

THE INULIN AND OLIGOFRACTOSE EFFECT ON QUALITY PARAMETERS OF BAKING PREMIUM WHEAT AND RYE FLOUR AND PRESSED BAKER'S YEAST

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To determine the expediency of inulin and oligofractose use as an additive giving the bread functional properties, the effect of inulin and oligofractose on quality parameters of baking premium wheat and rye flour and pressed baker's yeast was investigated.

Keywords: inulin, oligofractose, premium wheat and rye flour, pressed baker's yeast

The development of functional purpose bakery products using food fibers, obtained from readily available raw materials, that could have a positive effect on the human organism, improve the quality of the products under development, output, and thereby increase the competitiveness of products is an important task for today.

In this regard, it is expedient to use inulin and oligofractose, which are products of

the processing of chicory and Jerusalem artichoke growing in the most of European regions.

The purpose of research is to develop technologies for production of wheat and rye-wheat bread of functional purpose using inulin brands Beneo HP, Beneo GR and oligofractose brand Beneo P 95 their quality parameters are resulted in the Table 1.

Table 1

Quality parameters of food fibers

The indicator name	Beneo HP	Beneo GR	Beneo P 95
Mass fraction of solids, %	97 ± 1,5	97 ± 1,5	97 ± 1,5
Average degree of polymerization, g.u	> 23	от 10 до 14	от 2 до 8
The raftiline maintenance (raftilose), % on solid	> 99,5	≥ 93,2	> 90
The maintenance mono- and дисахаридов, % on solid	< 0,5	< 4	≤ 12
Solubility, g/l	20 – at 25 °C 300 – at 90 °C	120 – at 25 °C 350 – at 90 °C	> 750
Features at mixing with water	Formation of gels	Formation of suspensions	Formation of solutions

During the study, the fact that the injection of inulin and oligofractose does not influence the quantity and quality of wheat flour gluten was established, and the content of raw gluten was 33 %, readings DCO – 100.

In the investigation of the autolytic activity of wheat and rye flour in terms of «falling numbers», an increase in this indicator by 19,3–45,3 % compared with the control sample was pointed out, due to the ability of inulin and oligofractose to bind up to quintuple amount of water, the viscosity of the suspension increasing.

Since the definition of «falling number» can not fully assess the the inulin and oligofractose effect on the state of amylase and carbohydrate complex of flour the nature of changes in the autolytic activity of flour and flour starch gelatinization temperature is defined.

In determining the amount of water-soluble substances formed during the heating of the water-flour suspension an increase in the num-

ber of water-soluble substances by 0–11,9 % was found, which is the result of the partial solubility of inulin and oligofractose, the number of water-soluble substances increasing with higher solubility of the component injected.

To study the effect of inulin and oligofractose on the properties of flour starch, the gelatinization temperature of starch grains is defined and it is found that the addition of inulin and oligofractose does not influence the temperature of starch gelatinization, as, anyway, the swelling of starch grains starts at 75 °C, and the maximum effort with which the stock (rod) is mixing water and flour suspension is always observed at the temperature of 91,5 °C for rye flour, and at a temperature of 97 °C for wheat flour.

While examining the aerogenous ability of wheat flour it was established that the maximum aerogenesis in all samples was observed after 120 minutes of fermentation, with the samples with the introduction of 3 % inulin

brands Beneo HP and Beneo GR to the mass of flour and 5% oligofructose Beneo P 95 having the greatest aerogenous ability. Beneo HP having been injected, the aerogenous ability of flour increased by 17,4% compared with the control sample, with Beneo GR it grew by 19,7%, while introducing oligofructose Beneo P 95 it increased by 35,6%.

The results obtained in the study of water absorption capacity of flour (Table 2) (WAC)

let us say that, when injecting oligofructose with a degree of polymerization (DP) 2 to 8 m.u., rye flour WAC remained the same, and wheat flour WAC decreased by 2,3%, when using inulin brand Beneo GR with DP from 10 to 14 m.u. rye and wheat flour WAC didn't change. Inulin brand Beneo HP with a degree of polymerization above 23 m.u. being injected, rye flour WAC increases by 2,7% and wheat flour WAC grows by 2,6%.

Table 2

The results obtained in the study of farinograms

The indicator name	WAC, (ml)	Dough formation time, (mines)	Dough stability, (mines)	Dough resistibility (firmness), (B+C, mines)	Dough elasticity (D, mm)
Rye flour	86,5	5,5	13,0	18,5	2,0
Rye flour with the introduction of 3% Beneo HP	88,8	5,5	14,0	19,5	1,5
Rye flour with the introduction of 3% Beneo GR	86,5	6,0	12,0	18,0	1,5
Rye flour with the introduction of 3% Beneo P 95	86,5	6,5	11,0	17,5	2,0
Baking premium wheat flour	60,7	1,0	31,0	32,0	52,0
Baking premium wheat flour with the introduction of 3% Beneo HP	62,3	1,0	29,0	30,0	40,0
Baking premium wheat flour with the introduction of 3% Beneo GR	60,7	1,0	33,0	34,0	52,0
Baking premium wheat flour with the introduction of 3% Beneo P 95	59,3	1,0	31,0	33,0	56,0

It is established that the addition of inulin and oligofructose does not influence the quantity and the physiological state of yeast cells, as in all the samples of activated yeast the quantity of the yeast cells varied from $3450 \cdot 10^6$ to $5650 \cdot 10^6$ while the quantity of dead cells with glycogen being within the limits of $68 \cdot 10^3$ – $135 \cdot 10^3$ in 1 g of yeast.

Based on the data obtained, one could find that the addition of inulin and oligofructose affects only the rate of aerogenous ability and water absorption capacity of flour, while the

other indicators of the main raw materials remain the same.

Reference

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