



SYNTHESIS OF VOLATILE ORGANIC IMPURITIES OF ALCOHOL WHILE PROCESSING RAW GRAIN MATERIAL

page 4–8

Increasing exports to EU countries is a top priority for the distilling industry of Ukraine nowadays. In such circumstances when supply exceeds demand major concern is the quality of alcohol. In future the distilling industry should provide a possibility for customer-oriented modeling of alcohol quality. Enterprises able to modernize their production lines according to the European standards will not only survive, but grow and conquer foreign markets. A study of alcohol fermentation was conducted on synthesis of volatile organic impurities at different fermentation temperatures considering types of starch-containing raw material, concentration of wort dry substances, amount of process water substituted by thin stillage and its reuse ratio during mash preparation. Using of thin stillage was found to have a positive effect on synthesis of volatile organic impurities of alcohol reducing their content in matured wort. Thin stillage reuse ratio during mash preparation was defined.

Keywords: mash, raw material, temperature, fermentation, thin stillage, synthesis of organic impurities, recirculation.

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DEVELOPMENT OF TECHNOLOGY OF SMOOTHIE ON THE BASIS OF JERUSALEM ARTICHOKE WITH THE USE OF WALNUT

page 9–13

The results of research in the field of functional beverages based on artichoke and plums are given in the article. As a dietary supplement it is proposed adding walnut of the milk-wax maturity. The compatibility of the chosen research materials is investigated. Rational compositions are chosen. Organoleptic, physical and-chemical properties of experimental samples of smoothie are defined. The feasibility of using nut additives in fresh and in the form of extracts is proved. Their rational content in smoothie technology is experimen-

tally defined: fresh walnut – 8 % alcoholic extracts – 5 %, sugar – 13 %. The technology of Jerusalem artichoke and fruit smoothie is developed. The use of walnut of the milk-wax maturity as an additive will vary flavor range of beverages, expand assortment of the products, offering the consumer a quality product made entirely from the national natural raw materials. The developed smoothie can be recommended for use in the daily diet in order to enrich the human body by biologically valuable components.

Keywords: walnuts, milk-wax maturity stage, sugar extract, alcoholic extract, smoothie, technology.

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IMPROVING THE QUALITY MANAGEMENT SYSTEM IN THE DOMESTIC FISH PROCESSING COMPANIES

page 13–17

Quality management system at the domestic fish processing plants and methods to improve the quality management system are researched in the article.

The purpose of the research is to examine the quality management system in the domestic fish processing companies, assessing the quality of fish production by the «affinity diagram» tool, as well as by determining the organoleptic characteristics and chemical composition of the chilled saltwater fish.

As a result of theoretical and experimental studies it is determined the prospects of implementation of quality management system in the enterprise, as well as monitoring the development of new appropriate and effective methods to improve the performance of the current system. It was found that all samples comply with the requirements of the standard, i. e. this product is a high-quality fish processing plants for consumption.

Thus, the introduction and improvement of the quality management system to fish processing companies is necessary for the production of quality products.

Keywords: quality management system, live and chilled saltwater fish, monitoring, quality.

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DEVELOPMENT OF JERKED SAUSAGE TECHNOLOGY WITH GRAIN BIOPRODUCTS

page 17–23

Research work on the development of technology of fermented sausages to provide them probiotic properties and microflora protection by the use of grain product is conducted in the article.

On the basis of theoretical and practical part of science it is concluded that the development of technology of sausages with probiotic properties is possible and appropriate. Materials and products are chosen. Modern technological scheme of production to ensure efficient processing of raw materials and production are selected and supplemented.

Overview of scientific literature, selection and refinement of the technological scheme of production are done.

The scheme of bacterial cultures is developed, stage of starter addition (formation of mince) is defined, amount of starter addition (6 % by weight to unsalted raw materials) is defined, physical,

chemical, organoleptic, structural, mechanical and microbiological parameters are defined.

Keywords: probiotic bacteria, lactic acid bacteria, sausage technology, jerked sausage, prebiotics, grain bioproducts.

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SCIENTIFIC GROUNDS OF CONDITIONS FOR LIQUID FOOD EMULSIFICATION IN A VERTICAL LAYER OF FERROMAGNETICAL PARTICLES

page 24–29

Work is devoted to receiving high-disperse emulsions by use of the device with a circuital field.

Formation of emulsions in such devices happens due to the chaotic movement of the ferromagnetic particles covered with pellicle. Thus different types of hydrodynamic instability are created which cause crushing of drops as a result of turbulent hashing, and drop flattening due to particles colliding.

In the work it is established that emulsification process is influenced significantly by the frequency and force of particles impact which depend on diameter of a particle (d_p), its length (l_p), and geometrical size – l_p/d_p (identity coefficient), coefficient of the camera loading (K_f).

Established conditions of emulsification of liquid food systems in ferromagnetic particles circuital field of rotating electromagnetic field by means of methods of mathematical modeling:

$K_{fmax} = 0,08...0,1$; $Q_f = 0,3...0,5$; $l_p/d_p = 10...14$. Using of above-mentioned parameters will allow to receive resistant emulsions (quantity of fatty balls with sizes up to $2 \cdot 10^{-6}$ makes 86,6 %).

