Rye-wheat bread production at the restaurants

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ABSTRACT

The technological process of dough-making of rye flour on accelerated technology with using of "Ibis" integrated (complex) bakery improvers is investigated. The Influence of "Ibis" improvers on the process of accumulation of acids, structural and mechanical properties of dough and quality of bread is analysed.

It is set that using of "Ibis" integrated bakery improvers allows to reduce the duration of products maturation, provides high porosity and specific volume of bread. The results of our research showed that with using more improvers the porosity of the bread increases. It also increases the specific volume of bread; makes crumb more elastic, good taste and bread flavor.

Detailed laboratory baking and researching of viscidity, plasticity structural and mechanical properties of rye-wheat dough prove the effectiveness of using the integrated (complex) bakery "Ibis" improver for accelerated technologies of rye-wheat bread production. Using this improver will reduce the duration of technological process of bread producing while maintaining the quality of finished products.

Introduction

Producing and serving different dishes, restaurant institutions often use their own bakery and industrial products. However, it is their own production which gives them the opportunity to expand the assortment and produce products that can not be produced by mass baking.

Rye-wheat bread is very popular among the population. Also it is fact that they are much better for our health than wheat sorts. Rye bread contains a big amount of essential amino acids (such as lysine and arginine), as well as essential B vitamins, and PP. Comparing with wheat flour rye flour contains 30% more iron and twice more magnesium and potassium, which are necessary for our health. Moreover rye bread has less calories, as it contains less starch and more dietary fiber. Consuming this kind of bread has a positive effect on metabolism. For this reason, this bread is recommended for special diet at diabetes and obesity.

Rye-flour dough making technology is based on creating high acidity of the dough to reduce enzyme activity and increase swelling of proteins, pentosans and flour shell particles [1]. Based on the specifics of carbohydrate-amylase and protein complexes of rye flour, rye-wheat bread technology provides dough making with the use of leaven to produce high quality

bread. Thus the traditional technology of rye-wheat bread producing with liquid or dense leavens is quite difficult and labor-intensive.

Nowadays rye-wheat bread accelerated technologies are really actual, they are based on the using of acidulants, and integrated baking improvers. As this supplement we considered the possibility of using "Ibis" improvers for rye-wheat bread baking (LTD "Lesaffr Ukraine", Kyiv). "Ibis" - is an integrated Baking improver which is used for a speed-up rye-wheat bread production method that provides the necessary quality, acidity of bread and homogeneous structure of crumb porosity. The advantages of using IBIS are:

- Significant time savings of rye-wheat bread production;
- Simplification of acidity regulating procedure;
- Dark color of the crumb and pleasant taste and flavor of rye bread. The integrated baking improver "Ibis" contains barley malt flour, wheat flour and citric acid.

Material and methods

During our research we used wheat flour of the firs quality and rye flour with medium baking properties. We used an integrated Baking improver "Ibis", which is a brown powder with rye bread flavor.

In the laboratory environment a series of experiments on the use of integrated bakery improvers "Ibis" for rye-wheat bread production was conducted. Dough was prepared in speed-up way with adding 0.6%, 0.8% and 1.0% "Ibis" to flour in the dough.

Dough kneading process took place in a laboratory dough machine. Products were formed manually, maturation was led to completion at t = 30-32 ° C and bread was baked at t = 200 - 220 ° C. Titratable dough acidity was defined by mash. The changing of visco-plastic dough properties were investigated by the degree of its spreading during the fermentation process, the specific volume of the dough was defined by the changing of dough volume during the fermentation process in the graduated cylinder. Finished products were analyzed by the terms of acidity, porosity and specific volume of bread. [2]

The content of aromatics in bread was investigated by the content of carbonyl compounds, which are the main substances that form the bread aroma. Their concentration in bread was defined by the content of bisulphate connective compounds in bread crumb and crust. This method is based on the ability of carbonyl compounds to form compound products (adducts) with sodium bisulphate. This property of carbonyl compounds is taken as a basis for the method of bread aroma estimating, developed by PP. Tokarev and VL Kretovich.

Results and discussions

Analysis of research results (Table 1) shows a positive effect of complex baking improvers "Ibis" on bread making process and its quality. Adding "ibis" contribute more intensity of acids accumulation in dough, which reduced the duration of products maturation and also had a positive affect on the taste qualities of bread.

