

**RESEARCH ON THE PRODUCTION OF MONO-AND DIGLYCERIDES BASED ON
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Annotation. This study is devoted to the development of a technology for the production of mono- and diglycerides based on local raw materials and the assessment of its efficiency. Mono- and diglycerides are important surfactants widely used in the food, pharmaceutical and cosmetic industries. The main goal of the study is to create the possibility of producing import-substituting products and rational use of local fat and oil raw materials. In the process, the composition of vegetable oils was analyzed, and their esterification and transesterification reactions with glycerin were studied. The main factors affecting the process were determined - temperature, type of catalyst, reaction time and ratio of components. The physicochemical parameters of the obtained mono- and diglycerides, including acid number, solubility and emulsification properties, were evaluated. The research results showed that it is possible to obtain high-quality and competitive mono- and diglycerides based on local raw materials. The proposed technology is economically efficient and serves to reduce production costs. This scientific work is of great importance in the development of the food industry, expanding the use of local resources and creating new functional additives.

Keywords: mono- and diglycerides, local raw materials, vegetable oils, esterification, emulsifier, oil and fat industry.

Today, the demand for functional additives used in the food, pharmaceutical and cosmetic industries is increasing year by year. In particular, emulsifiers that improve the quality, stability and appearance of products are of particular importance. Mono- and diglycerides are among such substances. They have the property of forming stable emulsions of oil and water phases and are used in a wide range of industries.

Currently, a large part of mono- and diglycerides is imported, which leads to an increase in the cost of products and dependence on foreign markets. Therefore, the development of technology for obtaining mono- and diglycerides based on local raw materials is one of the urgent issues. The use of local vegetable oils not only increases economic efficiency, but also serves to rationally use existing resources.

This article discusses the chemical properties of mono- and diglycerides, methods for their production, and the development of effective technology based on local raw materials.

Mono- and diglycerides are complex esters of glycerol and fatty acids. When one hydroxyl group of glycerol binds to a fatty acid, a monoglyceride is formed, and when two groups bind, a diglyceride is formed. These substances have surface-active properties and stabilize the boundary between the water and oil phases.[1]

Mono- and diglycerides are found in small quantities in natural oils, but on an industrial scale they are obtained through special chemical reactions. Their main advantages are:

high emulsifying properties;

biological safety;

tasteless and odorless;

stability over a wide temperature range.[2]

Therefore, these substances are widely used in the production of bakery products, margarine, ice cream, confectionery products, and medicines.

There are many plant raw materials suitable for the oil and fat industry in Uzbekistan. In particular, cottonseed oil, sunflower oil, soybean oil, and rapeseed oil are widely produced. These oils contain a high amount of triglycerides, which are a convenient source for obtaining mono- and diglycerides.

The use of local raw materials provides the following advantages:

reduces the need for imports;

reduces production costs;

develops local industries;

ensures environmentally sustainable production.

In this regard, the deep processing of local vegetable oils is of great scientific and practical importance.

There are several main methods for obtaining mono- and diglycerides, each of which differs in technological conditions and economic indicators.

Esterification method. In this method, fatty acids are reacted with glycerol at high temperatures in the presence of a catalyst. As a result of the reaction, mono- and diglycerides are formed. The main advantage of the esterification process is the high purity of the product, but the energy consumption is relatively high.[3]

Transesterification method. The transesterification method is based on the re-esterification of triglycerides with glycerol. This method is widely used in industry and is considered relatively economical. The process is carried out in the presence of alkaline or enzymatic catalysts.

Enzymatic method. In recent years, there has been increasing interest in obtaining mono- and diglycerides using enzymes. This method is environmentally friendly and is carried out at low temperatures. However, the high cost of enzymes may limit the economic efficiency of the process.[4]

In this study, the process of obtaining mono- and diglycerides based on locally produced vegetable oils was studied. The experiments were carried out in laboratory conditions using the transesterification method. In the process, glycerin and vegetable oil were mixed in certain proportions, and alkaline substances were used as catalysts.

During the reaction, the following factors were analyzed:

the effect of temperature;

reaction time;

the amount of catalyst;

the ratio of components.[5]

The obtained products were subjected to physicochemical analysis and their quality indicators were evaluated.

The results of the study showed that it is possible to obtain high-quality mono- and diglycerides based on local vegetable oils. When the optimal temperature and reaction time were selected, the proportion of monoglycerides increased significantly. It was found that the obtained products were at the level of industrial requirements in terms of emulsifying properties.

The process was also economically efficient, allowing for cheaper production compared to imported products. This is an important advantage for the local industry.

The results of this research can be widely used in the food and oil industries. Based on the developed technology, there is an opportunity to establish the production of mono- and diglycerides at local enterprises. This will create new jobs, expand the product range and increase export potential.

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