STUDY OF CORRELATION BETWEEN RHEOLOGICAL PROPERTIES OF DOUGH AND BREAD QUALITY TO THE ADDITION OF A-AMYLASE EXOGENOUS

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***Abstract*:**

The addition of α-amylase increases the capacity of formation fermentation gas by lowering the falling value of the flour. In this paper it aimed if the addition of alpha amylase has an effect on dough rheology, because its viscoelastic properties play an important role in the technological process.

Key words: alpha amylase, viscoelastic properties

INTRODUCTION

In addition to the main effect of stimulus hydrolysis of starch and consequently, increase the amount of fermentable sugars in the dough formed with a positive effect on the quality of bread, the addition of exogenous α-amylase has also side effects, some undesirable. One is reducing consistency of the dough and modification of the rheological properties, especially since the addition of α-amylase is higher. Increases dough extensibility and resistance decreases. The effect is attributed to the presence of α-amylase preparations and a generally low proteolytic activity, and that maltose formed by hydrolysis of starch on an action dewatering gluten, following increase in osmotic pressure extramicelare. It thus increases the amount of free water in the dough, which reduces his consistency and worse rheological properties.

The rheological properties of dough elasticity, viscosity, relaxation and creep have influence on bread quality. They change during the technological process due to external forces exerted upon it, producing the appearance of tensions that cause him deformation. The dough of wheat flour is a nonlinear viscoelastic body. He possesses properties that are characteristic of both liquids and solids therefore has a behavior intermediate between solids and fluids ideal: when it is subjected to stress, the energy is dissipated part and the other part is stored. During baking, the dough is subjected to tensile stress, uniaxial and biaxial, and shear.

Tensile stress is considered prevalent during fermentation and is given by the mechanical effect of carbon dioxide, which stretch films gluten / dough is a biaxial tensile and shear stress is predominant during kneading.

MATERIALS AND METHODS

It took the amount of flour they were effectuate determinations on farinograph parameters: moisturizing ability, dough development, dough stability, dough elasticity and its degree of softening. Farinograph method uses a standard dough consistency, set at 500 Brabender units (BU). Were separated samples of flour into four groups in which one witness (M) not containing added alfaamilaza, group P1 with added 280,000 units SKB | 100 kg flour, group P2 with added 560,000 units SKB | 100 kg flour, P3 group to add the 840,000 units SKB | 100 kg flour. The enzyme used was a commercially under the trade name CLARASE. G PLUS

RESULTS AND DISCUSSIONS

Influence of α-amylase addition of moisture on the ability of the dough are shown in Table 1

Tabel 1

Influence of α-amylase addition on the ability of the dough hydration

The test of flour	**Capacity of hydration% at the adittion of α-amylase added fungal (U. SKB / 100 kg flour) to:**			
	M	**P1-280.000**	**P2-560.000**	**P3-840.000**
F1	64.4	60.5	61.8	62.7
F2	60.9	61.2	60.1	61.2
F3	61.9	62.1	62.8	63.1
F4	62.0	60.7	60.7	60.3

Influence of α-amylase addition the dough development is shown in Table 2. and graphically in Figure 1

Tabel 2

Influence of α-amylase addition the dough development

The test of flour	**Development (min) at the adittion of α-amylase added fungal (U. SKB / 100 kg flour) to:**			
	M	**P1-280.000**	**P2-560.000**	**P3-840.000**
F1	2	1.5	2	1.5
F2	1.5	1.5	2	1.5
F3	2	1.5	1.5	1.5
F4	2	1.5	1.5	1.5

Influence of α-amylase addition the stability of the dough is shown in Table 3 and graphically in Figure 2 of :

Tabel 3.

Influence of α-amylase addition on dough stability

The test of flour	Stability (min) at the adittion of α-amylase added fungal (U. SKB / 100 kg flour) to:			
	M	**P1-280.000**	**P2-560.000**	**P3-840.000**
F1	6	2.5	2.5	2
F2	5.5	4.5	2	2.5
F3	6.5	2	2.5	3
F4	6.5	2	1	1.5

Influence of α-amylase addition on dough elasticity is shown in Table 4 and graphically in Figure 3.

