

RESEARCH REGARDING BAKING BAKERY PRODUCTS WITH OATS FLOUR

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ABSTRACT: Proteins represent 90-95% and include albumins, globulins 30%, gliadin soluble in alcohol 70% and a reduced content of glutenin. Oatena and the gliadin of oats not form gluten with glutenin and have poor bakery properties. Starch is in top of glucides. Minerals are not distributed uniformly in bean. Oats flour contains vitamins B, PP and enzymes.

KEYWORDS: diet bread, fermentation process, oat.

1. INTRODUCTION

The development of the scientific branch make through modern process and new technology is crucial in obtaining of large type of bread and diet bread.

In nutritional point of view is absolutely necessary the completion of nourishment by mineral salts and vitamin type B from wheat peel.

Oats flour is used in mixture with wheat flour for obtaining dietetic bakery products.

The chemical composition of oats flour depends on bean type and is deferent from wheat flour composition.

Oats is wealthy in lipids (not only in embryo but also in entire mass of endosperm). For this reason, oats flour becomes rancid faster and loses his functional bakery proprieties.

The adding of wheat germs is important thanks to the content of essential fatty acids and vitamins.

2. MATERIALS AND METHODS

Oats flour is an important cereal source and is used with wheat flour to obtain dietetic bakery products, with reduced gluten content; 3-6% oats flour adding contribute to obtain dietetic bakery products, with nutritional part accepted by the consumers.

This program used a centered compound program by second degree that has two independent variables:

X_1 – baking temperature;

X_2 – baking duration.

To realize the dough for baking process, was used wheat flour type 800, 94%.

The following quantities was maintained constant:

- water 50 % given mixture flour;
- oats flour 6%;
- sodium chloride, 1.25 % given the flour mixture;
- bakery dregs, 5 % given flour mixture;
- kneading duration, 10 minutes;
- fermentation duration, 35 minutes;
- fermentation temperature, 36°C.

The independent parameters variation is presented in table no. 1.

Table no. 1

The independent parameters				
Independent values	X _i	Codified values		
		-1	0	1
Actual values				
Baking temperature, °C	X ₁	180	200	220
Baking duration, minute	X ₂	33	36	39

(*) reported to the total wheat flour

The value of average deviation $\sigma = 0,38$ confirm the correctness of research.

3. RESULTS AND DISCUSIONS

To establish the recipe necessary to baking dough with barley flour was chosen as dependent variables: acidity, based on the initial acidity of raw materials and the acidity resulted from biochemical reaction, H/D ratio and Core/Crust ratio.

For interpretation of the research results was used the regression equations particularized from general equation:

$$y = b_0 + b_1x_1 + b_2x_2 + b_{12}x_1x_2 + b_{11}x_1^2 + b_{22}x_2^2$$

To determine the necessary optimum condition for finalising the technological recipe of obtaining the bakery products with addition of oat it was chosen the statistic mathematical explanation based on the regression equations shown in table no. 2.

Table no. 2

The regression equations	
Dependent parameters	Equations
Acidity degree, mL NOH 0,1 n/100g dough	$y_1 = 4,2 + 0,1x_1 + 0,26x_2 + 0,075x_1x_2 - 0,27x_1^2 - 0,071x_2^2$
H/D ratio	$y_2 = 0,36 - 0,05x_1 - 0,01x_2 + 0,034x_1x_2 - 0,12x_1^2 - 0,0014x_2^2$
Core/Crust ratio	$y_3 = 1,8 + 0,016x_1 - 0,05x_2 - 0,11x_1x_2 - 0,41x_1^2 - 0,0065x_2^2$

Figures 1, 2, 3 and 4 present the variation of acidity degree of core, core/crust ratio, core/bread ratio and H/D ratio.

A 3-6 % oats flour adding is necessary to obtain a normal baking process.

The core acidity is maxim for dough with 6% oats flour, because of wheat flour that is suitable to obtain qualitative bakery products, when the baking duration is 33-36 minutes and baking temperature is 180-200°C.

Increasing baking duration to 39 minutes influences negatively the product quality and bread porosity that is minimal (fig. 1).

