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## EFFECT OF HERBAL MIXTURE "GASTROHERB®" ON THE QUALITY OF PIZZA CRUSTS

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### Summary

*In order to obtain novel bakery products with specific biological attributes, medicinal and aromatic herb mixtures have been included in product formulations. Researches from the Institute for Medicinal Plant Research "Dr Josif Pančić", Belgrade have formulated herbal mixture "Gastroherb®" in pulverized form and extract that enhances the functionality of bakery products. Medicinal herbs and aromatic components of the mixture (sage, artichoke, coriander and oregan) contain a complex of biologically active components exhibiting numerous activities (choleric, carminative, antioxidative, antimycotic) that positively influence digestion. Herbal mixture "Gastroherb®" doses varried in dough formulations depending on the form: 2% (flour basis) for pulverized mixture and 8% (flour basis) for extract. The addition of herbal mixture to pizza crust contributed to the development of new sensory profile and functional properties (improves digestion). In the paper, characterization of herbal raw materials and the blend, process technology as well as the sensory properties of pizza crusts have been accented.*

**Keywords:** medicinal and aromatic herbs, bakery products, sensory properties

### Introduction

Medicinal herbs have been considered as the most usable resources for the development of nutraceuticals - functional foods regarding food industry, (Arsić, 2003). According to T.P. Shukla (Shukla, 1998), herbs and spices were being used at a rate of 860 million lb per year in the United States alone in 1998. Baked foods are objective points to nutraceutical development because of their nutraceutical value and their value as nutraceutical carriers. When consumed at the daily recommended intake levels, fortified bread and bakery products as mass consumed food items can easily serve as an effective medium for administering a daily dose of nutraceuticals. 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 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).

During the last decade, the production of pizza supplemented with proteins, minerals, vitamins and dietary fibers has become very popular. Varying the composition of filling and pizza crust, an expansion of the product range with endless combinations of products could be achieved.

Associates from the Institute for Medicinal Plant "Dr Josif Pančić", Center for Cereal Technology and "Kikinda" Bakery have developed a new category of pizza crusts supplementing them with medicinal herbs (Brkić et al., 2001, Šimurina et al., 2000). Until now, herbs and spices were not being used as direct supplements in bakery products except for decorations (Neumann, 1999).

The aim of the paper was to define an appropriate formulation and dose of herbal blend for metabolism enhancement and to incorporate it to pizza crust. The impact of herbal blends on the technological quality of pizza crusts was also examined.

## Materials and methods

### *Preparation and characteristics of herbal blend*

Herbal mixture Gastroherb® was formulated in two forms: as a powder and liquid extract. Medicinal raw material used for the production of the herbal mixture 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). Quality control of all used herbal drugs covered: confirmation of identity, determination of sensory characteristics, determination of purity, determination of moisture content, determination of ash content as well as determination of active substances, and additional testing (microbial quality).

Table 1. Qualitative characteristics of herbal drug constituents of Gastroherb® blend

Herbal drug	Weight loss after drying, %	Ash content, %	Level of grinding	Content of active substance (aetheric oils)	Microbiological quality
Coriandri fructi pulvis (73621204)	3,58	4,51 (Jus. max.7)	1	0,311%	Appropriate
Cynarae folii pulvis (47911005)	4,40	17,67	Not uniform	-	Appropriate
Origani heracleoticae herbae pulvis	5,36	10,65	1	3,197%	Appropriate
Herbal blend 3B	5,08	8,35	1	1,525%	Appropriate

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 mixture with trade name Gastroherb® pulvis.

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

### **Baking procedure**

Pizza crusts were produced using no-time dough procedure. The basic dough formulation and procedure is described in Table 2.

