

RESEARCH REGARDING THE BAKING CONDITIONS OF THE DOUGH MADE OF WHEAT FLOUR WITH SOY AND BYPRODUCT OF THE BUTTER OBTAINING

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ABSTRACT: The research consists in the procurement of bakery products with additions farinaceous the soy 6% and byproduct of butter obtain. The research has a double technological appearance and economic, through the utilization of byproduct from the technology of obtain the butter, with the improvement quality of the bakery products.

KEYWORDS: baking, dough, soy, bakery.

1. INTRODUCTION

The actual stage of society development imposes to the food industry registration in the national complex of integration, capable to maintain a lasting activity integrated in the protection and capitalization demand of the resources of non-pollution environment.

It is necessary to appreciate as national solution the reuse of these secondary products in human food, to obtain dietetic products with nutritional proprieties improved: increasing the protein content with reduced gluten adding and lactose.

2. Materials and methods

For achievement the research it was used a program in order II rotator centered system with 20 experiments and independent variables: byproduct of butter obtaining adding in dough, duration and baking temperature.

To obtain dough was used: wheat flour type 000; water and byproduct of butter obtaining mixture; fermentation duration, 60 minutes, at 36°C; kneading duration, 10 minutes.

The independents parameters with technological ruling influence in baking process are reproduced in table no.

Table 1. Experimental conditions

Independent variables	X_i	Codified values					
		-1,678	-1	0	1	1,678	Δx
		Actual values					
Byproduct of butter obtaining, %	X_1	30	40	50	60	70	10

Temperature, %	X ₂	180	200	220	240	260	20
Duration (minutes)	X ₃	33	36	39	42	45	3

3. RESULTS AND DISCUSSIONS

The equations were reproduced in table 2.

Table 2. Regression equations for dependent variables

Dependent variable,	Regression equation
Dough acidity, ml NaOH N/1	$Y_1 = 2.74 + 0.12x_1 + 1.43x_2 - 0.14x_3 + 0.02x_1x_3 + 0.12x_1^2$
Ratio H/D	$Y_2 = 0.76 - 0.14x_1 + 0.22x_2 + 0.49x_3 - 0.011x_1x_2 - 0.57x_1x_3 - 0.19x_1^2$
Ratio core/crust	$Y_3 = 0.68 + 0.08x_1 - 0.15x_2 + 0.04x_3 + 0.22x_1x_2 + 0.14x_1x_3 + 0.08x_1^2 - 0.37x_3^2$
Porosity, %	$Y_4 = 52.18 - 0.044x_1 - 0.15x_2 + 0.88x_3 + 0.48x_1x_2 + 0.36x_1x_3 - 0.15x_1^2 - 0.28x_2^2$
Elasticity, %	$Y_5 = 66.36 + 1.14x_1 + 0.29x_2 - 0.08x_3 - 0.56x_1x_2 - 0.34x_1x_3 + 1.08x_1^2$

The influence interpretation of the independent variables was accomplished by the particularization of the general regression equation no 1:

$$y = b_0 + b_i x_i + b_{ij} x_i x_j + b_{ii} x_i^2, \quad [1]$$

The acidity degree of 3.4 ml NaOH n/1, obtained with a byproduct of butter obtaining adding of 70%, decreases at minimal values codified -1, -1,678. The same considerations are reproduced for product increase through ratio H/D (figure 2), when baking temperature is 220...240 °C. To obtain a product with increase quantity of core, it is recommended a 40 % byproduct of butter obtaining adding. The porosity and elasticity of product after baking process (figure 5,6,7,8) present results that manages to technological decisions with limitation of byproduct of butter obtaining content for porosity. Elasticity decreases if the byproduct of butter obtaining content is under the limit of central value.