Farinograph, is expressed as the width of the dough elasticity curve

Tabel 4

Influence of α-amylase addition to the elasticity of the dough

The test of flour	Elasticity, UF at the adittion of α-amylase added fungal (U. SKB / 100 kg flour) to:			
	M	**P1-280.000**	**P2-560.000**	**P3-840.000**
F1	75	80	70	80
F2	70	80	80	90
F3	80	70	90	80
F4	80	80	80	80

The addition of α-amylase influence on the degree of softening of the dough is given in Table 5 and graphically in Figure4

Tabel 5

Influence of α-amylase addition the degree of softening the dough

The test of flour	The softening UF at the adittion of α-amylase added fungal (U. SKB / 100 kg flour) to:			
	M	**P1-280.000**	**P2-560.000**	**P3-840.000**
F1	90	130	170	160
F2	65	118	130	110
F3	65	110	110	110
F4	80	130	140	110

From experimental data resulting decrease the capacity of hydration compared to the control sample in F1 and F4 flours due to the fact that the

addition of alpha-amylase increase the amount of maltose in the dough, a phenomenon which affects absorption technology.

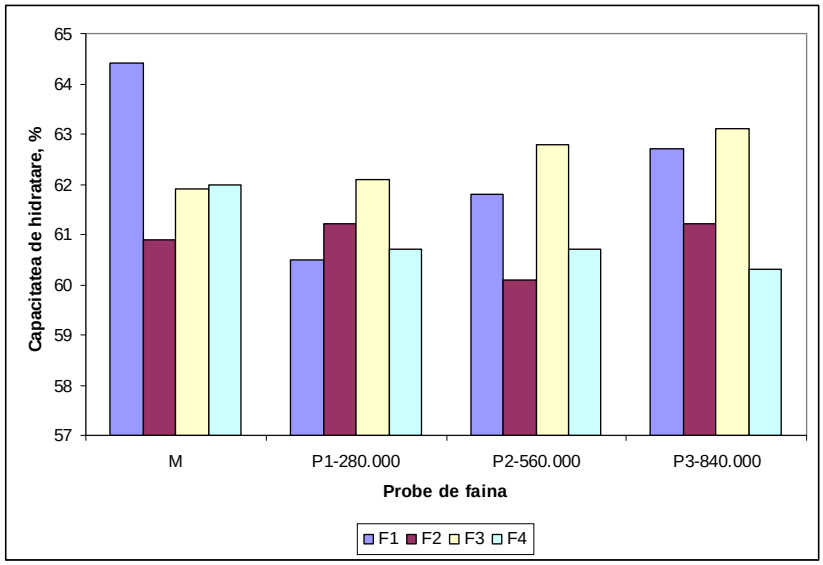

Fig.1. Influence of α-amylase addition on the ability of the dough hydration

The general trend for the development of the dough to the addition of exogenous alpha-amylase is decreasing.

Treatment with alpha-amylase, the added U.SKB 280 000/100 kg of flour, dough development is reduced from 2 minutes to 1.5 minutes flours F1, F3 and F4 as a result of the amilolitics.

