CONTENTS, ABSTRACTS AND KEYWORDS OF PAPERS

THE CHOICE OF INFORMATION CHANNELS THE MOISTURE CONTENT BUTTER IN THE PROCESS OF ITS PRODUCTION WAY OF CHURNING

V. A. Balubas, S. E. Aleshichev, Y. L. Malakhov

The results of studies related to defining and selecting control channels for multivariate object on the example of manufacturer of butter continuous operation. Found that currently, the management of the process of production of butter by the method of continuous whipping of cream carried out mainly through three channels: the temperature of the cream received at the churning, the rotation frequency of the stirrer of beater and submission normalizing component. It is not always able promptly to ensure the maintenance of the required level of the basic indicator of the quality of the finished product – the moisture content of the oil, especially in transient conditions, due to instability of the parameters of raw materials. The analysis showed that for this problem it is necessary to increase the number of information channels. The studies identified additional control channel – the size of the gap between the agitator blades of beater and cylinder walls of beater, allowing in combination with other channels to increase the level and efficiency of any control actions.

Key words: butter, moisture content, control actions, control channels, transfer ratio.

PROSPECTS FOR THE USE OF BY-PRODUCTS OF PROCESSING OF GRAIN BUCKWHEAT

T. A. Nikiforova, S.A. Leonova, I.A. Khon

A detailed study of the chemical composition of the secondary raw cereal products, buckwheat-husking bran, was carried out. The high nutritional value and the biological effectiveness of buckwheat flour are established. The possible ways of the rational use of the secondary raw materials, based on the results of the chemical composition analysis, were indentified.

Keywords: secondary raw products, cereal production, buckwheat husking bran.

DEVELOPMENT OF METHODOLOGY FOR THE DETERMINATION OF ABSORBED DOSE FOR DIFFERENT TYPES OF RADIATION-PROCESSED MEAT

R. T. Timakova, S. L. Tikhonov, N.V. Tikhonova

Dissemination of radiation technologies of processing of agricultural raw materials and food products requires sophisticated methods of dosimetry. The aim of the research is to develop a methodology for determining absorbed doses for different types of radiation-processed meat. In the experiment, the samples were irradiated with the following doses: 3, 9, 10, 12 kGy using a linear accelerator of electrons model UELR-10-10C2. Studies of the irradiated samples was carried out on EPR spectrometer brand Labrador Expert X-band. Empirically established that the method of determining the absorbed doses with high degree of confidence to calculate the absorbed dose for irradiated meat parts of beef, pork and poultry. The correlation shown to increase the area of the EPR signal of the dose of irradiation for beef of 0.89, for pork and poultry 0, 68 – 0, 73. The high strength of the statistical relationship between the radiation dose and the absorbed dose: pork to 0.87, beef – 0, 94, the bird is 0.84. The technique of determining radiation dose fleshy tissue allows a high degree of confidence ($p \leq 0.05$) to determine the radiation dose.

Key words: food losses, radiation, spectrum, amplitude, absorbed dose, method ESR.

ASSESSMENT QUALITY OF THE SILICON-CONTAINING WATER "ARDVI" AND STUDY OF INFLUENCE IT ON THE DEVELOPMENT "OXIDATIVE STRESS"

O. A. Tolmachev, V. A. Tolmachev, S. L. Tikhonov, N. V. Tikhonov

The article is devoted to the assessment of the quality and study of antioxidant activity of natural mineral water for drinking canteen from the source water intake wells No. 988, located 300 meters South-East of Kasargi Chelyabinsk region. As a result of researches it is established that the water on organoleptic, physic-chemical, radiological indicators and safety corresponds to requirements of normative documents and refers to a natural mineral dining room drinking fresh alkaline hydro carbonate calcium-magnesium water. The content of metasilicic acid in an amount of from 24.7 to 69,0 mg/dm3 makes it possible to recommend for prevention of "oxidative stress" to reduce lipid peroxidation in the stage of resistance stress, as evidenced by a decrease in the accumulation of malonovogo dialdehyde and diene conjugates in white rats males of Wistar line, treated with 35 ml of water to simulate stress swimming.

