CONTENTS, ABSTRACTS AND KEYWORDS OF PAPERS

USE OF SPECIALLY DEVELOPED AND INDUSTRIAL FOODS IN NUTRITIONAL COSMONAUTICS FOR OPTIMIZATION OF THE NUTRIOM OF THE ORGANISM IN THE CONDITIONS OF COSMIC FLIGHT

Dobrovolsky V. F.

The article is devoted to the issue of feeding astronauts in conditions of weightlessness and effective means of correcting metabolic changes in these unfavorable conditions. The conditions of space flight, such as weightlessness, limited space, unstable radiation conditions, artificial gas environment, increased nervous and emotional loads, negatively affect the cosmonauts' well-being, are accompanied by certain shifts in metabolism, digestive function, appetite state, decreased attention and performance. The conducted researches of the SSC IBMP RAS with the participation of NIIPPiSPT on the study of the changes occurring in the human body in the process of short-term and long-term space flights made it possible to formulate theoretical approaches to optimization of the astronaut organism's nutriomy by properly organized cosmonauts adequate for the needs of the organism, and on this basis to develop scientifically grounded approaches to the formation of food composition of food products and diets, oriented to use in manned conditions space flights of different duration. The conditions of space flight represent special requirements for both the diet in general and for the products included in its composition and the technology for their manufacture.

Key words: diet, canned food, body nutrients, freeze drying, freeze-dried dishes.

TO THE QUESTION OF INCREASE OF FOOD VALUE OF CANDY DUE TO FRUIT AND BERRY RAW MATERIALS

S. I. Koneva, L. A. Kozubaeva, E. Ju. Egorova

Candy is one of the major segments in the structure of assortment of confectionery, which enjoys consistently high demand among all social groups of consumers. A special place in this segment is candy, obtained from walnut-caramel mass, nutrition value which can be greatly improved by inclusion in the formulation of some types of fruit and berry raw materials. The aim of this work was to study the possibility of improving the nutritional value of candy, obtained from walnut-caramel mass, by including in the formulation of fruit-berry raw materials, processed in the Altai region in industrial volumes: pine nuts and apples, zoned pomological varieties. The kernel of pine nuts and oilcake from pine nuts is used as the basis for a walnut-caramel mass, applesauce-as one of the most important components for a fruit-walnut-caramel mass. The autors analyzed the general trends of formation of quality and food value of candy from solid walnut-caramel mass and fruit-walnut-caramel mass. It is established that introduction of products of processing of pine nuts and of applesauce does not require significant changes in the technologies of preparation of the walnut-caramel mass, and allowing to expand the range of candy with high consumer properties, above all – with increased food value.

Key words: confectionery, candy, walnut-caramel mass, fruit-walnut-caramel mass, development of the technology, nutritional value, fruit and berry raw materials, pine nuts, quality assessment, shelf life.

RESEARCH OF THE COMMODITY APPLICATION OF THE MARKET OF PRODUCTS FROM MEAT OF THE TURKEY

N.S. Moiseeva, O.K. Motovilov

The results of the research of the market supply of the market of turkey meat products in Novosibirsk are presented. Investigations of 228 trading companies in the largest and most popular retail chains in the city of Novosibirsk have been conducted: the supermarket chain "Bystronom", "Dobryanka", "Holiday Classic", "Brighter!", "Lenta", "Maria-RA", "Bahetle" , hypermarkets "Giant", "Auchan", "Magnet", "Metro Cash and Carry", a network of supermarkets "Gorozhanka." The assortment of products sold in the largest trading enterprises amounted to 41 names. The structure of the assortment by manufacturers is presented. We investigated such indices of the assortment properties as the latitude real and basic, completeness real and basic. Their indicators were also determined: the latitude indicator is valid, the latitude base factor, the latitude factor, the completeness exponent is valid, the completeness indicator is the base one, the completeness factor. As a result of the analysis of the obtained data, it was revealed that the assortment of turkey meat products in trading enterprises in Novosibirsk is not wide enough. It is established that in all trade enterprises the value of the completeness coefficient is below the optimal one, which indicates the low saturation of the assortment of turkey meat products by trade marks. It was revealed that most of the products are represented by semi-finished products.

