STUDY OF THE RAW MATERIALS INFLUENCE ON THE PHYSICO-CHEMICAL INDICATORS OF PREBAKED BREAD

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Abstract

The influence of raw materials, especially yeast type, to the quality of prebaked bread was investigated. Five different types of yeast were used.The volume, porosity, elasticity and moisture were evaluated at prebaked bread, after freezing, storing at freezing temperature, defrozen and final final baking. Physico-chemical characteristics of prebaked bread was compared with the same characteristics of control bread (classicly baking bread).
***Keywords**: prebaked bread, physico-chemical characteristics, quality, raw materials*

Introduction

The constant growing of frozen storage of alimentary products compels new requirements concerning the observance of the refrigerating chain. Specialists who work in processing, storing and commercialization field of these products should make available products of high quality and maitain them at an low temperature or at least equal to -18^0C.

Prebaked bread is the bread with incomplete baking. It has preserved shape and partially formed crust, that presents as a very thin one, lightly or not at all coloured. Under this shape, the bread is commercializing and can be rapidly transformed into final product after the final baking.

The process of obtain bread, in this case, implies two baking procedures:a pre-baking, that is made in the factory,and a final baking , at the market place or at the consumer.The preparation of the dough until the prebaking isn't different from the usual one.

In this study it was intended to follow the influence of different types of yeast used in the production recipe on the pre-baked bread quality.

Experimental

1.Test ingredients and dough rheological properties

Wheat flour Type 650 from S.C.Boromir S.A. was used, with the following physico-chemical and rheological characteristics:

Table 1: Physico-chemical indicators of wheat flour used during experiments

Physico-chemical indicators	U.M.	Value
Moisture	%	14.3
Dew gluten	%	34.2
Distorsion index gluten	mm	5.5
Ash	% s.u.	0.64
Falling number	sec.	315

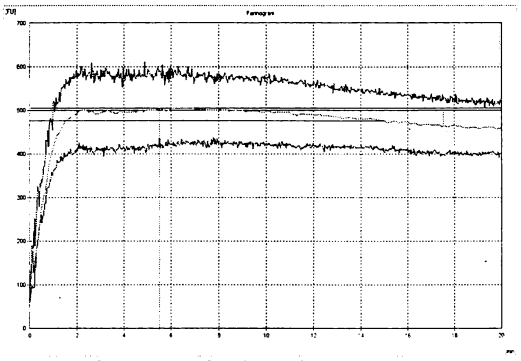

Fig.1:The farinogram for the white wheat flour ,type 650

Tabel 2: Rheological indicators of the dough obtained from the wheat flour used during experiments, type 650

Rheological indicators	U.M.	Value
Water absorbsion, C.H.	%	59.9
Development time , D	min.	3.2
Stability , S	min.	18.4
Degree of softening , I	u.B*.	30
Elasticity , E	u.B*.	220(after 45 min) 225(after 90 min.) 318(after 135 min.)
Extensibility	mm	206(after 45 min) 210(after 90 min.) 218(after 135 min.)

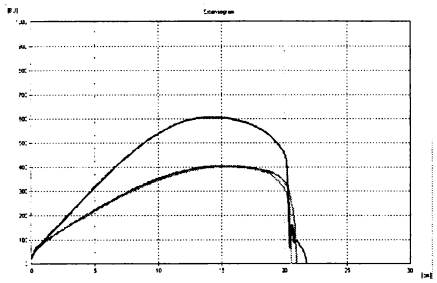

Fig.2: Extensogram for the white wheat flour, type 650

There have been tested compressed yeast types: Pakmaya yeast, Fulger yeast, Fala yeast, Budafok yeast,L'Hirondelle yeast. The quality caracteristics of the tested yeasts are presented in table 3.

Table 3: Quality indicators of the tested yeasts

Indicators / type of yeast	Pakmaya P_1	Fulger P_2	Fala P_3	Budafok P_4	L'Hirondelle P_5
Fermentation capacity,min	60	68	80	76	84
Moisture,%	65.7	67.4	67.5	67	66.8

2. Preparation of prebaked bread and control bread samples

The experiments were made for the prebaked bread weighting 0.500kg/piece , obtain in accordance with the recipe of manufacturing from table 4.There have been tested physico-chemical the control sample (fresh bread baked in conformity with the classical methods).as well as the prebaked bread (prebaked , frozen, stored, defrozen and final baked bread).

Table 4: The elements of the manufacturing recipe

Elements	U.M.	Quantity
White wheat flour type 650	kg	100
Compresed yeast	kg	2.5
Salt	kg	1.5
Water	l	~ 56
Additive *Gama Forte*	kg	0.2
Margarine	kg	2

The aditive *Gama Forte* is mixted with the flour.This tip of aditive can be used in obtaining the bread dough by directly as well as indirectly method.

In table 5 there are presented the techlogical conditions followed in the manufacturing of the control bread and prebaked bread.