Table 2. Basic dough formulation and processing parameters in the production of pizza crusts

Ingredients and parameters	Thin cracker-like crust (type 1)	Thick bread-type crust (type 2)
	%	
Basic dough formulation		
Wheat flour, type 500	100	100
Salt	1.8	1.8
Sugar	3.5	2.0
Oil	3.0	-
Baker's yeast	5.0	5.0

Water	According to water absorption	According to water absorption
<b>Processing parameters</b>		
Mixing time, min.	2+8	
Dough temperature, °C	24-25	
Bulk fermentation	-	
Dough make-up	Manual dividing and rounding	
Dough weight, g	150	
Dough sheeting	Manual	
Thickness of dough sheet, mm	4	
Final fermentation, min	30	
Bake temperature, °C	250	
Bake time, min.	8	

A commercial bread improver was also included in dough formulation in doses according to the recommendation of manufacturer. The quality attributes of flour was analyzed according to the current regulations (Kaluderski, Filipović, 1998, Pravilnik 74/1988, Pravilnik 52/1995). Processing quality of used wheat flour is reported in Table 3.

Table 3. Processing quality of wheat flour

<b>Quality parameter</b>	<b>Value</b>
Water content, %	14.7
Ash content, % d.b.	0.51
Wet gluten content, %	28.4
<b>Farinogram</b>	
Water absorption, %	54.3
Departure, min.	4.5
15-min drop, B.U,	120
Quality number	14.1
Quality group	51.2
<b>Extensigram</b>	
Extensigraph area, cm <sup>2</sup>	13.1
Resistance, B.U.	80
Extensibility, mm	126
Ratio	0.63

Results from preliminary trials were used to select doses of herbal blends that do not disturb the taste characteristics and acceptance of bread. Gastroherb® herbal blend in powdered form was added in amount of 2% flour basis while the same herbal blend in liquid form was added in amount of 8% flour basis.

#### *Sensory evaluation*

Sensory properties of pizza crusts with herbal blends were compared to standard pizza crust with respect to the following parameters: dough thickness, crumb grain structure, crumb colour, mastication, melting-in-the-mouth, cutting ability, taste, odour, having importance mainly for consumer's acceptance (Bojat and Vukobratović, 1993.). Sensory panel consisted of 3 trained judges.

## Results and discussion

The sensory properties of pizza crusts supplemented with herbal blends compared to that of the control standard pizza crust are shown in Tab 4.

Table 4. Sensory properties of pizza crusts supplemented with herbal blends

Quality parameters	Control sample		Crust with powdered herbal blend		Crust with liquid herbal extract	
	type 1	type 2	type 1	type 2	type 1	type 2
Dough thickness, mm	5	6	4,5	5.5	4	5
Cutting ability	very good	very good	very good	very good	good	good
Porosity	fine	spongy	fine	fine	fine	almost fine
Texture	crispy	crispy	crispy	crispy	crispy	firm
Crumb colour	light yellow	light	yellow with visible particles of herbs	yellow with visible particles of herbs	yellow-greyish	yellow-greyish
Taste/Odour	characteristic	characteristic	palatable, expressive herbal taste	palatable, expressive herbal taste	palatable, aromatic	palatable, aromatic
Melting-in-the-mouth	excellent	excellent	excellent	excellent	good	very good
Mastication	very good	very good	very good	good	almost good	good

The results confirmed that pizza crust supplementation with powdered herbal blend provided good quality pizza crusts with specific sensory attributes. The taste characteristics of the supplemented crusts are different from those of the control sample but well accepted by the panelists. The samples have well developed, porous and elastic crumb. Colour of the crumb is specific and visually very accepted. Excellent elasticity and porosity of the crumb for bread-like pizza crusts with extended shelf-life properties was observed. Pizza crusts supplemented with liquid herbal extract showed poorer sensory properties.

## Conclusion

Important step in creating a formulation for bakery products supplemented with medicinal herbs is deriving an optimal ratio of ingredients that does not negatively affect the sensory properties of the product as well as a suitable preparation mode of herbal extracts. The optimum doses of herbal blends reported (2 % flour basis for powder and 8 % flour basis for liquid extract) were found not to disturb the sensory properties and acceptance of the product but are sensorily registered. Pizza crusts supplemented with mixture of herbal extracts have specific taste and odour, coloured crumb and an acceptable sensory score.

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