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ANALYSIS OF EMULSIONS OBTAINED IN ULTRASONIC HOMOGENIZER AND MAGNETIC STIRRER DEVICES

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Abstract:

Objective. Today, the application of water-oil emulsions will help not only increase the quality indicators of the product but also reduce its cost. This is done by introducing quality products into their composition. But it is also possible to improve the cooking processes, i.e., the quality of the output product, by lubricating the molds using various emulsions.

Methods. We made emulsions taxable in ultrasound homogenizers and magnetic stirrer devices. And the viscosity of the emulsions obtained in the two devices is compared.

Results. the emulsion produced by an ultrasonic homogenizer device, as opposed to one by a magnetic stirrer device, has produced a suitable microscope image, meaning that the water and oil have thoroughly reacted with one another.

Conclusion. Thus, the obtained emulsions will not only replace emulsions imported from abroad, but the emulsion obtained on the ultrasonic homogenizer device from the emulsion obtained on the magnetic stirrer device will be able to freely compete in terms of energy and time savings, which will lead to an increase in the quality of its products.

Keywords: ultrasound, homogenizer, magnetic stirrer, microscope, oil, stagnation, viscosity, surface tension, energy, emulsifiers, density, dispersion, lubrication.

Introduction. In the food industry, especially in the oil and baking industries, nutrient emulsions are widely used not only in the composition of products but also in the processes of their preparation. Today, the application of water-oil emulsions will help not only increase the quality indicators of the product but also reduce its cost. This is done by introducing quality products into their composition. But it is also possible to improve the cooking processes, i.e., the quality of the output product, by lubricating the molds using various emulsions. Proper preparation of the emulsion increases the quality of the appearance of bread [1, 2].

In order to further increase the stagnation of the resulting emulsions, it is necessary to bring them to their previous high indicators in the previous values of their viscosity. When preparing oil emulsions in the traditional way, they are mixed at high speed for 10–15 minutes, based on GOST R 51785-2001 [2, 3]. It contains 75% water, 15–17% vegetable oil, and 5-7% phosphotide concentrate. In Russian bakeries, emulsion is applied to it by up to 1.5–8%. Proper preparation of the emulsion leads to the fact that the bread does not lose its quality for a long time.

Method. One of the main and most necessary processes for obtaining stagnant oil-water emulsions is the process of grinding the initial raw materials as much as possible. There are several types of emulsions, depending on the nature of the emulsifier being mixed and applied. To obtain emulsions of the" oil-water" type, the oil is added to the water. Before carrying out mixing processes, it is necessary to add an emulsifier to the water and dissolve it. The opposite of this process is used in "water-oil" type emulsions by adding an emulsifier to the oil and then adding water. These conditions should be taken into account when a small amount of dispersing particles is introduced into it. If this mutonosity is disturbed, the dispersing phase will pass into the dispersing medium.

We have also made emulsions taxable in ultrasound homogenizers and magnetic stirrer devices. 1: We compared the viscosity of the emulsions obtained in the two devices. With the help of a viscosometer, the resulting emulsions were determined by their viscosity and surface tensions. The viscosity of the emulsion was calculated using the formula:

$$\mathrm{N}x = \frac{\mathrm{Px \cdot To}}{\mathrm{Po \cdot Tx}}$$

where: **Px** is the solution density, **Ro** is the water density,
Tx is the time the solution flows. **To** is the time for water to flow.
The surface tension of the samples is determined by the following formula:

$$\sigma x = \frac{\mathrm{no} \cdot dx}{\mathrm{nx} \cdot \mathrm{do}}$$

Where: **no**-drop number of water, **nx**-drop number of emulsion,
do is the density of water, **dx** is the density of the emulsion.

Results.

Table 1

Physical properties of emulsions obtained and brought from abroad

Samples	Viscosity, μ Pa·c.	Surface tension, δ, N/m
Emulsion from abroad	0,127	0,75
Emulsion obtained in a magnetic stirrer device	0,032	0,5
Emulsion obtained in an ultrasonic homogenizerdevice	0,066	0,9

As can be seen from the table below, the results from an ultrasonic homogenizer device rather than a magnetic stirrer device are close to emulsion indicators from abroad.

As well as the emulsions obtained in ultrasonic homogenizers and magnetic stirrer devices if we pass microscope views in a raw way.

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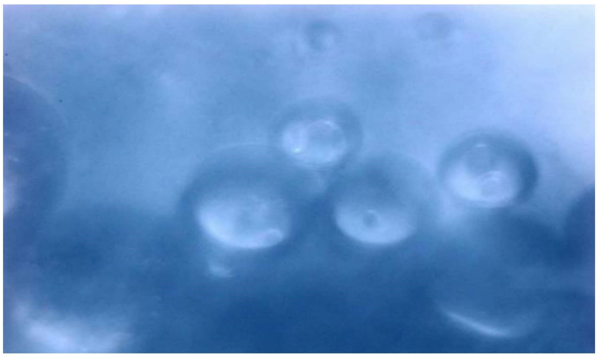

Fig.1 Below is a microscope view of the emulsion obtained through a magnetic stirrer device

Fig.2 The next quoted figure shows a microscope view of the emulsion obtained in an ultrasonic homogenizer device

This image shows the emulsion produced by an ultrasonic homogenizer via a microscope. The following shows that the emulsion produced by an ultrasonic homogenizer device, as opposed to one by a magnetic stirrer device, has produced a suitable microscope image, meaning that the water and oil have thoroughly reacted with one another.