Table 5: Technological parameters for manufacturing bread , weighting 0.500 kg

Technological parameters	U.M.	Control sample M	Prebaked sample P
Dough kneading time	min.	12	12
Dough fermentation time	min.	15	15
Initial Dough temperature	^{0}C	27	27
Final dough temperature	^{0}C	29	29
Dough acidity	grade	2,8	2,8
Rekneading	min.	1	1
Final fermentation time at 35^{0}C and air relative humidity 70%	min.	70	70
Prebaked time	min.	-	13
Prebaked temperature	^{0}C	-	200-210
Baking time	min.	17	-
Baking temperature	^{0}C	260	-
Final baking time	min.	-	5
Final baking temperature	^{0}C	-	250-260

After final fermentation the dough is baked for the control sample. The rest of the dough is prebaking, freezing, storing, defreezing and final baking. There have been analysed the samples physico-chemically. The samples were subdued to the same conditions of freezing presented in table 6.

Table 6:Technological indicators of the prebaked bread freezing conditions,weighting 0.500kg

Technological indicators	U.M.	Values P_1
Air Medium Temperature	^{0}C	-20 ÷ -22
Air Velocity	m/s	Constant atmosphere
Freezing time	min	300

After the freezing, the prebaked samples were stored at -18^{0}C,and after seven days of freezing storage, they were defrosted and finally baked in the same conditions for all the samples.The small variation of the tracers

values are due to the real work conditions. In the table 7 there are presented the defreezing process tracers.

Table 7: Technological indicators of the defreezing conditions for prebaked bread, weighing 0.500kg and the storage at -18^0C

Technological indicators	Values
Storage at -18^0C , days	7
Defreezing at 20 – 25^0C, hours	100

Results and discussions

There have been determined the quality indicators for the control sample after 3 hours since it was removed from the oven.They are presented in table 8. After 7 days of storage in freezing conditions,the frozen prebaked bread was defrozen and finally baked . There have been obtained prebaked samples and there have been determined physico-chemical indicators for them , presented in table 8 and 9.The obtained values have been presented graphically in figures 3 and 4.

Table 8: Quality indicators of control samples rezults after tests

Indicators	U.M.	M_1	M_2	M_3	M_4	M_5
Volume,	cmc/100g product	295	309	315	301	378
Porosity	%	76	75	79	80	83
Elasticity	%	97	91	95	92	97
Moisture	%	42. 1	43.1	43. 2	42. 8	42. 5

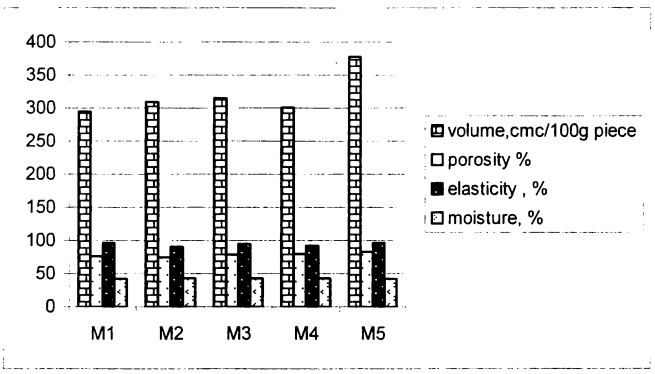

Fig. 3: The Influence of the yeast types on the control sample quality indicators

Table 9: Prebaked bread quality indicators results at the tests, after 7 days of storage in freezing conditions

Indicators	P_1	P_2	P_3	P_4	P_5
Volume,cmc/100g product	263	295	302	290	350
Porosity,%	74	74	76	79	81
Elasticity,%	94	90	93	91	95
Moisture,%	43.3	44.2	44.2	43.8	43.6

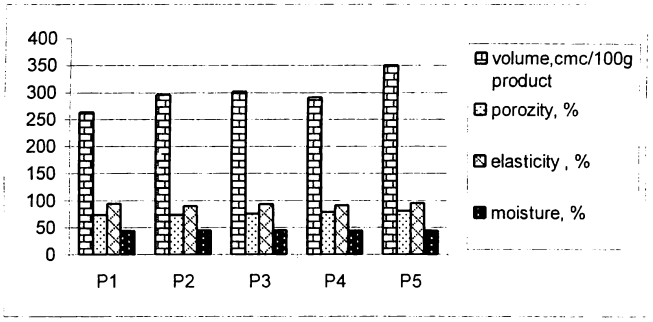

Fig. 4: The influence of different types of yeast on the prebaked bread quality indicators stored in freezing conditions for 7 days

It is observed that prebaked bread that a yeast with a greater fermentation capacity was used for (80 min, 84 min., respectively) has a bigger volume that the others,at the control sample (M_3-315cmc/100g product, M_5-378cmc/100g product) as well as for the frozen prebaked sample and stored for 7 days (P_3-302cmc/100g product, P_5-350cmc/100g product respectively).