Keywords: market, product offer, turkey meat products, breadth of assortment, completeness of assortment, assortment structure, customer needs, trade enterprises, brands, manufacturers.

METHODOLOGICAL APPROACHES TO THE DEVELOPMENT AND QUALITY ASSESSMENT OF NEW DRINKS OF THE GROUP OF DISTILLATES. PART 2. THE CHOICE OF RAW MATERIALS

E. Ju. Egorova, Yu. V. Morozhenko

Steadily high demand of Russian consumers in the drinks group "Distillates" motivates the producers to increase output, often at the detriment of individuality, and sometimes to the detriment of the alcohol products. This practice leads to the appearance in the consumer beverage market low-quality and outright counterfeits, which indicates the use is not relevant raw materials or non-compliance with the modes of its processing into separate stages of production.

The aim of this paper was to develop general recommendations for the selection of the raw materials used in the manufacture of beverages group "Distillates". The results of the summarizes of the regulatory requirements, the literature and own data in the field of technology of production of alcohol beverages the authors have formulated the principal requirements which must be observed vegetative raw materials, ethyl alcohol and water as main components used in the production of beverages group "Distillates".

Keywords: bread, alcoholic beverages, distillates, technology development, vegetable raw materials, requirements for raw materials, the quality of the alcohol water quality.

BIOLOGICAL EVALUATION OF THE BUCKWHEAT HUSKING BRAN

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

The article deals with the issues related to the development of science-based solutions for the implementation of resource-saving technologies for the rational use of secondary raw materials of cereal production. The main materials of the study were samples of buckwheat husking bran produced at the Sorochinsky grain plant (Orenburg region). The detailed study of the chemical composition of the secondary raw cereal products, buckwheat husking bran, was carried out. During the of a work the important advantage of buckwheat husking bran, expressed in the complexity of its chemical composition, was noted In connection with the prospect of using buckwheat husking bran for food purposes, its sanitary and hygienic condition was evaluated. The biological evaluation of buckwheat husking bran was carried out with the use of the biological method in animal experiments. The data obtained during the study of growth and weight parameters and nitrogen balance of experimental animals formed the basis for assessing the biological value of buckwheat husking bran proteins. The biological evaluation of buckwheat husking bran proteins, as determined in experiments on animals, testifies to the high biological efficiency, digestibility and utilization of buckwheat husking bran proteins. The prospects of using buckwheat husking bran as a raw material have been established to enrich the food products with vegetable protein.

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

STUDY OF INTERACTION OF THE MACRO- AND MICRONUTRIENT COMPONENTS OF SOME CEREAL CROPS BY THE REGRESSIVE AND CORRELATION ANALYSIS METHOD

A. L. Novokshanova, O.A. Shikhova, D. B. Nikitiuk

The value of cereals is considered from the positions of macronutrient and micronutrient composition. It is especially important to substantiate formulations and design new polycomponent food products. The aim of this work was to search for and model reliable regularities between macro- and micronutrient components of some crops based on the use of statistical analysis methods. The processing of experimental data was carried out using a software package STATISTICA for statistical analysis. To confirm the generality of the biosynthetic processes in the plant cell, the analysis is abstracted from specific features, plant variety, agrotechnical techniques, etc. The results of the study showed that the protein content positively correlates with the micronutrient composition of the investigated cereal crops. With a probability of at least 95%, we can expect that with an increase in the mass fraction of protein in the grain culture by 1%, the average content will increase: potassium by 29.583 mg%, calcium by 3.121 mg%, thiamine (vitamin B1) by 0.042 mg%, riboflavin (vitamin B2) by 0.0074 mg%. The obtained reliable dependences of the content of potassium, calcium, thiamine and riboflavin on the mass fraction of protein in cereals can be successfully used in the rapid assessment of their biological value.

Keywords: statistical analysis, correlation-regression analysis, cereals, macronutrients, micronutrients, protein, potassium, calcium, thiamine, riboflavin.