Discussion. In light of this, it was discovered that the stagnation of the emulsions affects how long they take to mix. The following table shows the results that were obtained.

table 2

The dependence of the mixing time of the emulsion obtained in a magnetic stirrer device on the stagnation of the emulsion

Sunflower seed oil (%)	Lecithin (%)	Water (%)	Stirring time,min	Stability,day
25	2	73	15 minut	20
25	2	73	20 minut	25
25	2	73	25 minut	38

As can be seen from the table, it was observed that with an increase in the duration of mixing, its stagnation increased from 15 days to 40 days. But since the result between 25 minutes and 30 minutes was almost close, 25 minutes were considered sufficient.

Table 3

The dependence of the mixing time of the emulsion obtained in an ultrasonic homogenizer device on the stagnation of the emulsion is shown

Sunflower seed oil (%)	Lecithin (%)	Water (%)	Stirring time,min	Stability,day
25	2	73	10 minut	25
25	2	73	15 minut	35
25	2	73	20 minut	45

As can be seen from the table, we can see that the emulsion obtained in 10 minutes in an ultrasonic homogenizer device is stable for 25-30 days.

After that, the effect of changes in the amount of fat on the stagnation of the emulsion was studied. The results obtained were given in Figure 3.

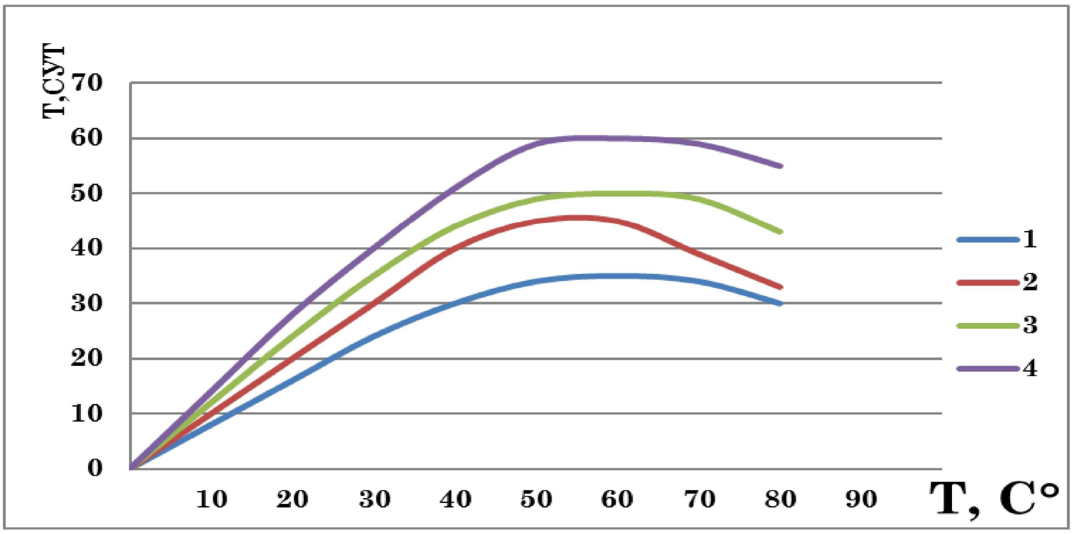

Fig 3. The effect of changes in fat content on stagnation and storage duration. 1-contains 15% fat; 2-contains 20% fat; 3-contains 25% fat; 4-contains 30% fat.

From the results, it was observed that the emulsion stood in a stagnant state for 30–35 days when it contained 15% fat. But it has been found that increasing the fat content of the emulsion from 15 to 30% increases the emulsion's stagnation by almost two times. But considering that the increase in the amount of fat in the emulsion does not justify itself on the economic side, it was considered sufficient that the optimal composition be up to 20% fat in the emulsion.

From Figure 3, it was observed that the stagnation of the emulsion is mainly due to 50–60 °C. The main reason for this is that the emulsification process is carried out at high or extremely low temperatures, which leads to a violation of its stagnation in storage processes. The effect on temperature of polyoxyethylenated noionogenic surfactants, in particular, is very high. For this reason, it allows obtaining different emulsions under the influence of temperature: "oil-in-water" at normal temperatures and "water-in-oil" type emulsions at high temperatures [3, 4].

Conclusion. Thus, the obtained emulsions will not only replace emulsions imported from abroad, but the emulsion obtained on the ultrasonic homogenizer device from the emulsion obtained on the magnetic stirrer device will be able to freely compete in terms of energy and time savings, which will lead to an increase in the quality of its products. Considering that sunflower oils are produced in the Republic today, the resource will also be enough for production.

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COMPARATIVE ANALYSIS OF PHYSICAL-CHEMICAL PARAMETERS OF DOMESTIC TRITICALE GRAIN

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Abstract:

Objective. The article carried out a comparative analysis of the physicochemical parameters of triticale grains in comparison with grains of wheat and rye.

Methods. To analyze the physicochemical parameters of grain samples, the standards GOST 13586.5-85, 10840-64, 10842-89, 10987-76, 10847-74, 23586.1-68 were used. The purpose of the research is to compare the physicochemical parameters of local triticale grain and study its technological capabilities for obtaining flour.

Results. In the course of the study, the physicochemical parameters of local wheat grain "Sila", rye grain "Vakhsh-116" and triticale grain "Sardor" were comparatively studied.

Conclusion. It has been established that the vitreousness of local samples of rye and triticale grains is 25-27% higher than that of wheat grain samples, and that there are no grounds for making baking flour from them, and for this it is necessary to compare chemical composition of these grains.

Keywords: wheat, grain, rye, triticale, flour, physical and chemical index, baking, gluten, rheological properties.

At present, crops, including cereal products, are of great importance in the food ration of the population of the world. It is significant in order to optimize the structure of a healthy nutrition, including its essential amino acid composition, in meeting the physiological needs of the human body not only for energy, but also for nutrients.

Traditional cereal crops such as

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