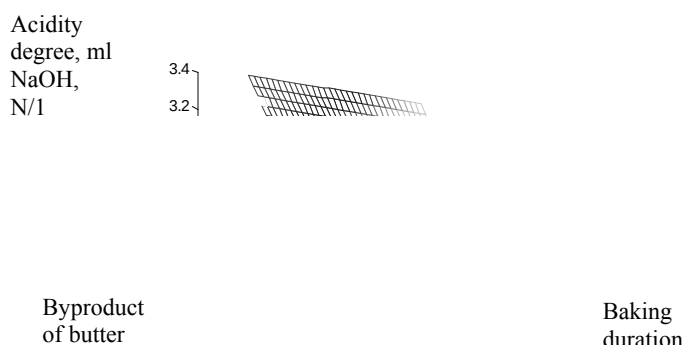


Fig. 1. The variation of acidity degree of bread obtained of wheat and soy flour with byproduct of butter obtaining adding, after baking process, when baking temperature is constantly, in central domain (220 °C).

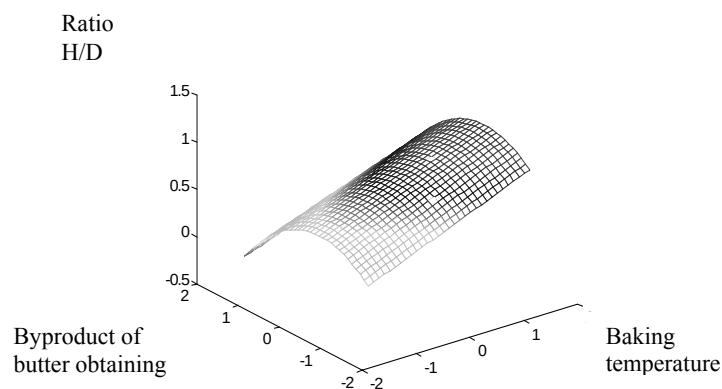


Fig. 2. The variation of ratio H/D of bread obtained of wheat and soy flour with byproduct of butter obtaining adding, after baking process, when baking duration is constantly, in central domain (39 minutes)

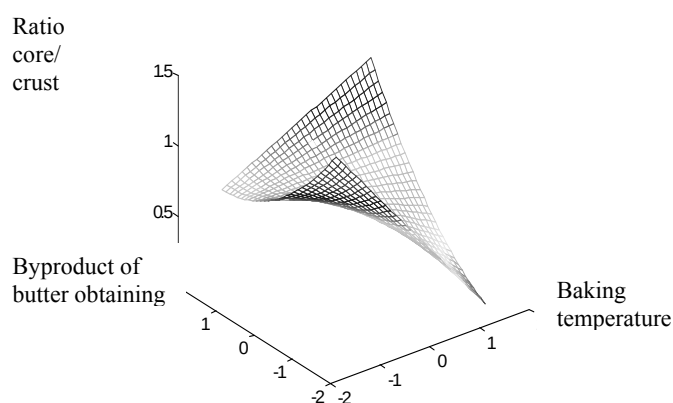


Fig. 3. The variation of ratio core/crust of bread obtained of wheat and soy flour with byproduct of butter obtaining adding, after baking process, when baking duration is constantly, in central domain (39 minutes)

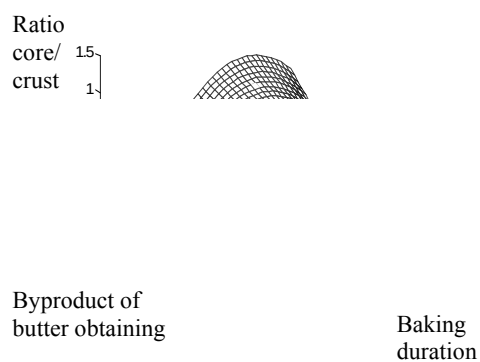


Fig. 4. The variation of ratio core/crust of bread obtained of wheat and soy flour with byproduct of butter obtaining adding, after baking process, when baking temperature is constantly, in central domain (220 °C)

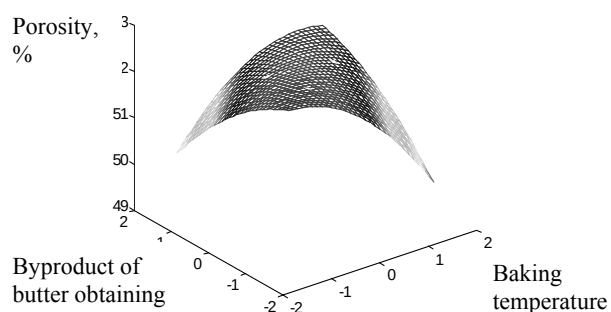


Fig. 5. The variation of porosity of bread obtained of wheat and soy flour with byproduct of butter obtaining adding, after baking process, when baking duration is constantly, in central domain (39 minutes)