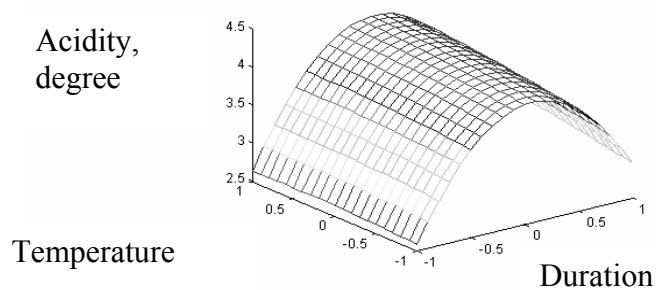


Fig.no.1. Variation of bread with oats flour, after baking process, depending on temperature and duration

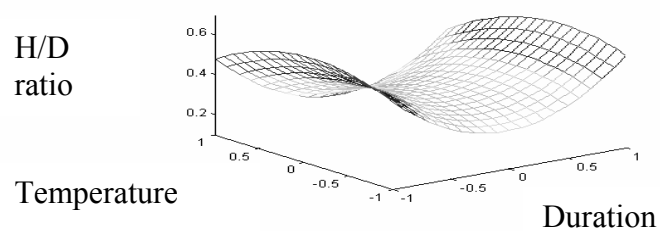


Fig.no.2. H/D ratio variation of bread with oats flour, after baking process, depending on temperature and duration

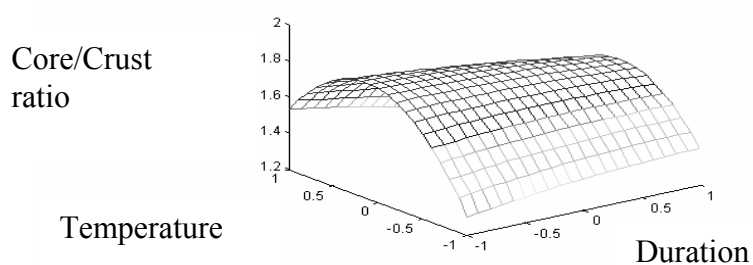


Fig.no.3. Core/Crust ratio variation of bread with oats flour, after baking process, depending on temperature and duration

The core/crust ratio is 1,5 % when the baking temperature is 180°C and baking duration is 39 minutes. Maximal crust is obtaining for 200-220°C and 33-36 minutes.

When the baking temperature is over 220°C and baking duration is over 39 minutes the core quantity will put on the brake the dough development and will influence negatively the baking process (fig. 3).

The core/crust ratio will increase to 0,27 for 200°C and 36-39 minutes, and will decrease for a temperature over 200°C and a baking duration over 39 minutes (fig. 4).

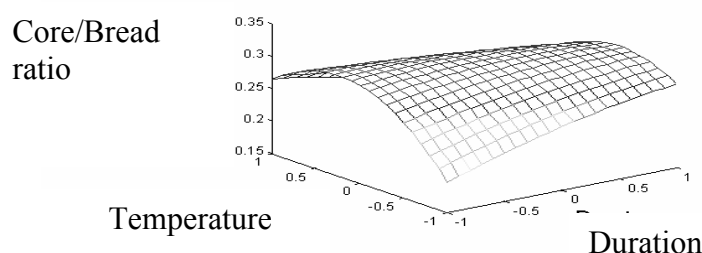


Fig. no. 4. Core/Bread ratio variation of bread with oats flour, after baking process, depending on temperature and duration

The optimal values of acidity, H/D ratio and core/crust ratio was established according with the reckonings (table no. 3):

4. CONCLUSIONS

The oats flour can be considered a necessary solution to obtain dietetic bakery products, with increased fibers content for the people with gluten intolerance.

It is necessary to apply a baking program according to the following recipe, to obtaining bakery products with functional qualities:

- ❖ wheat flour type 800, 94 -97 %;
- ❖ oats flour, 3-6%;
- ❖ fermentation duration of dough: 31-35 minutes;
- ❖ fermentation temperature of dough: 35 °C;

To obtain a suitable bakery product it is necessary a baking duration of 200-220°C and a baking duration of 33-36 minutes.

The impact studies of people response of this dietetic product with reduced gluten content are necessary.

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