Porosity index describes the structure of bread crumb, its volume and digestibility. Low level of porosity shows that bread is made of bad fermented dough. Analyzing the structure of bread crumb it was indicated that the porosity increases with adding more "Ibis" improvers. Increasing this parameter correlated with an increase in specific volume of bread, friability and elasticity of bread crumb and perfect look of products.

Table 1. "Ibis" improvers Effect on bread making process and its quality

INDEX	ADDING «Ibis», % to the main part of the flour in the dough		
	0,6 %	**0,8 %**	**1,0 %**
Dough			
Kneading duration, min.	5	5	5
Initial acidity, grad.	5,0	5,6	6,0
Duration of fermentation, min.	30	30	30
Duration of maturation, min.	50	45	40
Final acidity, grad.	6,8	8,0	8,2
Mass concentration of moist, %	47	47	47
Bread			
specific volume, cm^3/g	2,13	2,17	2,37
Shape stability	0,36	0,38	0,39
Porosity, %	64	67	68
Acidity, grad.	6,2	7,4	7,8
Look	Right shape, smooth		
Crumb quality	Non-rigid		
Porosity	Equable		
Taste and flavor	Natural for rye-wheat bread		

The acidity of bread has real influence on its taste. The acidity also demonstrates the main features of bread making process. The acidity is caused by primary products acidity and products that are formed during the dough ripening.

One of the advantages of "Ibis" is a simplification of acidity control, so we investigated the changes of dough titrated acidity after its mixing and during its fermentation. The results of our research shows (Fig. 1), that adding "Ibis" improvers to dough increases the initial dough acidity to 0.4 - 1.2 deg, due to own high acidity of the improvers. During the fermentation dough acidity increases due to the intensification of the dough fermentation process. Adding "ibis" brought more intensive acid accumulation, which reduced the duration of products maturation and had a positive influence on bread taste.

The Research of dough abilities to save its shape, which was conducted on spreading of the dough balls showed (Table 2), that increase amount of improver slightly affects the visco-plastic properties of the dough, which allows to get products with high shape stability and high quality.

Tab.2."Ibis" improvers effect on dough balls spreading, *mm*

Duration of fermentation, min	Adding «Ibis», % to the main part of the flour in the dough			
	0	**0,6**	**0,8**	**1,0**
0	45	45	45	45
60	65	65	70	75
120	75	75	75	80
180	80	80	80	85

Structural and mechanical properties of the dough were studied at the changes of dough specific volume in a graduated cylinder at t = 30 ° C for 2 hours fermentation. Analysis of the

data showed (Fig. 2), that the largest specific volume of dough was in samples with 0.8% of "Ibis". These data correlate with the analysis of the finished products quality. So, adding 0.8% of "Ibis" baking improvers to the dough during the accelerated way of rye-wheat bread production is enough for high bread quality.

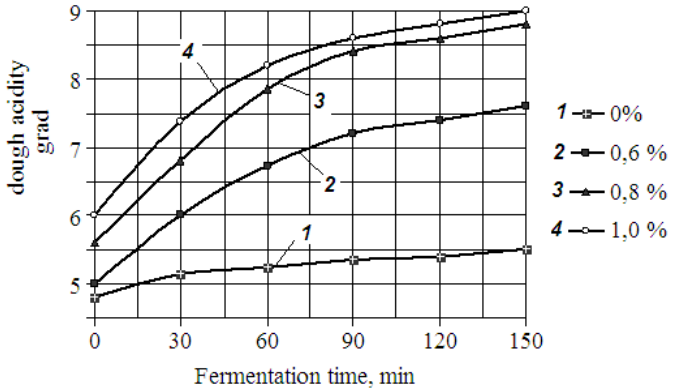

Fig. 1 Dough acidity change during fermentation

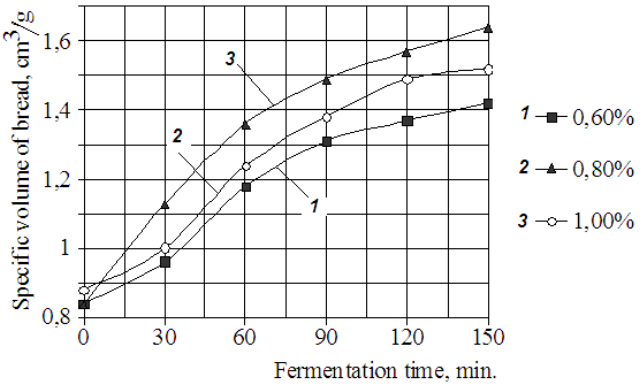

Fig.2. dough specific volume change with the adding of "Ibis" improvers

Assimilation of bread by the human body is mostly depend on its contain of the aromatics. Pleasant taste and flavor of bread cause the increased secretion of enzymes in the digestive system and this provides a fast and good assimilation of nutrients. Also we have studied the effect of "Ibis" baking improvers on of accumulation aroma making compounds during bread baking and their loss during the storage. We determined the number of carbonyl compounds, which mainly form the bread aroma. The evaluation of aroma was providing through the content of bread bisulphate astringent compounds in bread crumb and crust (Fig. 3, Fig. 4).

