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NATURAL STABILIZERS USING IN TECHNOLOGY OF EMULSION PRODUCTS

I. Choni, *Cand. Tech. Sci., Docent;* ***T. Sutkovych,*** *Cand. Tech. Sci., Docent*
Institution of Higher Education *(Poltava University of Economics and Trade).*

Summary. Products with emulsion structure make a significant relative share in a wide range of food products. Increase of demand for these products is determined by generality, high consumer performance, potential of regulating chemical composition of ready-made meals. Therefore, extension of sauces by means of addition of natural stabilizers is quite topical. Object – manufacturing process of emulsion-type sauces using flour of grain crops. Objective of the study – development of recipe and manufacturing parameters of emulsion-type sauces of grain flour. Individual manufacturing parameters and modes of emulsion-type sauce manufacturing are substantiated. Sequence of basic luncheon sauce manufacturing process is developed, manufacturing process parameters are set forth.

Keywords: emulsion-type sauces, recipe ingredients, fillers of vegetable origin, emulsification of oil, stabilizers.

Problem in general. Human health is mostly determined by usefulness of diet and stable nutrients supply to the body. The high level of nutrition efficiency is determined by the food nature which meets market demand, and its manufacturing is based on progressive ideas of essential changes in the structure of human nutrition in modern conditions, which include the ecology of the environment, the pace of life and the value of time, pragmatism in food attitude from the position of human health impact and necessary time and other resources to provide it.

Significant development of chemical and food technology has led to the emergence of the supplement industry. Products of this industry, on the one hand, significantly improved the process, and on the other hand they led to the exclusion from the technological cycle the ingredients which usually were the sources of important nutrients in traditional technology.

The exclusion of these ingredients from recipes simultaneously led to the depletion of vitamins, minerals and other nutritional components in final products. This problem equally concerns the emulsion type sauces among which cold

sauces is the most common group, including mayonnaises , many of which are manufactured by using a variety of functional formulations or mixtures, which were primarily developed on the basis of hydrocolloid polysaccharide nature.

Analysis of recent research and publications. Analysis of the literature shows the availability of emulsion structure of pectin and their modifications using in food technology [1, 2]. Thanks to its properties pectin can serve as a thickener, stabilizer of emulsions and suspensions, structure builder, water-retaining and gelling agents.

Scientists have proven the feasibility of apple pectin using, beets and watermelon which are mixed with other emulsifiers in mayonnaise manufacturing process [3].

Scientists from Lviv Commercial Academy [4] offered a method of mayonnaise manufacturing from sugar beets, pumpkins and wheat germ, developed recipes of three types of mayonnaises. We confirm that the using of beet pectin in emulsion food manufacturing has allowed not only to increase the "Ugorskiy" and "Aromatnie" sauces stability, but also provide them with consumer properties

It was proved the possibility of ginger and white pepper using in mayonnaise [5]. In their research P. Pivovarov, A. Grinchenko [6] proved the feasibility of using as ingredients of culinary products such functional emulsion compositions as starched –non starched hydrocolloids, extrudate - non starch hydrocolloids, extrudate – non starched hydrocolloid- concentrate wheyish protein . During a complex study of physical-chemical, structural and mechanical, functional and technological properties of semi-finished products, it was found that their use provides emulsion stability during storage of culinary products, allows to intensify the technical process of their manufacturing, to use domestic raw materials in the production cycle , minimize the cost of functional and technological ingredients

It should be mentioned that emulsion stabilizers and emulsifiers of artificial origin are used to produce the vast majority of production technologies with emulsion structure .

Expert analysis showed that the most problematic issue of the sauces production technology is a receiving of stable texture by using natural stabilizing ingredients.

The goal of the article is to study the possibility of oatmeal and pearl barley flour using in sauces manufacturing of emulsion type. To achieve this goal it is necessary to perform a number of interrelated tasks:

- to study the impact of hydrological and thermal processing of oat and pearl barley flour on viscosity of derived sauces;

-to determine the optimal correlation of flour and water;
- to research emulsifying ability of oat and pearl barley flour.

Recently, stabilization systems containing polysaccharides are used in technology production with emulsion structure more and more often. This emulsion stabilization is achieved by increasing of the dispersion medium viscosity, which improves the stability of emulsions hydrodynamic factor by reducing the rate of the dispersed phase coagulation [5].