THE USE OF REGIONAL FRUIT AND BERRY RAW MATERIALS FOR THE ENRICHMENT OF KVASS FERMENTATION

A. I. Otradnov, E. Ju. Egorova, Yu. V. Morozhenko

Kvass is among the beverages, which stably retains its popularity by Russian consumers. The aim of the study was an experimental assessment of the possibility of fortification of kvass with fruit and berry raw materials of regional importance: sea buckthorn fruit and cowberry. Experimental kvass was obtained by the classical technology of bread kvass, with the preparation of kvass wort by a method of infusion, on the basis of a combination of dry instant bakery yeast with a infusion of rye and wheat crackers. Cowberry and sea buckthorn were used in the form of infusion of dried berry, infusion was introduced into the blend of the main wort before fermentation of kvass. Introduction to the blend of kvass of infusions of dried of sea-buckthorn and cowberry did not lead to changes in the basic parameters of the traditional technology. Obtained the kvass had a harmonious, but a more subtle and original taste and aroma characteristics (had a taste of the fruits of sea-buckthorn berries or cowberries) in kvass more intensively proceeded lactic acid fermentation (which is confirmed by data about the content in the finished beverage solids, and ethyl alcohol). The results of the studies confirm that the introduction of dried sea buckthorn and cowberries in the form of infusions into kvass blends can increase the nutritional value of these drinks.

Keywords: beverages of fermentation, kvass, technology, engineering, nutritional value, beverage enrichment, sea buckthorn fruit, cowberry.

INVESTIGATION OF PROPERTIES OF WATER-ALCOHOL EMULSIONS OF SUNFLOWER OIL BY MULTISENSOR SYSTEM AT VARIOUS TEMPERATURES

Fedorov A.V., Kirsanov D.O., Legin A.V., Lisitsyna I.A., Volkov S.M., Novoselov A.G., Pozdeeva U.V., Elovegina E.A.

The article is devoted to finding the optimal temperature mode for carrying out studies of water-alcohol emulsions of sunflower oil by the method of multisensory potentiometry. Before the release of sunflower oil from production, a number of long-term and

complicated analyzes are conducted to determine the main quality parameters. The method of multisensory potentiometry, in turn, allows one to obtain at once four main indicators of the quality of the oil, such as the acid number, the pea-number, the anisidine number and the content of tocopherols. The method of multisensory potentiometry is a promising analytical method for determining the qualitative and quantitative properties of various food products. It is based on the measurement of the potential difference between the reference electrode and the analyte, followed by the processing of the responses obtained. To obtain more accurate measurements obtained by the multisensory potentiometry method, it is necessary to select the temperature conditions for conducting the analysis, since the composition of the emulsion under study contains isopropyl alcohol, water and vegetable oil in which the properties such as solubility and volatility can change with temperature. Based on this, a study was conducted to select the optimal temperature for the analysis, in which the obtained indices will have a minimum deviation, and will allow them to find the main criteria for the quality of sunflower oil. In the course of the work, a number of experiments were carried out with various samples of sunflower oil and the optimal temperature for analysis was found.

Keywords: sunflower oil, EVO - edible vegetable oil, analytical methods, multisensory systems, multisensory potentiometry, water-alcohol emulsion, sensor reproducibility, potential difference.

THE METHOD OF ELECTROCHEMICAL ANALYSIS OF THE FOOD QUALITY

S. A. Romanchikov

Abstract: Methods of researching perishable food products in the food supplying of servicemen are analyzed. It was established that the organoleptic method of assessing the quality of food is the main method used in the military unit now. However, it does not fully allow for an objective assessment of their consumer properties.

