

CHANGES IN THE CARBOHYDRATE-AMYLASE COMPLEX GERMINATION OF CEREAL CROPS

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Abstract

The technology for the production of functional drinks provides for the activation of the latent potential of cereal grains by sprouting it. At the same time, significant biochemical changes are observed, as a result of enzymatic cleavage by amylase, a carbohydrate complex, which is rich in cereal crops, into mono-, di- and polysaccharides. In this regard, we studied the dynamics of the enzymatic process occurring in the grain mass during grain germination. The aim of the research was to study the enzymatic activity (amylase) depending on the timing of germination and the consequences of changes in the carbohydrate complex of the objects of study - cereal grains of domestic breeding varieties (triticale, wheat and barley).

The objects of study are varieties of cereal crops: triticale variety "Asiada", spring barley variety "KazSuffle-1", soft spring wheat variety "Almaken". These varieties are the latest breeding achievements of domestic research teams of research and production centers in the field of crop production. Amylase activity during the germination of research objects (triticale grains, barley and wheat) was determined by using the spectrophotometric method of research. To study the activity of the amylase complex, a starch solution was used as a substrate, which is obtained by its hydrolysis, with an aged solution of enzymes of various grain crops. The dextrinogenic activity of amylases was determined on a ShimadzuUV-1900i spectrophotometer (Japan) by measuring the light absorbing capacity at a light wave of 660 nm. A sample was prepared from germinated grain, separately triticale, wheat and barley with different germination periods, which were ground in a Retsch Grindomix GM-200 laboratory mill.

We studied the activity of the amylase complex of sprouted grains of triticale, barley and wheat. The results obtained showed a direct effect of the timing of germination on the quantitative expression of amylase in the grain, which characterizes its activity. In the grain of cereal crops that are at rest, the activity of amylase corresponds to the minimum values and only traces of amylase are established. After exposure to moisture and a long time for germination, an increase in amylase values is found, which breaks down complex carbohydrate compounds, starch and fiber, first into dextrin, and then into the disaccharide maltose, etc. We studied the change in the content of carbohydrates (sucrose, maltose, glucose and fructose) in the objects of study, depending on the timing of their germination. The results obtained showed that with an increase in the germination period up to six days, the content of carbohydrates in the objects of study increases, and from the sixth to the eighth day of germination, there is a slight decrease in the content of carbohydrates.

As a result of studying the enzymatic process of cereal grains (triticale, barley, wheat), it was found that as a result of the hydrolysis of the carbohydrate group of research objects during germination for food purposes, changes in the content of the mass fraction of carbohydrates are observed. It has been proven that the optimal germination

time should be taken as the period at which the values of the carbohydrate composition are the highest, as evidenced by the graphical interpretation of the experimental data. The activity of the amylase complex was confirmed to appear on the 4-6th day. This indicator is confirmed by the results of a study of the carbohydrate complex of cereal grains.

Key words: *Functional drinks, Carbohydrate-amylase complex, Germinated grain, Cereal crops, Amylase, Triticale, Germination time.*