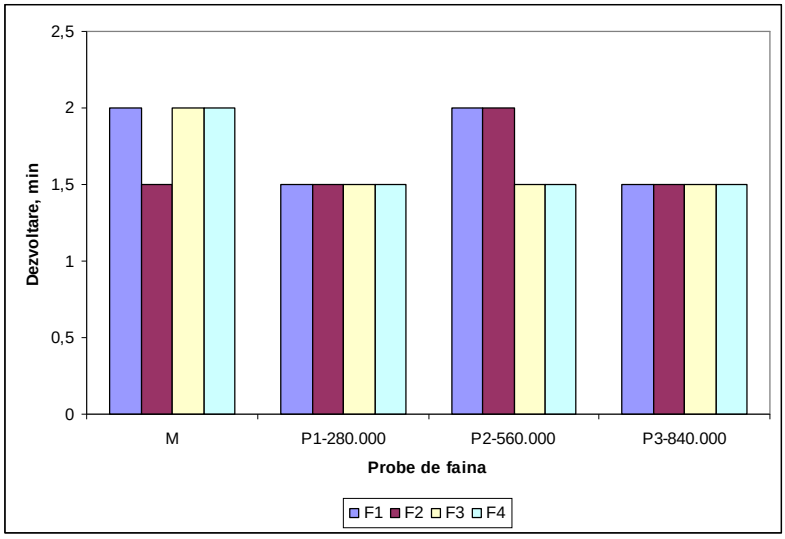

Fig. 2. Influence of α-amylase addition the dough development

According to experimental data, goods that have worked between 5,5 and 6,5 stability min. Adding alpha-amylase, dough stability is greatly reduced, as shown in the table or chart. The biggest reduction is seen in the flour dough stability F4 which added 560,000 U.SKB / 100kg flour decreased from 6.5 min to 1 min.

Restoring stability amylose dough due process which is the result of joint action by α-β-amylase and amylase.

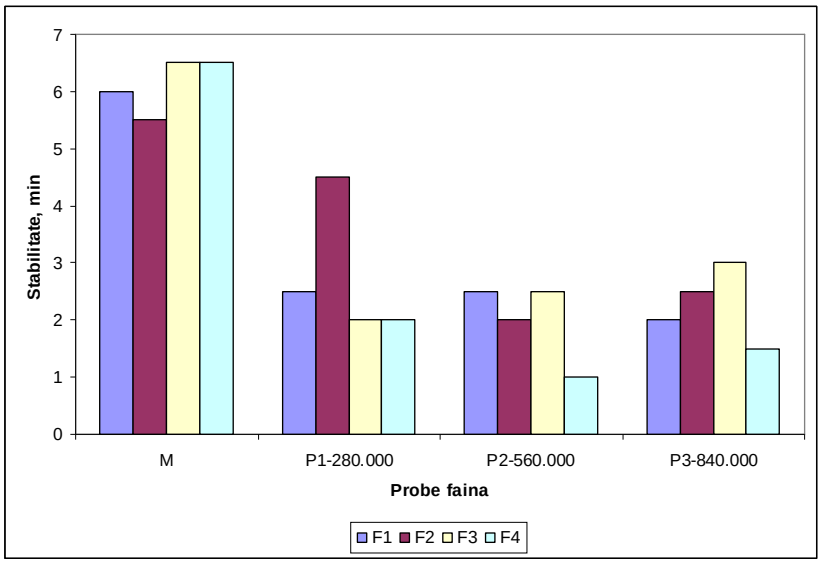

Fig. 3. Influence of α-amylase addition on dough stability

From the data obtained experimental results that we obtained a linear increase elasticity to the addition of 280,000 U.SKB / 100kg flour and .SKB 560 000 / 100kg flour compared with the control (14.20%), followed as an addition 840 000 U.SKB / 100kg flour elasticity increase by 20.8% as compared to the control sample, the explanation being that the width of the farinograph curve is influenced by the viscosity of the dough.