This necessitates the development of mobile devices for determining the freshness of food. In order to increase the efficiency of control over the freshness of meat and fish, a device is proposed whose operation is based on the measurement of the current intensity, which is formed as a result of the electromotive force that appears inside the cell tissue of food products. Such design allows you to objectively and quickly evaluate the freshness of meat and fish by changing the pH of the environment, which occurs in the tissues of perishable products. The pH level affects the electromotive force within the test sample. The carried out experimental researches allowed to draw a conclusion that if the quality of the food product deteriorates and the pH of the medium changes from acidic to neutral and alkaline weak electric potential (current strength), which occurs with the electromotive force decreases. The action of the device makes it possible to measure the electrical potential (current strength) resulting from the electromotive force of the medium in the tissues of the food product. The analysis of the measurement results consists of comparing the obtained data with the reference indicators. The main principles of electrochemical analysis are used to develop the instrument, which allows solving the problem of reliable determination of the change in acid-base medium while controlling the freshness of meat and fish.

Keywords: device, quality, food product, electromotive force, electrochemical analysis method, method.

MATHEMATICAL MODEL OF KINETICS OF GRAIN HUMIDIFYING OF GRAIN CROPS IN HYDROTHERMAL PROCESSING

A.A. Rumyantsev

The article gives a method for describing the process of moistening grain during hydrothermal treatment. The developed method of steaming a stirred layer of buckwheat grains with both saturated and superheated steam assumes in the latter case, as controlled parameters, the pressure, vapor temperature and processing time. Despite the difference in the kinetics of grain moistening in one way or another, its nature has common tendencies, which creates the prerequisites for use in modeling the process and a general class of functions. The kinetics of grain moistening can be rationally modeled using simplified mathematical functions that provide acceptable accuracy and convenience of interpretation. A feature of grain moistening is the presence of a limiting stage, going much slower than the others and limiting the speed of the whole process. In this case, the moisture curve of the grain, calculated from the proposed model, will have the form of a monotonically increasing function characteristic of this process, asymptotically approaching a certain limiting value associated with the saturation of the grain with moisture during certain moistening methods. The proposed model of the grain moistening process allows to include a variety of investigated factors that are quantifiable, and also simplify the software for automating the process of hydrothermal processing of grain.

Keywords: mathematical model, temperature, pressure, time, hydration, steaming, hydrothermal treatment, grain, cereals, automation.

THE POSSIBILITY OF USING AMARANTH GRAIN IN THE TECHNOLOGY OF KISSEL

A. V. Snegireva, L. E. Meleshkina

The development of food products from vegetable raw materials, rich in essential nutrients has been and remains an urgent task of the food industry. In this connection, in this work the study of the prospects of using different types of barley flour as raw materials for the production of kissel and the possibility of increasing the nutritional value of the dish by making amaranth bran. For this purpose, the acidity, size, ash content of different types of barley flour. The viscosity of the paste of barley flour from different manufacturers subjected to heat treatment. Selected sample with optimal technological characteristics of alternative potato and corn starch in a sweet dish. The possibility of adding amaranth bran to the recipe of kissel was investigated and a comparative analysis of the nutritional value of traditional kissel and kissel based on barley flour with amaranth bran was carried out. Revealed the positive effect of bran amaranth in jelly composition of barley on nutritional value. It is established that introduction of bran of amaranth and barley flour enriches kissel with food fibers. Significantly increases the content of minerals, such as phosphorus, iron, magnesium and calcium, vitamins B1 and B2.

Keywords: desirable sweet dishes, kissel, barley flour, amaranth bran, nutritional value, squalene, functional, dietary fiber, atherosclerosis, vitamins of group B.

EXPANSION OF BAKERY PRODUCTS ASSORTMENT AND RESOURCE SAVING OF BAKING PROCESS

A. P. Savelev, O.I. Nikolyuk, G. V. Alexeev

In accordance with the world trends, the priority areas for the development of the food industry are resource saving and expanding the range of food products produced to better meet consumers. These trends in Russia are accompanied by national peculiarities of production development. The basis for improving the work of food and processing industries, as well as the work of most scientific and research organizations of this profile are documents that provide for the creation of an advanced scientific and technical reserve for the agro-industrial complex of the Russian Federation, based on "breakthrough" end-to-end agrarian and food technologies for solving problems food security, healthy nutrition of the population and rational nature management. One of the special features of the current stage of development of food production is the creation of food products that are promising for use in the Arctic regions. An important requirement for such production itself is the minimum energy and resource intensity with sparing effects on the environment. The industrial base of the bakery industry is currently represented by small bakeries and large and medium-sized enterprises and provides the population with the basic food product - bread at the recommended consumption rate. Taking into account the social significance of bread, the formation of effective conditions for the functioning of the bakery sector on the basis of the development of competition should allow creating favorable conditions for the development of bakery and enhancing the investment attractiveness of the industry.

