ±0.34	5,9 <sup>b</sup> ±0.97	4.47 <sup>a</sup> ±0.45
Penetrometer number, after 24h	100 <sup>a</sup> ±15.2	126 <sup>a</sup> ±13.4	88 <sup>b</sup> ±14.8
Crumb elasticity	excellent	Excellent <sup>+</sup>	very good
Crumb grain structure	spongy	spongy	fine
Taste	archaic	Aromatic on mint, pleasant	Aromatic on mint, pleasant

Values followed by the same letter in a row are not significantly different at 5%.

The colour parameters of breads are displayed in Table 6.

**Table 6**  
Crumb and crust colour parameters of breads supplemented with VITALPANT<sup>®</sup> herbal blend

Sample	Crust colour parameters			Crumb colour parameters		
	L*	a*	b*	L*	a*	b*
<b>Control, standard bread</b>	64,72 <sup>a</sup>	0,38 <sup>a</sup>	34,15 <sup>a</sup>	95,77 <sup>a</sup>	5,32 <sup>a</sup>	22,6 <sup>a</sup>
<b>Bread with 2% VITALPANT<sup>®</sup> pulvis</b>	59,47 <sup>c</sup>	3,73 <sup>c</sup>	35,24 <sup>a</sup>	56,72 <sup>c</sup>	-2,51 <sup>b</sup>	31,18 <sup>b</sup>
<b>Bread with 2% VITALPANT<sup>®</sup> extract</b>	60,79 <sup>b</sup>	2,38 <sup>b</sup>	77,23 <sup>b</sup>	67,73 <sup>b</sup>	-7,27 <sup>c</sup>	30,66 <sup>b</sup>

<sup>a,b,c</sup> Values followed by the same letter in a row are not significantly different at 5%.

The addition of herbal blend decreased the lightness (L\*). This effect was more prominent in the crumb rather than in the crust.

Moreover, it was observed that herbal blend in the form of pulvis caused higher decrease in the lightness of either crumb and

crust as compared to extract. There was an increase in the red tone ( $a^*$ ) of the crust in the supplemented breads. The yellow tone prevailed in all samples. The herbal extract caused a marked increase in the yellow tone of the crust.

As presented in Table 6, the  $a^*$  values registered in the crumb of the supplemented

breads were negative which imply to the prevalence of green tone of the crumb. Again, this effect was more marked in the samples prepared with the extracts. Same as in crust, the supplementation increased the yellow tone of the crumb as compared to the control. This increase was similar either for the extract or pulvis supplemented breads.

**Table 7.**

Texture parameters of breads supplemented with VITALPANT® herbal blend

Sample	Firmness, g	Resilience, %
Control, standard bread	376,00 <sup>a</sup> ±22.06	30.27 <sup>a</sup> ±1.58
Bread with 2% VITALPANT® pulvis	352,46 <sup>a</sup> ±20.43	30.96 <sup>a</sup> ±0.63
Bread with 2% VITALPANT® extract	433,01 <sup>b</sup> ±27.25	29.73 <sup>a</sup> ±0.61

<sup>a,b</sup> Values followed by the same letter in a row are not significantly different at 5%.

The addition of herbal pulvis did not significantly affect the crumb firmness in comparison with the standard white bread, however, the herbal extract gave a massive increase in the crumb firmness which is probably due to the effect of solvent (45% propylene glycol) present in the extract. The crumb resilience was not significantly affected in the supplemented breads.

## CONCLUSIONS

The commercial herbal blend VITALPLANT® which contains the following aromatic herbs and medicinal plants: *Fragulae cortex*, *Menthae pip. Folium*, *Carvi fructus* and *Petroselinii fructus* can be used in the bread production.

Breads with herbal blends VITALPANT® have different crumb colour than that of the standard bread, specific taste and aroma.

Herbal blend VITALPANT® in the form of pulvis is far more suitable for application in bread making than extract because it gives bread of high loaf volume and good crumb firmness and springiness.

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