

INFLUENCE OF ADDITIVE FROM SUGAR BEET ON WHITE BREAD QUALITY

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The additive of acceptable sensory, physical and chemical and microbiological characteristics was made from cossettes. Great water binding capacity, related to microcrystals of cellulose qualifies this additive as a desired one in bread making process.

Bread was baked in the laboratory and patent flour was used. The additive with particles smaller than 95 μm was supplemented in the quantities of 2, 5 and 10%.

The data related to the influence of the quantity of additive on white bread quality point that parallel to increasing the amount of the additive in the dough, yield of dough and bread were also increased. Negative effects are detected as volume depression and inferior bread crumb quality and altered crumb color. The decrease in bread quality is small if 2% of additive was applied, but significant with 5 and 10%. The bread freshness was highly graded 48 hours after baking due to the ability of the additive to retain water. On the whole, bread of superior quality supplemented by 5 and 10% of the additive from sugar beet fiber can be easily made by fortifying flour with gluten and by adding appropriate dough conditioner.

KEYWORDS: Sugar beet fiber; bread; quality

INTRODUCTION

Sugar beet pulp is a safe product concerning health safeness, microbiology and toxicology, and if it is implemented into the yeast dough, bread enriched with fiber is produced. Bread is a constituent part of meals, and in many countries in fact is inseparable part of every meal, so it can be a good source of fiber, contributing well-known benefits to the diet of developed countries (1-5).

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The objective of this experimental work was to make bread enriched with fiber of high quality, adjusted to the customer taste and needs. The additive from sugar beet supplemented patent flour to avoid phytic acid present in wheat bran (1, 2).

EXPERIMENTAL

For these experiments, the additive with particles smaller than 95 μm (6), white flour, so-called baker's patent, commercial vital gluten and commercial dough conditioner were used.

Bread was baked according to standard AACC baking procedure and bread quality was evaluated by dough yield, volume and breadcrumb quality (7).

RESULTS AND DISCUSSION

In the technological sense, the additive from sugar beet in the dough is beneficial because it absorbs and retains water more than plain flour. It increases the quantity of the dough and bread from a batch. At the same time fiber is being incorporated in the gluten matrix and makes disorder of the network causing, trouble in dough handling and decreasing the ability of the dough to retain gases during fermentation and baking. Therefore bakers have to use dough conditioners – improvers to diminish negative effects (1).

As the supplementation of the flour with the additive is increasing, the adverse effect on bread quality is also increasing: volume is decreasing, grain structure is very coarse, and breadcrumb color is becoming very dark, not acceptable. Positive effects of the additive supplementation are: increased dough yield and retarded staling, decreased energy, (Table 1).

Table 1. Quantity of the additive influencing white bread quality

Bread characteristics	Quantity of the additive (%)			
	0	2	5	10
Volume* (ml)	337	309	268	194
Dough yield (g)	162	165	167	169
Crumb quality after baking**				
24 h	5.5	4.9	3.3	0
48h	3.5	3.7	0.4	0
Energy (J)	896	878	851	803

* Mean of 5 replicates ; ** Maximum 7, minimum 0

Bread enriched with 5 and 10% of additive, of high quality can be made with the help of vital gluten, as it has been suggested by Stauffer (1). At the same time, the content of digestible carbohydrates is reduced, bread is enriched with fiber and calories are reduced, but bread of fine grain structure, great volume and acceptable taste is produced, (Table 2). High eating quality qualifies this type of bread as a suitable children food (5).

It is important to point out that staling and keeping quality of bread are improved if the dough is fortified with appropriate quantity of gluten.

Table 2. Quantity of added gluten influencing white bread supplemented with the additive

Bread characteristics	5% of the additive			10% of the additive		
	5	10	15	10	15	20
Added gluten (%)	5	10	15	10	15	20
Volume * (ml)	396	390	570	298	445	445
Dough yield (g)	178	186	193	192	203	214
Bread crumb quality after baking**						
24h	6.2	5.6	6.5	3.5	4.8	5.6
48h	5.4	4.5	6.3	1.2	4.4	5.0

* Mean of 5 replicates; ** Maximum 7, minimum 0

It is also worth emphasizing that supplementation with gluten and fiber additive reduces total digestible carbohydrates in this type of bread and it can be used in diabetic diets (reduction of 30%), Fig 1. High fiber content of this bread attributes this product as a functional food, because of the positive fiber effects on cholesterol and bile acid metabolism, proving the hunger alleviating effect, increasing fecal bulk and at the same time not binding minerals like calcium, magnesium and zinc (1, 2, 4).

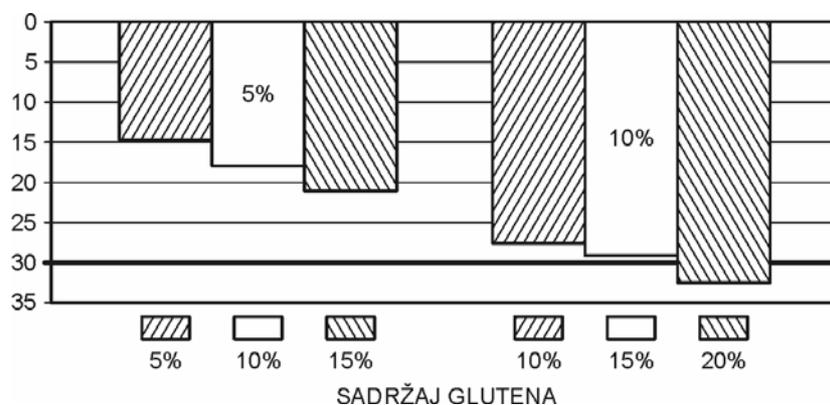


Fig. 1. Reduction in digestible carbohydrates in bread supplemented with 5 and 10 % of additive

CONCLUSION

Based on the presented data, it is evident that sugar beet dietary fiber in yeast dough is influencing water retention of the dough, which is a favorable characteristic, but it has an adverse effect on gluten structure and bread crumb quality and color.

In bread, fiber from sugar beet reduces calories and retards bread staling. Supplementation of yeast dough with fiber may classify this type of bread as a functional food exhibiting positive effects in diabetic and high fiber, low energy diets, cholesterol reduction and bile acid metabolism.

With the help of spices, favorable taste of this bread type can help in creating good dietary habits of people.

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УТИЦАЈ АДТИВА ИЗ ШЕЋЕРНЕ РЕПЕ НА КВАЛИТЕТ БЕЛОГ ХЛЕБА

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Слатки резанци шећерне репе су сировина од које је направљен адитив прехранбених влакана задовољавајућих сензорних, физичких, хемијских и микробиолошких особина. Услед присуства микрокристала целулозе, овај адитив има веома велику способност везивања и задржавања воде, што је веома повољно у производњи хлеба. Хлеб од белог брашна је печен у лабораторијским условима. Адитивом са честицама мањим од 95 μm у сировинском саставу замењено је 2, 5 и 10% брашна.

Резултати показују да се паралелно са повећањем количине адитива у тесту повећавају принос теста и хлеба. Запажен је негативан утицај адитива на запремину,

као и на квалитет и боју средине хлеба. Квалитет хлеба је незнатно нарушен при додатку 2%, али је зато знатно умањен при додатку 5 и 10% адитива. Због велике способности адитива да задржава воду, хлеб је остао свеж 48 сати након печења. У целини посматрајући добијене резултате, додатком глутена и одговарајућих побољшивача, може се добити квалитетан хлеб са 5 и 10% адитива из шећерне репе.

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