Keywords: bakery products, resource-saving, energy consumption, baking chamber, heat pump, organoleptic evaluation, descriptor.

GRAIN-BASED PRODUCTS WITH FRUIT, VEGETABLE AND BERRY COMPONENTS FOR BABY FOOD

S.A. Urubkov, S.S. Hovanskaya, N.V. Dremina, S.O. Smirnov

Annotation: This article deals with the problem of feeding children over one year, as well as preschool and school age. Domestic and foreign practice of application of various raw components, and also technologies of production of grain-based products for baby food is considered. The importance of the use of vegetable raw materials in the concept of balanced nutrition and influence on the development and growth of the child's body is emphasized. The direction of further research is determined, which has not only medical, but also great social significance, since it is the determining factor of all subsequent development of the child. The result of this work will be the development of new grain-based products with the addition of fruit, vegetable and berry raw materials, providing a balanced and rational supply of nutrients and energy, while having no analogues in its nutritional value.

Keywords: products for baby food, grain-based products, fruit, vegetable and berry raw materials, children of preschool and school age, balanced diet.

TECHNOLOGY AND ADJUSTABLE PARAMETERS PRODUCTION OF CAPSULATED FORM SUPPLEMENTS "OLEOPREN GEPA"

M.M. Shamova, Yu.R. Mukhametova, A.N. Austrian, V.M. Poznyakovsky

The technology and adjustable parameters for the production of a new type of specialized product - biologically active additive (BAA) "Oleopren Gepa" have been developed. A feature of the technology is the encapsulated form, which, in addition to the sparing production regimes, ensures the stability of biologically active ingredients and their functional orientation. The production process consists of the main stages: preparation of raw materials, preparation of a mixture for encapsulation: dosing of components; mixing; homogenization for 3-4 minutes until a homogeneous mass without lumps; control of conformity of the name, quantity and series of raw materials; preparation of a solution of zhel-latin at the given parameters of water temperature and the speed of the mixer's revolutions. The retention of the gelatin solution after filtration is carried out for 4 hours at 600 C, the drying process - at sparing temperature parameters for 30-60 hours. The process of capsulation and drying is also carried out at sparing temperature conditions. Appraisal of an external type of a semi-finished product is carried out visually. Quality and safety indicators in the production and storage process were studied. The developed technology can be positioned as innovative, taking into account the novelty of the formula formula, technological solutions, sparing parameters of production and successful implementation in the market.

Keywords: BAA, "Oleopren Gepa", technology, regulated parameters of production, encapsulation, polyprenols, hepatoprotector, functional nutrition, biologically active additive, nutrition correction.

COMPARATIVE ANALYSIS OF THE CHEMICAL COMPOSITION OF VEGETABLE RAW MATERIAL APPLIED IN THE TECHNOLOGY OF RYE BREAD PRODUCTION

E. A. Cherniazova, A. A. Efremova, N. L. Naumova

One way to increase the nutritional value of bread from rye flour is the use of non-traditional types of plant raw materials that exceed the rye flour by a set of individual nutrients. In this regard, the purpose of the research was a comparative analysis of the chemical composition of the raw material base used in the technology of rye bread production. Various types of flour were used as research objects: rye peeled (producer of the Magnitogorsk Bread Products Plant - SITNO), black cumin seeds (producer of the Altai Cedar) and sesame (producer of Organic Product), from the kernels of pine nuts (producer "Dar Altai"), from grape seed (producer "Sampo"). It is established that the use of non-traditional types of flour is justified to enhance the nutritional value of baking from rye raw materials. Thus, the use of flour from seeds of black cumin will significantly increase the content of dietary fiber and trace elements (iron, copper, cobalt, magnesium) in rye products; application of sesame flour - concentration of protein, copper, magnesium, phosphorus, zinc; the use of flour from the kernels of pine nuts - the content of polyunsaturated fatty acids, manganese, phosphorus, cobalt, copper; the introduction of grape seed meal - the dosage of soluble and insoluble dietary fiber, as well as iron, copper, calcium. In all cases, substitution of a certain amount of rye flour in the bakery recipe for the analyzed plant raw materials reduces the gluten load on the human body.