Keywords: natural mineral water drinking dining bicarbonate, calcium, magnesium, oxidative stress.

MILK-PROTEIN CONCENTRATE, FORTIFIED WITH CALCIUM

I.S. Khamagaeva, D., A.V. Shchekotova,
O.A. Zherebyateva, E.M. Shchetinina

The authors developed the technology of dry milk protein concentrates, fortified with calcium. The proposed new method of fermentation of milk-protein concentrates obtained thermal calcium coagulation, by making an active starter culture of lactic acid bacteria of the species Lactobacillus helveticus in the protein clots of cows and goat's milk. Found that obtained milk-protein concentrates have high functional and consumer properties, are characterized by high content of easily digestible calcium and a high number of viable cells of Lactobacillus helveticus.

Keywords: milk-protein concentrate, calcium, thermal calcium coagulation, fermentation, lactobacillus.

NUMERICAL SIMULATION OF HEAT AND MASS TRANSFER IN THE PROCESS OF THE CONCENTRATION OF THERMOLABILE SOLUTIONS IN A SWIRLING FLOW

V.V. Khar'kov, A.N. Nikolaev

The paper represents numerical computation scheme of heat and mass transfer in swirling gas-drop flow. Calculation of a vortex chamber with air tangent-blade swirl diffuser under concentrating thermolabile liquids with known properties is based on the mass and heat balances together with condition that the necessary time of evaporation, induced the process kinetics, should be provided by the swirl diffuser and chamber constructions, defined hydro- aerodynamics principles and heat and mass transfer distinctive features in the apparatus.

Key words: vortex chamber, thermal sensitivity, drop evaporation, mathematical simulation, tangent swirl diffuser.

LIMITING ELECTROMAGNETIC LOADS MOTORS PERMANENT CURRENT, FILLED WITH LIQUID DIELECTRICS

A. A. Lubsanov, A.P. Haptaev, L.O. Chmeleva

The article is devoted to determination of limiting electromagnetic loads special electric DC motors, filled with liquid dielectric. It is shown that for the maximum load of the engine current can introduce the factor of heat is analogous to the criterion of the thermal load of the anchor machines for General use. The obtained limit on the heating value of the current density in the windings of the wires of different sections. Also the influence of the type of fill fluid on thermal performance engines.

Key words: DC Motors, current loads, the temperature of the windings.

DEVELOPING A DATABASE OF THE WELDING ELECTRODES FOR MANUAL ARC WELDING SPECIFIED FOR M01 GROUP STEELS

B.I. Mandrov, I.A Shakirov

The article shows the broad application of manual arc welding in the production of metal structures. A group of metallic materials M01 for developing a database of the electrodes is defined. Software is selected. Tables, queries, forms for requests and switch board forms for working with the database are created.

Keywords: manual arc welding, welding electrodes, database, Microsoft Access, tables, queries, forms, switch board.

BIOCOMPATIBLE COVERINGS FROM POWDER MECHANOCOMPOSITES OF STRUCTURE: THE CALCIUM HYDROXYAPATITE – NIKELID OF THE TITANIUM ON IMPLANTS, RECEIVED BY METHOD OF THE DETONATION - GAS SPRAYING

A. A. Popova, V. I. Yakovlev

The structure of composite biocompatible coatings of composition is studies: calcium hydroxyapatite - nikelid of the titanium, obtained by the detonation-gas spraying method.

Key words: calcium hydroxyapatite, nikelid of the titanium, mechanoactivation, detonation-gas spraying, composite coating.

METHOD OF ESTIMATION OF THE VOLUME OF WORK PERFORMED IN THE REPAIR OF HIGHWAYS WITH TERRESTRIAL LASER SCANNING TECHNOLOGY

B. F. Azarov

This article contains a description of the methodology of terrestrial laser scanning technology to assess the volume of work performed in the repair of highways. The possibility of using this technology for practical use in construction, repair and reconstruction of road network, Altai Krai.