Complex using of polysaccharides which plant material contain, allows to reduce significantly the cost of manufactured products and helps to get a product with low calorie and high nutritional value.

So, in this context using of oat and pearl barley flour as emulsifiers and stabilizers in emulsion type sauces will be quite promising . It is necessary to perform a series of studies to confirm scientifically the impartiality of natural stabilizers using.

An important prerequisite of these types of flour using is a special composition of carbohydrates, which are represented by a significant proportion of pectin and mucous substances. They have highly ability to increase viscosity systems and thus stabilize emulsions

As using of flour as sauces ingredients is possible after hydro thermo treating , we identified parameters of viscosity depending on the hydromodule and temperature of processing.

The data on Fig. 1 and 2 shows that aqueous flour dispersions of oat and pearl barley cereals where concentration of flour is 7.0% with the temperature range of 60 ... 90 ° C are not Newtonian liquids by the structure which viscosity depends on the shear rate. The viscosity increases significantly with temperature increasing (curves 3 and 4 against the curves 1 and 2), indicating a change in the properties of raw materials probably due to adhesive of starch and extra hydration of the flour hydrocolloids.

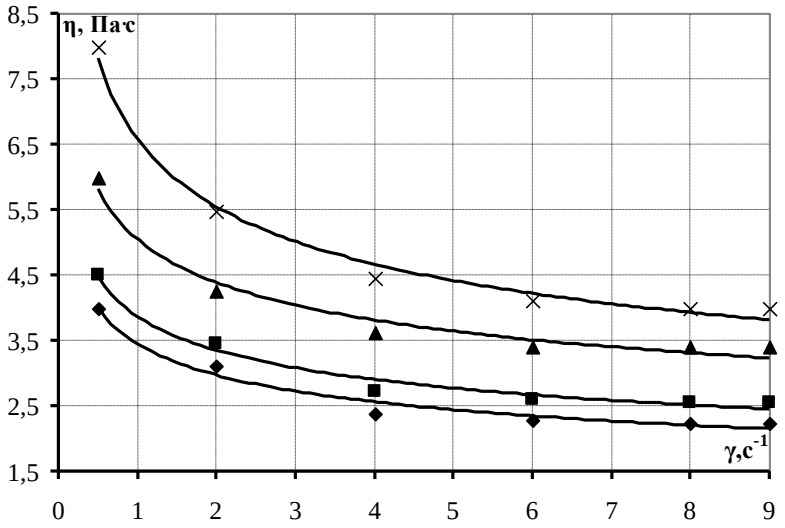

Fig. 1. The dependence of the system effective viscosity "Oatmeal flour (7%) water" (93%) "on shear rate with temperature 1, 2, 3, 4 - 60, 70, 80, 90 ° C, according to

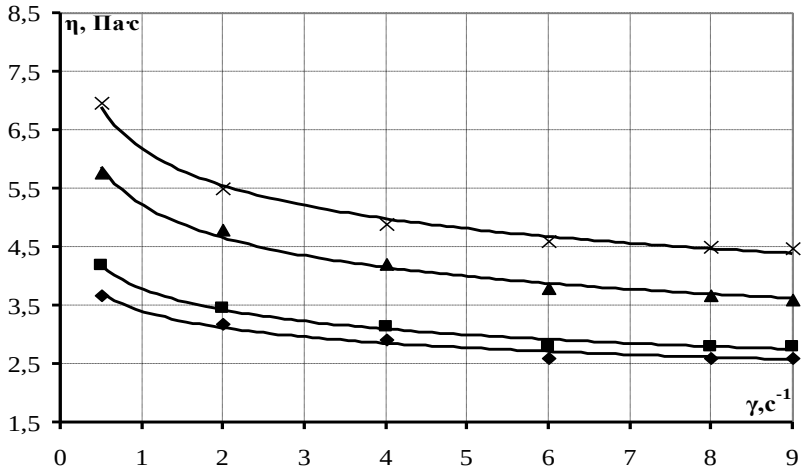

Fig. 2. The dependence of the system effective viscosity " Pearl barley flour (7%) water" (93%) "on shear rate with temperature 1, 2, 3, 4 - 60, 70, 80, 90 ° C, according to

At low shear rates (γ <0,2 s-1) temperature raising from 60 to 90 ° C doubles the viscosity of pearl barley flour and increase in 2.5 times of the oatmeal flour, indicating the possibility of using flour as a thickener of aqueous phase and stabilizer of food emulsions.