Keywords: rye flour, black cumin seed meal, sesame seed meal, cedar nut kernel meal, grape seed meal, chemical composition.

STUDY OF PROPERTIES OF MEAT SYSTEMS BEEF LIVER WITH THE ADDITION OF HEMP FLOUR

T. A. Stoporeva, M. A. Vaitanis, S. V. Novoselov

One of the most important tasks facing society is to meet the needs of the population in high-quality food. Mass nutrition needs to expand the range of dishes with increased food and biological value, high quality and cost-effective technological process of cooking. Meat products are basic in the daily human diet, as they can meet the daily needs of an adult in the necessary nutrients. The most valuable raw meat is beef liver, which contains a large amount of easily digestible iron, essential amino acids, Vita-Minov, essential phospholipids. The introduction of additives in meat products is now widespread. Especially remarkable is the use of additives with structure-regulating properties. The use of such additives can affect the rheological properties of minced systems and lead to a significant reduction in moisture and nutrients losses during heat treatment. Taking into account the practical interest in the use of additives in products made of chopped meat, the goal of the work is to develop a scientifically based recipe and technology for the production of products from chopped beef liver with a filler in the form of hemp flour and the addition of emulsified hemp oil. Hemp flour contains coarse dietary fibers and pectin which have a complex healing effect on the human body. Compared to other known oils, hemp oil contains the maximum amount of unsaturated fatty acids and vitamin E.

Keywords: beef liver, minced systems, nutritional value, hemp flour, additives, protein, organoleptic evaluation, functional and technological properties.

SOLID-PHASE METHOD OBTAINING OF THE SODIUM-CARBOXYMETHILCELLULOSE OF THE FLAX CELLULOSE IN THE LABORATORY

K.V. Aksenchik

The shortage of high-quality raw materials for the production of cellulose esters, in particular, carboximetil carboxymethilcellulose, due to the lack of the country's own resources of cotton cellulose and the general reduc-tion of cellulose production volumes, forces manufacturers to seek alternative sources of raw materials for the production of cellulose esters. The assessment of the suitability of flaxen fiber material from different technologi-cal stages of flaxen cotton wool production as raw materials for solid-phase method for obtaining sodium-carboxymethilcellulose is carried out in this work. Experimental studies by standard methods of physico-chemical properties of flaxen fiber material, is important for determining the possibility of recycling such material into the sodium-carboxymethylcellulose and the choice of the reaction conditions of carboxymethylation and experimental studies of physico-chemical quality indicators samples of sodium-carboxymethylcellulose obtained from flaxen fiber material are performed. It is established that although cellulose samples do not fully satisfy all the parame-ters of both cotton and flaxen cellulose in accordance with the standards, but still bleached coarse fiber is suitable as a raw material for obtaining sodium-carboxymethylcellulose solid phase method. The parameters of synthesis to obtain a product of a given quality are set. In work recommendations on improvement of quality of a product are given.

Keywords: cellulose, cotton cellulose, flaxen cellulose, sodium-carboxymethilcellulose, flaxen cotton wool, solid-phase synthesis.