Keywords: emulsions, circuital field, rotating electromagnetic field, ferromagnetic particles, conditions of emulsification.

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PRE-ACTIVATION OPTIMIZATION OF THE YEAST

page 29–35

This article presents a mathematical calculation of lift force and osmosensitivity of yeast cells depending on the temperature and duration of the pre-activation of yeast. The main aim of the research was the study of the activation process of yeast (*Saccharomyces cerevisia*) in a medium consisting of water and dry additives derived from by-products of processing potatoes. The investigations have been used model systems of yeast-fermented dough. Design of the experiment was carried out according to an orthogonal symmetrical Box-Behnken design.

From previous studies it was found that the resulting additive improves the performance of enzyme activity, which ultimately promotes intensification of dough formation process.

As a result of researches it was found that the optimum temperature of pre-activation of yeast is 30...35 °C, and the duration is in the range (18...20) · 60 sec.

The results can be used in bakeries to intensify the production process of yeast-fermented dough products.

Keywords: dry potato additive, pre-activation of the yeast, lift force of the yeast, osmosensitivity.

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THE DEVELOPMENT OF TECHNOLOGY OF 9-SUCCINYL-8-DECEN ACID

page 35–40

The technology of 9-succinyl-8 decen acid is proposed. The main stage and flows are shown in the flowchart. Technology type is periodic responds to manual discharge of the crystalline product. Basic stages of technology are: charge of the components, hot filtering, synthesis in the main unit at the reflux temperature (120–123 °C), cooling the reaction mass, secondary filtration of sediments, crystallization of 9-succinyl-8-decen acid, evaporation.

As a result, this technology results in two target product: 9-succinyl-8-decen acid and mixture of raw materials, a residue of oleic acid and byproducts. The second product can be used as the organic solvent and also as semi-finished product of organic synthesis. The total yield of production is 47–49 %.

The advantages and disadvantages of the scheme and the process are considered. The features of the work associated with the properties of reactants, products and solvent are marked. It is recommended the method of charge the maleic anhydride by the melt to prevent foaming of the reaction mass. It is indicated that the liquid phase of the process is preferably moved by gravity or by vacuum of the filtration funnel to simplify the arrangement of the chart. This is possible through the distribution of equipment on several floors.

Also, in the technology it is provided return of organic solvent — perchlorethylene — back in the process to 80–85 % that significantly reduces production costs, reduce production costs and increase environmental impact of production.

Keywords: maleic anhydride, oleic acid, adduct, technology of 9-succinyl-8-decen acid, flow sheet.

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INFLUENCE OF HYDRODYNAMIC CAVITATION ON BIOLOGICAL OBJECTS

page 41–45

Cavitation, which yet has not found a wide application in industrial technologies, is an effective method of hydro-mechanical intensification of chemical-engineering, food, pharmaceutical, biological and other processes. The effectiveness of cavitation process is enabled by cavitation crashing of the solid phase, turbulent diffusion of boundary layer of the fluid by cavitation bubbles, emergence mass transfer aspects, which are characterized by high values of mass transfer coefficients. Processing of biological objects in a cavitation field can be used as an independent process and ensure an inactivation and extinction of microorganisms or as cyanobacteria pre-treatment stage with the aim of increasing the mass transfer surface for the following extraction or biochemical processes. The results of microscopic analysis showed that for certain modes of processing of liquid substances in the cavitation field the decrease of contrast cells is observed as well as damage to the cell membrane, reducing the clarity of contours, cell shape change, aggregation and mechanical damage. Experimental studies have established that in the case of hydrodynamic cavitation to increase the effectiveness of the process of obtaining energy from cyanobacterial biomass, treated in a hydrodynamic cavitation field cyanobacterial biomass, a degree of lipid extraction is increased by 54,3 % and the number of synthesized biogas increases by 28,3 %.

Keywords: hydrodynamic cavitation, cyanobacterial biomass, biogas, lipids, biological objects, inactivation of microorganisms.

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METHODS OF OBTAINING BITUMEN FROM HEAVY OIL PROCESSING RESIDUES

page 45–48

The article describes several methods for solving urgent problems: obtaining the qualitative bituminous materials from unsuitable for recycling heavy oil processing residues. The work was carried out in three directions. The results of the study of the basic laws of oxidation of heavy oils processing residues showed that this method for obtaining the bitumen is failed. The basic laws of joint oxidation of tar from heavy Orkhovitsk oil with heavy pyrolysis resin and neutralized acid tar. It was shown that the method of co-oxidation of Orkhovitsk oil residue and 11–13 % masses of heavy pyrolysis resin at the temperature of 250 °C, air supply 2,5 h⁻¹ during 6 hours allows obtaining the road bitumen of the grade BND 60/90 according to DSTU 4044-2001. The process of modification of residual bitumen derived from heavy Orkhovitsk oil by the Butonal latex and rubber crumb is described. It is established that the use of these modifiers makes it possible to improve the properties of bitumen obtained from heavy oils. The results, presented in this article, can be used in the development of industrial technology for obtaining the bitumen from heavy oil processing residues.