Keywords: repair of highways, roads, terrestrial laser scanning, digital, point cloud model.

CONTENTS, ABSTRACTS AND KEYWORDS OF PAPERS

AN EXPERIMENTAL SETUP FOR DETERMINING DISPERSE PARAMETERS OF SUBMICRON AEROSOL

E.A. Metsler, S.S. Titov, E.V. Muravlev, A.A. Pavlenko, V.A. Arkhipov

We consider a new experimental setup for dynamically measuring of aerosol concentration, mean diameter and size distribution functions. A method determining the dispersed characteristics of the aerosols is presented. The results of the experimental studies of the aerosol parameters of the medium are reported.

Keywords: aerosol, aerosol optics inverse problem, size distribution function, optical depth.

DEVELOPMENT OF PID - CONTROL TO IMPLEMENT THE SPECIFIED LAW OF CHANGE OF WHEELS' TURNING ANGLE OF THE AGRICULTURAL MACHINE

V.I. Poddubny, A.S. Nenaydenko, A.I. Valekzhanin

The article describes a solution to the problem of implementing of a target law of an agricultural machine wheels' turning angle by using an electromechanical bow thruster with a PID controller. To define and to test the regulation characteristics, a hardware and software complex was created. Based on the results of the laboratory experiment using the developed Simulink model, the PID-controller indexes were defined. The results of testing the developed system on the test bench are shown. The possibilities of using the obtained results are evaluated.

Keywords: Precision agriculture, wheeled agricultural machine, dirigible wheels turning angle, PID Control, bow thruster, Simulink model

AN INFLUENCE OF THE POROUS SURFACE STRUCTURE OF SOLID PARTICLE ON CONDITIONS FOR HETEROGENEOUS WATER DROP BOILING

A. G. Borisova, O. V. Vysokomornaya, M. V. Piskunov

By using the high-speed video recording, we performed the experimental research on intensive heating, boiling and explosive breakup of heterogeneous water drops containing single graphite particles. By using a scanning microscope, we got images of the graphite particle surface before and after intensive vaporization of water film with its explosive breakup. In the initial state the graphite particle surface has rather uniform fine-pored (as high as 10 μm) structure facilitating the nucleation and evolution of bubbles. It was also shown that a surface structure of graphite particles during the explosive breakup of water film is significantly deformed, i.e. the large irregularities in size up to 170 μm are formed. Consequently, conditions for the explosive breakup of heterogeneous drops with such the inclusions are not fulfilled.

Keywords: heterogeneous drop, graphite particle, explosive breakup, explosive fragmentation, evaporation, surface structure.

CONDITIONS OF MECHANICAL FAILURE OF THE DETONATION NANODIAMONDS IN SEGREGATION AND PROCESSING

A. L. Vereshchagin

The detonation nanodiamonds are compared with the properties of the frozen drops of tempered glass, has extremely high internal mechanical stresses (drops of Prince Rupert). We consider the machining conditions of detonation nanodiamonds, leading to their destruction. Critically analyzed previously known results on the isolation, processing and use of DNA with the possibility of mechanical failure. Express opinions on the possibility of DNA consolidation.

Key words: detonation nanodiamonds, drops of Prince Rupert, the conditions of preservation and destruction.

GEONICS: FROM THE GEOCHEMISTRY OF DEFERNITE, SPURRITE AND THEIR ANALOGUES TO THE CREATION OF ARTIFICIAL MATERIALS BASED ON CEMENT SYSTEMS

E.Yu. Malova, V. K. Kozlova, V. I. Vereshchagin, Yu. S. Sarkisov, N. P. Gorlenko, A. N. Pavlova

In the article the possibilities of applying the basic principles of geology in the design of composite materials are considered. It is shown that durability of composite materials for various purposes is increased during the forming their mineral composition phases are formed which are analogues of natural minerals. So in cement stone with the presence in its composition of carbonate additives in the process of hydration formed minerals like depernite and scoutite.