STYDING OF THE COMBUSTION MECHANISM OF NANOTHERMITE SYSTEMS

V.V. Gordeev, M.V. Kazytin, N.V. Kozyrev, A.O. Kashkarov, I.A. Rubtsov, K.A. Ten, S.I. Rafeychik

In this paper, we present the results of an investigation of the CuO / Al nanothermite system by the rapid X-ray diagnostic method for fast processes. The use of this method was first used to study combustion processes in nanotermite systems. It is found that the burning rate obtained in this work is consistent with the values of the previously used methods. The sensor short circuit occurs at the time of the wave of compaction, while the compression of the substance in the reaction zone is more important for the high density samples, but the burning rate is lower than for compositions with bulk density. However, the application of this technique did not allow the fixation of the movement of the gas phase from the end of the sample. The dynamics of the signal of small-angle X-ray scattering (SAXS) changes with increasing sample density. The compression of the substance is characterized by a longer decay of the signal of the SAXS, which is comparable to the speed of the combustion front for a high density samples.

Keywords: nanothermite, nano systems, high-speed radiography, synchrotron radiation, SAXS, combustion, burning mechanism of nanothermite, nano powders.

OVERVIEW OF INNOVATIVE DEVELOPMENTS IN COAL MINING AND COAL PROCESSING

E.S. Zadavina,Yu. A. Ryazanova, A.V. Papin, A.Y. Ignatova

The activity of almost any production is accompanied by the formation of illiquid products. In view of this, there is a need for its disposal or recycling. Waste of the enterprises involved in the concentration, transportation and coal processing can be an excellent basis for the production of composite fuels. The article describes the alternative types of composite fuels based on carbon-containing particulate waste of their distinctive features.

Operation of gas treatment plants requires special equipment that reduces the amount of dust emissions. This is necessary to reduce the anthropogenic impact on the environment and reduce the loss of a useful product during technological operations. The article describes some methods to reduce gas-dust emissions into the atmosphere, equipment and products obtained at the same time. In addition, several methods of drying the finished product are described, thereby significantly increasing the cost of the product. For example, technology – short cycle nanodrying "Kronos" or the use of hyperbar filters steam "HiBar".

The article also describes the technology of purification of circulating water after flotation of solid minerals.

The possibility of saving resources, to create a new product based on waste materials are very attractive aspects.

Keywords: coal slurry, enrichment, dumps, tailing dumps, dust, slurry water, drying, hydrocarbon fuel, recycled water, reclamation, dust collectors, air agglomeration.

LUMINESCENCE of Cd(Mn)S IN POLYMER MATRIX

A.A. Isaeva, V.P. Smagin

Semiconductor nanoparticles are of interest due to their potential application in many fields of science and technology. Their properties depend on a number of factors. In many ways, they are determined by the conditions of receipt. Based on this, the aim of this work was to determine the effect of synthesis conditions on the luminescent properties of Cd(Mn)s nanocrystals enclosed in a polymer matrix. During the work, under different conditions, colloidal solutions of nanoparticles of individual cadmium sulfide doped with manganese ions were obtained. Radical thermal polymerization in a block of stable colloidal solutions of CdS and Cd(Mn)S synthesized optically transparent polymer compositions and their photoluminescence was. Photoluminescence of polymer compositions containing cadmium sulfide was observed in the red region of the spectrum. It is associated with the formation of vacancy complexes on the surface of CdS nanoparticles. Their energy levels are located in the forbidden area of CdS. Luminescence intensity of compositions containing Cd(Mn)s nanocrystals obtained by successive deposition of cadmium and manganese salts was not high. This is due to the formation of cadmium sulfide crystals on the surface of the shell of MnS and manganese complexes. Compositions with Cd(Mn)s nanoparticles synthesized by combined salt deposition showed stable and bright photoluminescence in the region of 606 nm. The hypsochromic shift of the maximum luminescence band relative to cadmium sulfide (618 nm) is caused by the resonant transfer of energy from the surface vacancy levels of cadmium ions to the excited manganese levels in the prohibited CdS zone and luminescence from them. As a result of the work, it is shown that the synthesis conditions significantly affect the photoluminescent properties of CD(Mn)s nanoparticles and the most effective method for obtaining sulfide co-deposition.

Keywords: nanoparticles, cadmium sulfide, manganese sulfide, colloidal synthesis, polymethyl methacrylate, nanocomposites, photoluminescence.