The amount of these compounds in bread increased with increasing adding of improvers to dough. During the storage bread lost its taste and flavor which is associated with biochemical and other processes that occur during bread firming. Bread crust lost its aromatics in the

environment, some of them goes from the crust into the crumb. Flavor impairment during the storage of bread can also occur due to oxidation of aldehydes by the air.

Results of our research showed (Fig. 3) that the content of bisulphate astringent compounds in bread crumb decreased, due to the redistribution of these substances into the bread crust. After 24 hours of bread storage aromatics content in all samples of bread decreased almost in half. The content of these substances in bread crust (Fig. 4) just after baking was 4-5 times higher than in crumb as it was caused by the formation of aromatics under high temperature during baking and as a result of melanoidin formation reaction. After 12 hours of storage bisulphate astringent compounds does not change, but during the subsequent storage their content in bread crust is significantly reduced, which requires more detail study of the bread firming process with adding "Ibis" bread improvers.

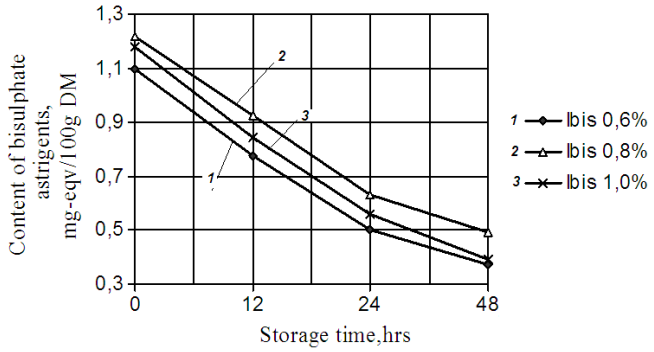

Fig.3 Content of bread bisulphate astringent compounds in bread crumb with “Ibis” improvers.

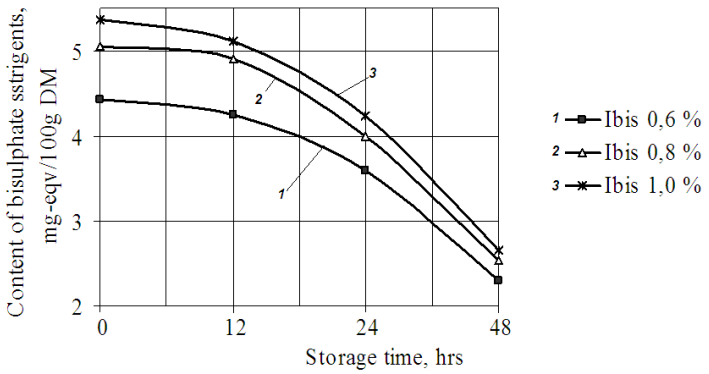

Fig.4. Content of bread bisulphate astringent compounds in bread crisp with “Ibis” improvers

Conclusion. Conducting laboratory baking test and research of visco-plastic, structural and mechanical properties of rye-wheat dough confirm the effectiveness of the "Ibis" bakery improvers for the speed-up production of rye-wheat bread. Using this improver will shorten the process of bread production while maintaining high quality of finished products. Our studies have shown that the use of "Ibis" integrated bakery improvers is effective for accelerating

technologies of rye-wheat bread production. Using it provides high specific volume of bread, porosity, and as a result bread has good flavor and taste. Basing on our research, we recommend to produce rye-wheat bread with 0.8% of "Ibis" integrated bakery improvers to the most part of the flour. It won't only expand the range, but it will also improve the quality of finished products. During advanced research we are planning to do more detailed analyze of complex improvers impact on visco-plastic properties of the dough, to study the process of bread staling with the addition of "Ibis" integrated bakery improvers, to work out the recommendations for the speed-up technology of rye-wheat bread production in the restaurant institutions.

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