

розчину) чи сольватні оболонки навколо молекул (іонів) поверхнево інактивної речовини.

Поверхнево інактивними речовинами у відношенні до води є кислоти, луки та солі. Також воду можуть утримувати навколо гідрофільних груп вуглеводи та білки, а також продукти їхнього гідролізу. Ці ж речовини створюють осмотичний тиск розчину. У харчових продуктах поверхнево інактивні речовини можуть виконувати роль консервантів за рахунок зменшення вмісту вільної води, яка є субстратом у метаболічних шляхах перетворення мікроорганізмами поживних речовин.

Електроліти, розпадаючись на іони, дають можливість утримувати навколо кожного іона молекули води. Утримування води біля іонів ефективніше у електролітів, порівняно з молекулами неелектролітів.

Отже, ефективність добавки у харчовому продукті залежить від фізичних і хімічних властивостей молекул розчинника і розчиненої речовини та визначають експериментально.

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REDOX POTENTIAL OF OATMEAL DOUGH

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Bread is part of the daily diet, so an important task for scientists is to expand the range of bread products with high consumer properties.

Taking into account the scientific achievements of domestic and foreign scientists, the enrichment of bread with complex carbohydrates, vitamins, minerals and fiber was realized by replacing wheat flour with oatmeal. To increase the protein content of bakery products, casein was added. Glucan-delta-lactone was used as a structure-forming agent in the technology of agglutinating products.

The process of maturation of dough semi-finished products includes the course of redox reactions, which depend on the volume and concentration of the direct components of the processes and their origin.

The redox potential allows us to understand the intensity of the transformation in the control environment, and also ensures the activity of the enzyme complex of the system. Accordingly, the vital activity of yeast microorganisms is dependent on the level of oxidation of the medium [1].

For their research, the redox potential was expressed through the negative logarithm of the partial pressure of molecular hydrogen rH_2 , which allows predicting the total redox state of the medium. The degree of change in the rH_2 value expresses the intensity of the processes inherent in the dough fermentation process, and the fermentation activity will increase with an increase in the reducing conditions created in dough semi-finished products. The value of rH_2 ranges from 0 to 40 and indicates the degree of reduction (movement to 40) or oxidation (movement to 0) of the environment, that is, from saturation of the dough with hydrogen molecules to saturation with oxygen [1].

During the fermentation of yeast dough, the redox potential value decreases, and during the fermentation of unleavened dough, it increases. This is because the vital activity of saccharomycetes results in the accumulation of substances (ethyl alcohol, acetaldehyde) with reducing properties. Fig. 1 shows the data obtained on the change in TOC during the fermentation of dough from the studied raw materials.

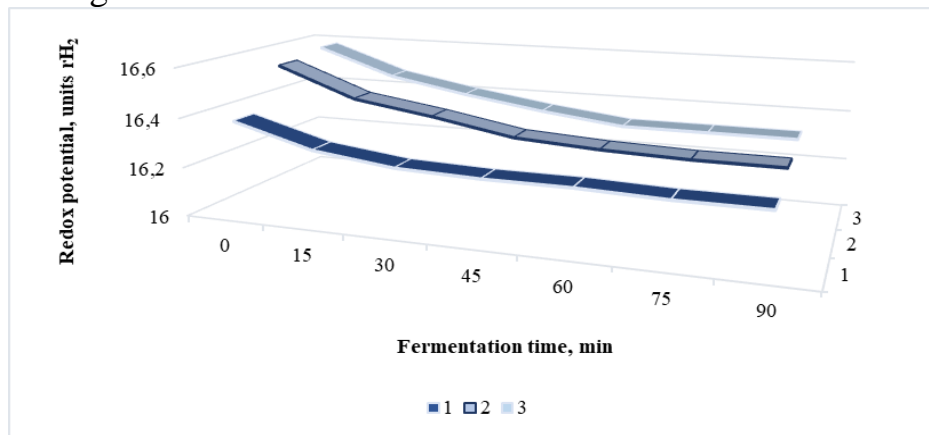


Fig. 1 - Dynamics of changes in the oatmeal dough's moisture content:
1 - Sample 1 (without additives); 2 - Sample 2 (with the addition of glucan-delta-lactone); 3 - Sample 3 (with the addition of glucan-delta-lactone and casein)

Summarizing the results of the change in the redox potential of oatmeal dough, it was found that more relative conditions are created in samples using glucan-delta-lactone and casein, which has a positive effect - activation of microbiological processes. This is due to the increase in the amount of simple sugars (glucose and maltose), and according to [2], sugars act as reducing agents in oatmeal dough.

Addition of the glucan-delta-lactone and casein complex also helps to activate the activity of yeast microflora by improving the availability of nutrients important for the metabolism of saccharomycetes during the maturation of semi-finished dough products. The period of rH_2 stabilization is a key stage in determining the readiness of the dough. It

can be considered optimal when the rate of change of rH_2 is close to zero. When a dynamic equilibrium is achieved between the oxidized and reduced forms of structural compounds in dough semi-finished products, the transition of electrons from one form to another is stabilized, and accordingly, the dough acquires the optimal level of readiness [2].

It has been shown that the fermentation activity of the developed samples with the addition of glucan-delta-lactone tends to decrease after 50 minutes of maturation, which is associated with an insufficient amount of fermentable sugars. For the dough made without the use of improvers, this tendency to stabilize the rH_2 value is observed after 30 min. The established results of the dynamics of changes in the rH_2 value during the fermentation of dough semi-finished products correlate with the data of their titratable and active acidity. Taking into account the studies conducted, it can be assumed that the fermentation time of oatmeal dough will be 45 min, since this duration allows achieving the highest intensity of microbiological processes [3].

Thus, the analysis of the physicochemical and organoleptic quality indicators of semi-finished and finished products revealed that it is rational to completely replace wheat flour with oat fiber, provided that casein is added in the amount of 5% and glucan-delta-lactone in the amount of 1%. This ratio provides the required specific volume, porosity, crumb condition, appearance, taste, and aroma of aggluten-free bread products.

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СУЧАСНІ МЕТОДИ ОЧИЩЕННЯ АНТОЦІАНІВ

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Вступ. У процесі екстракції одночасно екстрагуються антоціани і велика кількість домішок (розчинний цукор, білок, органічна кислота). Надмірна кількість домішок створює суттєвий вплив на фізіологічну активність, стабільність і якість кінцевого продукту антоціанів.