RESEARCHES CONCERNING ON MAKING FUNCTIONAL BREAD ENRICHMENT WITH SOLUBLE DIETARY FIBERS

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Abstract: *At the present day, the food producers meet the demands of the consumers that want products with an important role in health preservation. Thus, the bread producers focused theirs attention towards the researches of the functional food. A functional role it is attributed especially to the soluble fibers that help in the control of the level of the glucose and lipids in the blood. Therefore, the practical and theoretical researches were made in order to obtain bread with a low content of glucides, and that compliance with all legal requirements these are in force .The purpose of this paper is to present a study about bread where it was added insoluble fibers (bran) and soluble (inulin), in different rates, and using as sources chicory and Helianthus tuberosus (topinambur). It was analyzed the percent of inulin retrieved in the final product relatively to the initial supplementation, the percent of protein and glucides. It was analyzed the level of the microorganisms in relation to the legally limits stipulated in the Health Ministry Regulation no 975 (OMS 975). It was made sensory test relatively to a free inulin control sample. It was calculated the energetically value and it were done appreciations about the intake of the fibers in comparison with daily demand recommended, without pass over the economically aspect.*
Dependent on results that were obtained it is recommended a using of 3% inulin (irrespective of source) based on flour.

Key words: *insoluble fibers, soluble fibers, functional food, bread, bran, inulin, chicory.*

Introduction

The trend of the big bread making companies is that to satisfy not only the taste of the consumers, but also their wish to preserve their health. Thus, it appeared the notion of functional food that was created especially for pretentiously consumers that want to maintain a healthy style of life.

The functional food in bread making industry appeared by supplementation of the soluble fibers that have prebiotic effect. The most common soluble fiber is inulin, whose sources of obtaining are chicory and Helianthus tuberous (topinambur). By adding inulin into the product it was observed that there is a technological improvement too, such as: substantially increase of the end product volume, uniform porosity, facile slicing, flavor, sweetish, conservation of the freshness on the shelf life established without any modification of the microbiology charge.

Concerning nutritionally aspect it was observed the existing of a protein and soluble fibers content (inulin) and a decreasing of the glucides content without any taste modification.

Starting with these reasons we intend to present the bread products manufactured at SC Lujerul SA, and that meet the requirements of the consumers.

Materials and methods

It was used dietetic flour (whole grinding, graham flour), black flour, soluble fiber (inulin from chicory and topinambur), in various ratio, vital gluten, iodated salt, water.

It was obtained bread with a low energetic value and with soluble fibers content.

2.1 Working method

It was adopted a direct process and baking in trays

2.2 Sample preparation

In table 1 it is show the base receipts for bread with added fibers.

Table 1Base receipts for 100 kg final products

Ingredients	Bread with bran Blank taste (M) (Control sample)	Bread with bran and inulin Samples			
		Chicory P1	Topinambur extract 12,5% s.u.		
			P2	P3	P4
Dietetic Graham flour	5	-	-	-	-
Dietetic whole grinding flour	-	37	37	37	37
Black flour	40	-	-	-	-
Yeast	2	1,8	1,8	1,8	1,8
Vital gluten	0,7	13	13	13	13
Wheat bran	7	13	13	13	13
Inulin	0 %	2 (3%)	2 (3%)	2,5 (4%)	3 (5%)
Iodated salt	1	1	1	1	1

Results and discussions

3.1 Physical and chemical analyses

The obtained results are presented in table 2. It can observe a volume improvement in the case of the samples with inulin, relative on the control sample (M). Concerning the humidity, there is no major differences in relation to control sample and the effective technical standard. The inulin percent related to 100 grams of product enhance significantly along with the growth of the added percent. The percent of the protein related to 100 grams of product not vary too much. The percent of the insoluble fibers is relatively the same of 6 grams/100 grams of product.

Table 2 Physical and chemical results

Sample	Humidity [%]	Volume [cm3/100g]	Protein [g/100g prod]	Inulin [g/100g prod]	Lipids [g/100g prod]	Glucides [g/100g prod]
M	51,6	525	8,3	0,05	1,1	41,4
P1	50,1	556	12,5	2,1	1,8	27,6
P2	50	570	14,3	2,3	0,67	26,73
P3	50	570	16	2,7	0,72	24,58
P4	49,8	567	18,3	3,2	0,86	21,84

From the results presented in table 2 it can observe that along with the growing of the inulina content there is a decrease of the glucides percent.

3.2. Microbiological characteristics

For this reason, the obtained bread can be recommended for the diet of the diabetics.

From the obtained results that was compared with the limits imposed by

OMS 975 it can see that the products are safe for consume.

Table 3 Microbiological characteristics

Sample	Yeasts and molds [Spores / g]	OMS [Spores / g]	Bacillus subtilis [Spores / g]	OMS [Spores/ g]
M	0	Max 1000	Absent	Max 10
P1	0		Absent	
P2	0		Absent	
P3	0		Absent	
P4	0		Absent	

3.3.Dietetic fibers and nutritional characteristics analyses

Analyzing the obtained products it can observe that with every percent of added inulina, the recovered inulin in the final product increase with 0, 2 - 0, 3 grams. For economical reasons the recommended percent is 3% related to the flour. It can observe that in case of the addition of the soluble fibers, the energetically value decrease due to the decrease of the glucide content and the increase of the proteins and fibers content. As it is show in table 4 the energetically value of the final products with inulin comparatively with the final product without inulin is 11% lower. For this reason, these products are recommended to be consumed when we want to maintain our weight.

Table 4 Nutritional characteristics

Nutritional information / 100 g final product	Bread with bran M	Bread with bran and inulin Samples			
		P1	P2	P3	P4
Energetically value, kcal	203	185	179	180	181
Proteins, g	8,3	12,5	14,3	16	18,3
Glucides, g	41,4	27,6	26,73	24,58	21,84
Lipids, g	1,1	1,8	0,67	0,72	0,86
Fibers, g	3,2	6	6	6	6
Inulin, g	0	2,1	2,3	2,7	3,2

Conclusions

The obtained results from this study demonstrate that the inulin addition (as soluble fibers) not affect the sensuous characteristic of the products.Regarding physically and chemically properties it can observe a volume increases of the finite product.The microbiologically parameters are under the legal established limits, and this is a proof that the products are safe for human consumption. In the case of modification of the soluble fibers added percent it can observe a difference in recovered quantities in the finite product irrespective of the source of the inulin. Knowing that the inulin (dietary fiber) has a prebiotic role, its adding can be considered as a choice for the obtaining of the functionally bread products.

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