Keywords: bitumen, heavy oil, oxidation, modification, tar, rubber crumb.

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INVESTIGATION OF THERMAL DECOMPOSITION PROCESS OF FINELY DIVIDED CARBONATE RAW MATERIALS AND SOME PROPERTIES OF THE ROASTING PRODUCT

page 49–56

The problems of the roasting of finely divided carbonate raw material are considered in the article. The aim of the research is to determine the physical and chemical laws, by which we can manage the process and roasting product quality. Some results of a comprehensive study of the physical and chemical properties of several kinds of finely divided carbonate raw materials and the laws of its thermal dissociation are given, physical and chemical properties of the dissociation products are defined. They are allowed to establish in each case the kinetic and technological parameters of thermal dissociation process of raw materials, at which the maximum conversion rate of CaCO_3 into CaO is observed, whereby the product has the highest activity. The practical application of the principle of the results will reduce investment in the creation of the unit, improve the furnace performance for the final product. This process organization on the basis of the research results provides the optimal regimes of carbonate waste preparation and their firing to obtain highly active lime and production effectiveness.

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DYNAMIC PENETRATION BY LIQUIDS TECHNICAL ELEMENTS SPECIAL CLOTHING

page 57–60

The main problem to be solved is to provide the protective properties of special clothing under the effect of liquids. In particular, the questions explored the behavior of materials for the manufacture of overalls on the example of the professional activities of a locksmith to repair vehicles in the process of interaction with technical liquids such as gasoline, diesel fuel, mineral spirits and a variety of motor oils. As the result of study of the physical and mechanical properties of liquids, it was determined that the rate of spreading, penetration and absorption of the liquid fabric affect its density and viscosity. The dependence of the dynamics of penetration of fluids through the technical materials are determined that allow the right to determine the use of materials for special clothing. Statistical analysis allowed to determine the links between physical and mechanical properties of fluids. The findings suggest the presence of a significant relationship between the flow rates of fluids and viscous.

Keywords: textile, technical liquids, special clothing, penetration of liquids.

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EXPRESS METHOD OF DETERMINE THE DIFFUSION COEFFICIENT OF FRACTAL MATERIALS

page 60–63

The problem of penetration of liquid through technological materials whose solution is largely constrained by the lack of operational methods for the determination of material parameters is solved in this paper. The main purpose of research is to develop methods for the determination of the diffusion coefficients of fractal materials based on rapid experimentation with the mathematical model of the passage of moisture. On the base of the approximate solution of the

diffusion equation relationship between the diffusion constants and parameters of the process at an early stage of the liquid absorption are obtained. It is proved that for determination of both the diffusion coefficients only one experimental parameter is enough. This parameter is the time to achieve a concentration at the inner surface to 0,4 of the main. The developed approach allows use of the initial stage of the experiment on the accumulation of moisture fractal material and may use a simplified approach to conducting experiments, which greatly simplifies and accelerates the process of determining the diffusion constants. The results of research can be applied by experts in the field of products of light industry, as well as in the systems of metrological provision of material constants determination.

Keywords: diffusion, fractal material constant, rapid method, passing moisture.

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ASSESSMENT OF PROTECTIVE PROPERTIES OF LEATHER MATERIALS OBTAINED USING ECOLOGICALLY SAFE MINERAL COMPOSITIONS

page 64–69

Special production footwear is the primary means of personal protection from harmful factors, which purpose is to guarantee human safety in the workplace. Accordingly, shoe materials that are used in the production of the shoes should have increased protective properties.

The results of tests of leather materials obtained using ecologically safe mineral compositions of natural origin have been presented in the article. The influence of the mineral content of semi-finished leather on operational, environmental and safety properties of finished leather and suitability for the manufacture of top of special protective footwear have been determined.

During the studies the environmental safety of researched skins for external and internal parts of uppers by setting exposure Cr (VI), formaldehyde and heavy metals and their comparison with MPC for materials of the first category that have contact with the skin of the foot have been evaluated.

Moisture, water resistance and hygroscopic properties of skin have been defined by setting parameters of moisture, water yielding capacity, water adsorption in dynamic conditions, moisture soaking

in static and dynamic conditions, wet and moisture content of leather for 2 and 24 hours.

Thermal resistance of leather has been determined by determining the thermal resistance of the material to burning with hot metal, heat exposure 200 °C in air-dry condition and to the influence of hot surfaces.

To predict the sustainability and reliability of footwear without loss of functional properties, changes of physical and mechanical properties have been defined after aging of researched skins at low and high temperatures. Also defects have been evaluated on samples after repeated bending at ambient and low (–15 °C) temperatures.

The results show the feasibility of using animal skins with mineral filling for making comfortable, environmentally friendly footwear with high humidity, water and thermal resistant properties.

Keywords: leather, special shoes, mineral composition, property, natural minerals, safety, quality.

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