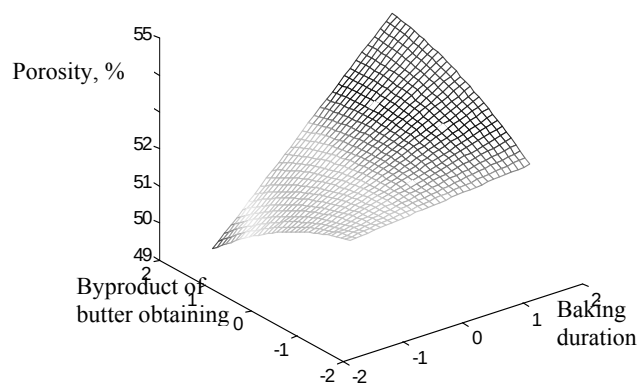


Fig. 6. The variation of porosity of bread obtained of wheat and soy flour with byproduct of butter obtaining adding, after baking process, when baking temperature is constantly, in central domain (220 °C)

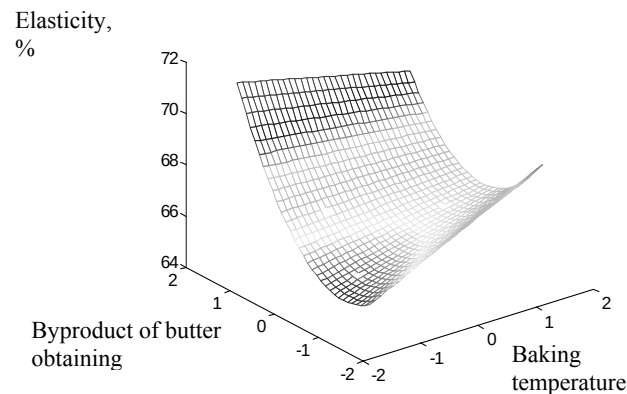


Fig. 7. The variation of elasticity of bread obtained of wheat and soy flour with byproduct of butter obtaining adding, after baking process, when baking duration is constantly, in central domain (39 minutes)

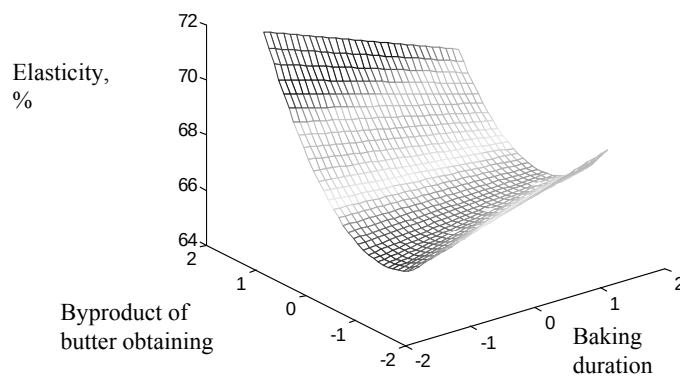


Fig. 8. The variation of elasticity of bread obtained of wheat and soy flour with byproduct of butter obtaining adding, after baking process, when baking temperature is constantly, in central domain (220 °C)

4. CONCLUSIONS

The utilization through capitalization of byproduct of butter obtaining, secondary product of milk industry, butter technology, to obtain a dietetic bakery product are realized through limit of glucose and the supplement of glucides with lactose of byproduct of butter obtaining composition necessary to people with problem in glucose assimilation.

A $40 \div 50$ % byproduct of butter obtaining adding influence positively the dough and reduced the water consumption that means an increasing of product quality.

In classic conditions the byproduct of butter obtaining adding not modified essentially the parameters of baking: temperature and duration, that, in this conditions was: 220 °C and 39 minutes.

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