To ensure the the emulsion stability taking into account the presence of temperature anomalies of viscosity dynamic, it is important to determine viscosity dynamics in the time at different tempering conditions.

By pilot method we determined that the change of flour viscosity depends on the temperature. Tempering for 120 s at 90 ° C reduces the viscosity of pearl barley flour to 18.75% and oatmeal flour to 16,70% respectively. A similar dependence is observed at a temperature of 80 ° C. Probably these changes of viscosity are dictated by starch thermal and other polysaccharides which determine viscosity dispersions. At tempering temperatures 60 and 70 ° C change of viscosity is not observed.

We also identified the patterns of structural and mechanical system indexes modeling, depending on flour concentration, ie hydromodule. Let define that at low temperatures hydrological reduce from 1:13 to 1:10 which leads to a monotonic increase of viscosity. At temperatures 80 and 90 ° C with increasing of flour concentrations aqueous dispersion viscosity rapidly increases that significantly enhances the stabilization effect.

The next stage of research was to determine the emulsifying ability of the objects. Emulsifying ability was studied by determining the point of phase inversion, to which within 60 seconds hydro thermo treated oatmeal flour and pearl barley were added with concentration of 5 ... 13%.

It was found (Fig. 3), that in the range of indicated concentrations the point of phase inversion is between 18 ... 37 vol. units., that at fat contents allows to stabilize the emulsion with fat phase concentration to 74.0%. For defined quantities maximum emulsifying capacity corresponds to flour cereals concentration 7 ... 13% (oatmeal) and 8 ... 13% (pearl barley).

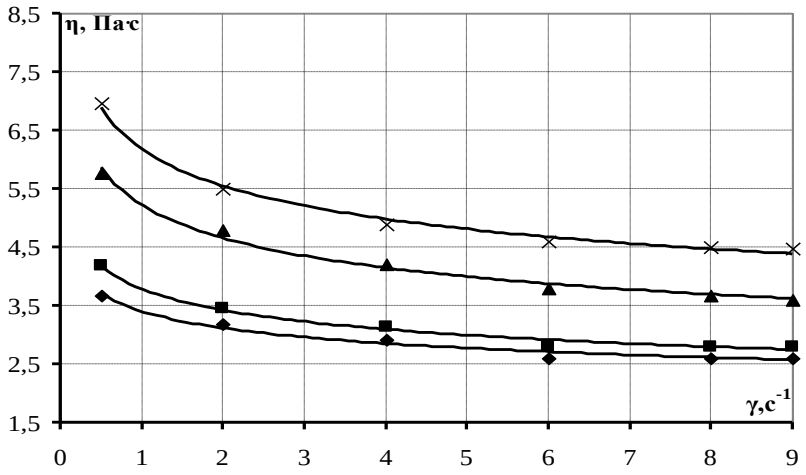

Fig. 3. Dependence of emulsions phase inversion point on cereal flour concentration : 1 - oatmeal, 2 - pearl barley l.

After analyzing the data, we note that the maximum emulsifying capacity is provided by hydro thermo treated oatmeal flour with concentration 7..13% and 8 ... 13% pearl barley . It is possible under these conditions to stabilize the straight emulsions with fat contents to 74%.

Conclusion. Summarizing the results of research , we note that at low shear rate (γ <0,2 s-1) and with increase of hydro thermo treat temperature of flour from 60 to 90 ° C increases the viscosity of sauce after adding of pearl barley flour in 2 times in 2, 5 times for f oatmeal flour . We determined that temperature lowering of flour hydro thermo treating and reduction of hydrological from 1:13 to 1:10 leads to a monotonic increase of viscosity of the sauces we have got.

It was found out that the point of phase inversion oatmeal and pearl barley flour with concentration of 5 ... 13% range within 18 ... 37 vol. units. This allows to stabilize the emulsion with concentration of fat phase to 74.0%.

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