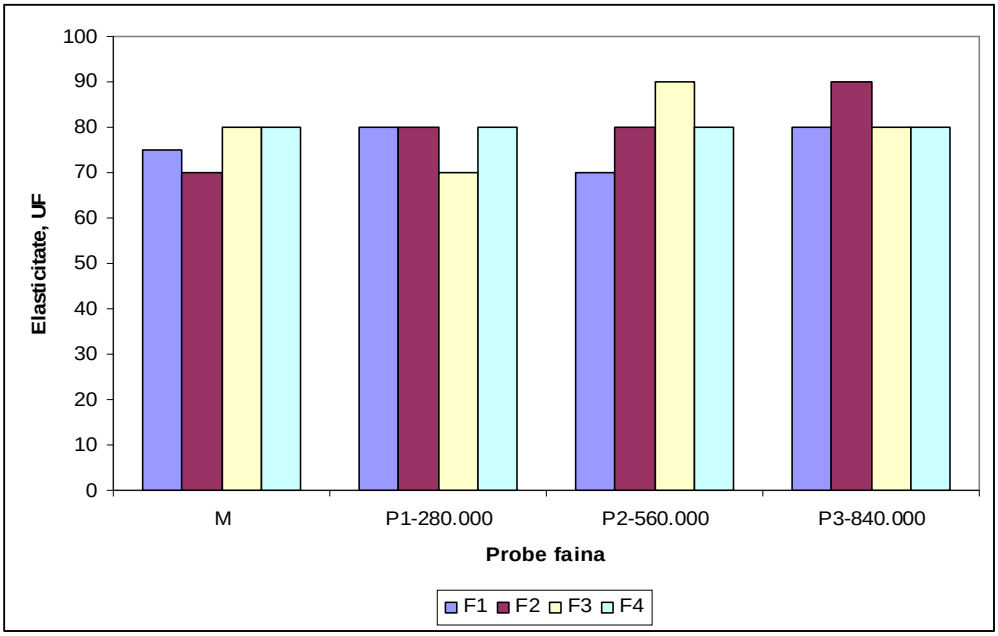

Fig. 4. Influence of α-amylase addition to the elasticity of the dough

From experimental data obtained an increase in the degree of dough softening compared with the controls at doses of 280 000 U.SKB / 100kg flour and U.SKB 560 000 / 100kg flour.

Note that if the F1, F2 and F4 softening index rise is spectacular for α -amylase dose U.SKB 560 000 / 100kg flour (F1 = increase of 80.8%; F2 = increase of 100% growth F4 75%) compared with the control to increase the softening of the flour F3 compared to untreated control was 60.9%, and remains linear for all doses of α -fungal amylase. From the above, that the structure of the dough is degraded as compared with the control than in the case of F1 flour at a dose of α -amylase fungal U.SKB 280 000/100 kg flour, the influence being. 40.4%

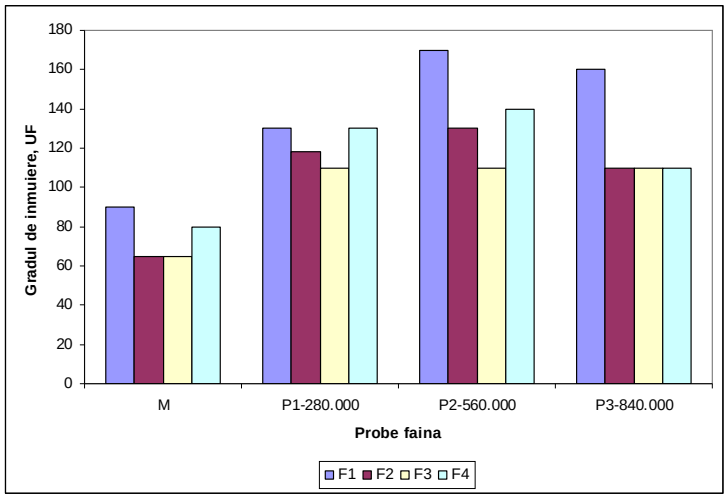

Fig. 5. Influence of α-amylase addition the degree of softening the dough

CONCLUSIONS

In conclusion the addition of alpha amylase exogenous decreases viscoelastic properties of dough, and therefore dosage thereof must be made in amounts weighted, otherwise nothing grows forming capacity of gas fermentation the addition of α-amylase, the dough will be very difficult processed during the process and finished product quality will be compromised.

This decrease of viscoelastic properties is due to amylose as alpha amylase action and as effect change the gelling starch obtaining a liquefaction yielding thereof. This liquefaction change viscoelastic properties, as if the amount of excess lead alfaamilaza is getting a sticky dough.

To avoid these situations it will add alpha amylase in quantities weighted and if it did not decrease enough figure to fall near the optimum value of 280 seconds is recommended mixing flour with another flour which has a number of hair as close to optimal value.

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