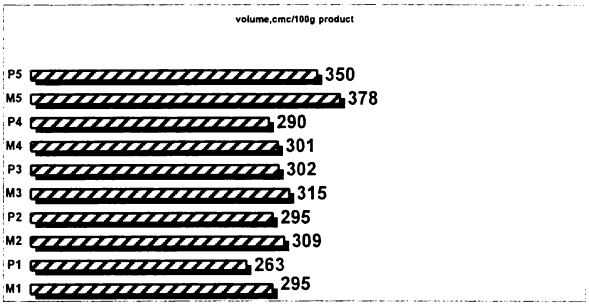

Fig. 5: Influence of the different types of yeast on the prebaked bread and control sample volume

The prebaked sample porosity dropped compared with the one of the control sample. There have been obtained higher porosity levels at the prebaked bread obtained from a dough that contained yeast with the biggest capacity of fermentation(control sample M_5,prebaked sample P_5).

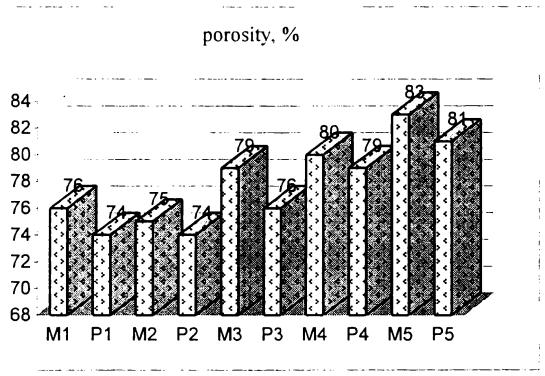

Fig. 6: The influence of different type of yeast on the prebaked bread and control sample porosity

The elasticity of the prebaked bread registred lower values, but not essential, compared with the elasticity value of the control sample.

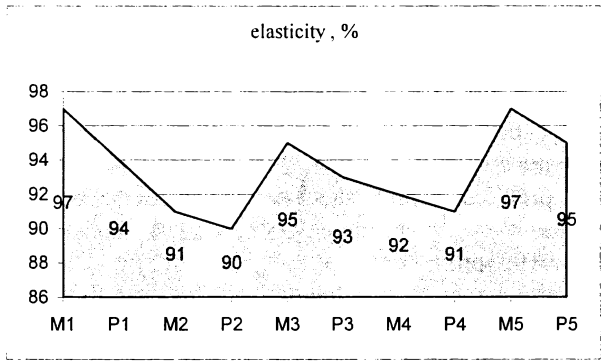

Fig. 7: Influence of the different types of yeast on the prebaked bread and control sample elasticity

It is noticed a considerable growth of the prebaked bread moisture in comparison with the control sample moisture. The registered values for moisture are presented graphically in figure.8

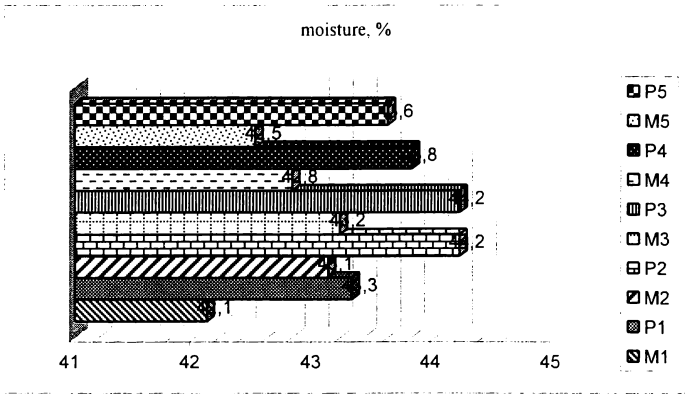

Fig. 8: Influence of the different types of yeast on the prebaked bread and control sample moisture

Conclusions

- quality indicators of the tested prebaked bread have been the best using the L'Hirondelle yeast,with the highes fermentation capacity (84 min)followed by the use of Pakmaya,Fulger and Budafok yeast(control sample M_1,M_2,M_4, respectively prebaked sample P_1,P_2 and P_4);
- in the case of control sample there have been noticed the highest value of volume for the control sample M_5(378 cmc/100gproduct) and the lowest for the control sample M_1(295cmc/100gproduct) ;
- in the case of prebaked sample there have been regitered the highest value of volume for P_5 (350cmc/100gproduct) and the lowest for P_1(263cmc/100gproduct);
- the porosity value lowered from the prebaked sample P_5 that has registered the highest value,81%,at the prebaked sample P_4 and P_3, and the smallest porosity values have been registered for the prebaked sample have been registered for the prebaked sample P_1 and P_2(74%).
- the moisture content has modified significantly for all prebaked samples in comparison with the control samples, having been registered much higher for the prebaked samples than for the control samples.

- the decreasing of the volume, porosity, elasticity, and the increasing of the moisture at the prebaked samples, comparativelly to the control sample volume , can be attributed to the yeast or flour quality indicators , or the changed occured at freezing, defreezing and final baking .

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