Key words: geonics, geochemistry, defernite, scoutite, spurrite, composite portland cement with carbonate additives, durability.

EVALUATION OF THE FRACTAL STRUCTURE OF THE EPOXY COMPOUND WITH A CERAMIC FILLER ACCORDING TO THE MICROSCOPIC IMAGES

N. N. Minakova, A. A. Sivkov, A. S. Silutin, N. V.. Timoshenko, A. S. Ivashchenko

The article is devoted to search of ways of numerical estimation of characteristics of structures in microscopic images. Examines the highly thermally conductive electrically insulating casting compounds based on epoxy resins with dispersed ceramic fillers, used to increase reliability of electrical devices.

Photomicrographs of highly thermally conductive epoxy compound with the use of aluminum nitride synthesized by self-propagating high-temperature synthesis were studied.

The possibility of applying the fractal approach to the study of the structure filled with the epoxy compound according to the microscopic images were evaluated. The method of analysis of images was developed. Determined the dimension of the Minkowski and Renyi. The results obtained allowed to conclude that the fractal dimensions of the analyzed structures, capabilities, quantitative consideration of the parameters "structure – properties".

Keywords: filled polymers, highly thermally conductivity insulating sealing compounds, nanoparticles, aluminum nitride, microscopic images, the fractal estimation, the Minkowski dimension, Renyi's dimensionality

FABRICATION OF METAL-CERAMIC INTERCONNECTION FOR THE POSITRON TARGETS

A.G. Nikiforov, J.S. Evdokimova

In the electron-positron accelerators, the target play an important role in positron production, this target must be able for extreme power about 10^{12} GeV/mm^2 per pulse and still maintain their mechanical properties. The requirements for target material and its construction are considered. In the program pocket GEANT4 numerical simulation of the target-electron beam interaction was performed. The properties of the target materials are explored. It was found that kovar and ceramics of different types meet the requirements for the target material. The technology for metal-ceramic connection is proposed.

Key words: positron target, kovar, electron beam welding, boron carbide, dynamic loads.

THEORY AND PRACTICE GROUTING CEMENT SLURRY INTO THE STRUCTURE OF REINFORCEMENT BASE FACILITIES WITH COARSE AGGREGATE

I.V. Noskov, S. A. Ananyev

The article presents the theoretical basis, theoretical and empirical based injection grout in dockable base structures with coarse aggregate.

Keywords: injection method, strengthening soil, injecting soil, coarse aggregate

INFLUENCE OF THE FORMATION OF MEZOFERRITE AND GRANULAR BAINITE IN HAZ ON THE FORMATION OF COLD CRACKS

M.N. Seidurov

Forecasting the structure and properties of the HAZ allows us to find out the conditions for obtaining high-quality welded joints before welding. It is shown that bainite of granular morphology is the most preferred structure of the HAZ in the impact bending test at a negative temperature. It is established that the leading role in the formation of intermediate structures of granular morphology in the HAZ is played by the rate of mesoferrite formation and the rate of carbon removal from the front of growing crystals.

Keywords: mezoferrite, granular bainite, bainitic steels, stresses, cold cracks.

THE INFLUENCE OF STRUCTURE MODIFIEDED VENEER OF THE ELASTOMERS ON TENSILE STRENGTH

S.A. Khaperskikh, E.A. Golovina

The article discusses the method of determining the tensile strength at break of the modified veneer (veneer sheets by impregnation with a solution of elastomer with different concentrations of rubber) in vivo. The analysis of the effect of concentration of rubber on mechanical properties of modified veneer when you stretch it. Developed an impregnating system in which the modified veneer, with different orientation of fibers has a higher tensile strength at its breaking.

Key words: modification, elastomer, veneer, tensile strength at break.