

CHANGES IN LIPASE ACTIVITY DURING GERMINATION OF OIL SEEDS

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Abstract

The process of germination of oilseeds is accompanied by enzymatic hydrolysis of lipids under the action of lipase, which catalyzes the hydrolytic cleavage of triacylglycerols to glycerol and fatty acids. This article studied the activity of lipase in germinated oilseeds. The aim of the study was to determine the activity of oilseed lipase, analyze the effect and identify the dependence of lipase on the fatty acid composition at different exposure times.

The objects of study are oilseeds of the 2021 harvest: spring rapeseed variety "Gulsary"; sunflower grade "Rauan"; flax oil grade "Kostanay"; safflower variety "Nika 80". Determination of lipase activity (dependence of the enzymatic activity of lipase on the duration of the germination of oilseed grains, dynamics of the enzymatic process, which is characterized by changes in the quality of the objects of study, depending on the timing of germination, and change in the acid number of fat in sunflower, flax and safflower seeds depending on the timing of germination) was carried out by the conventional titrimetric method on two types of buffer solutions (alkaline phosphate buffer with pH 8 and acid acetate buffer with pH 4.7).

Analysis of the obtained data when studied the dependence of the enzymatic activity of lipase on the duration of the germination of oilseed grains, showed that an increase in the germination of oilseed grains, as a result of active hydrolysis of the lipid bonds of the fatty composition, leads to an acceleration of the fermentation process - lipase activity, rapidly splitting triacylglycerols to glycerol and fatty acids. Regarding the dynamics of the enzymatic process, which is characterized by changes in the quality of the objects of study, depending on the timing of germination, the analysis of the presented data showed that an increase in the germination of spring rape seeds significantly affects the change in the acid number of fat, which confirms the active course of the enzymatic process due to the breakdown of vegetable oil molecules by lipase into free fatty acids. When studied the change in the acid number of fat in sunflower, flax and safflower seeds depending on the timing of germination, dependence analysis showed that with an increase in the terms of germination of seeds of sunflower, flax and safflower, an increase in the values of the acid number of fat is observed.

As a result of studying the process of fermentation of oilseeds with lipase during germination, it was found that the timing of germination actively affects the quality indicator - the acid number of fat. The acid number indicates the amount of free fatty acids, which leads to the oxidation of the final product and oxidative spoilage. An increase in acid number leads to a reduction in the shelf life of the finished product. The increased content of free fatty acids occurs due to the fact that during the germination of grain, the lipase enzyme is activated, which breaks down the oil molecules in oilseeds into free fatty crops. The longer the grain germination process, the higher the lipase activity becomes. High activity of lipases leads to an increase in the acid number of fat.

Key words: *Enzymes, Lipolytic activity, Lipase, Functional drinks, Safflower, Sunflower, Linen rape.*