FTIR SPECTROSCOPIC STUDY OF CELLULOSE AND ITS NITRATES FROM NONCONVENTIONAL RESOURCES

A.A. Korchagina, V.V. Budaeva

This paper reports the nitration of pulp isolated by the nitric-acid pulping method at a pilot production site from nonconventional renewable feedstocks, an agricultural waste–oat hulls, and commercial cotton pulp. The use of mixed acid at a water content of 14 % afforded cellulose nitrate specimens similar in physicochemical properties: 11.82-12.12 % N content, 10-15 MPa·s viscosity, 96-98 % solubility in mixed alcohol/ester, and 128-130 % yield. The pilot specimens were found to be alike Colloxyline N in basic characteristics. A comparison between the test pulps by FTIR spectroscopy revealed that the spectra of the specimens in question had the main functional groups (3700-3000, 3000-2800, 1645-1640, 1400-1300, 1200-1000, 900-500 cm^{-1}) typical of cellulose. IR spectra of the test pulps were found to be identical in basic characteristic frequencies to pulps from the conventional feedstocks, cotton and wood. FTIR spectroscopy demonstrated that the IR spectra of cellulose nitrates from oat hull pulps and commercial cotton pulp had absorption bands at 2558-2556, 1662-1660, 1642-1639, 1279-1277, 825-816, 746, 680 cm^{-1} responsible for the nitro group vibrations. The synthesized specimens were confirmed to be commensurate in basic absorption bands to industrial Colloxyline N.

Keywords: oat hulls, pulp, cellulose nitrates, FTIR spectroscopy.

THE EFFECT OF CARBONIZATION ON THE COMPOSITION THE PRODUCTS OF HYDRATION AND STRENGTH OF CEMENT STONE

V. K. Kozlova, A.V. Wolf, E. V. Bozhok, A. M. Manoha, K. A. Makhov

The kinetics of the process of carbonization of cement stone, made on the basis of Portland cement of different manufacturers. It was found that the carbonization process takes place most actively in the initial period (in the first 2,5 hours), while the amount of CO_2 associated with various types of cement stone is from 80 to 150 mg/g clinker. The influence of the degree of carbonization on the strength of cement stone was also evaluated. In the process of forced carbonization cement stone loses from 10 to 20 % strength. It is shown that the cements based on clinkers containing a lesser amount of tricalcium silicate, are more resistant to carbon dioxide corrosion. Since the main reason for the decrease in the strength characteristics of the cement stone is the change in the phase composition of the hydration products during carbonization, the phase composition of the cement stone before and after carbonization was investigated using differential thermal and thermogravimetric methods of analysis. It is revealed that the carbonate-containing hydrate phases formed in the process of carbonization contain in their composition less chemically bound water, which can cause carbonization shrinkage and decrease in the strength of the cement stone.

Keywords: carbon dioxide corrosion, carbonation, hydration products, cement stone, Portland cement, shrinkage, durability, strength, durability, clinker.

SYNTHESIS AND SPECTRAL - LUMINESCENT PROPERTIES OF COMPOSITIONS BASED ON OXIDE AND OXYFLUORIDE OF YTTRIUM ACTIVATED BY IONS OF EUROPIUM (III).

A.P. Khudyakov, V.P. Smagin

The aim of this work is to develop a new method for synthesizing luminescent compositions based on oxide and oxyfluorides of yttrium using low-polar organic media and establishing the dependences of the spectral-luminescent properties on its conditions, the composition of the components, and the wavelength of the exciting radiation. The compositions are synthesized in two stages. In the first stage from among the low-polar ethyl acetate selected gel formulations containing ions of yttrium and europium. In the second stage, the compositions are decomposed when heated. Heating is carried out at temperatures of 400 ° C, 600 ° C and 800 ° C for a time up to 6 hours. Identification of the compositions was carried out by X-ray phase analysis and IR spectroscopy. The spectra of luminescence and excitation of luminescence are recorded. The luminescence of the compositions is associated with the introduction of Eu^{3+} ions into their composition: narrow luminescence bands are observed in the luminescence spectra corresponding to $^5D_0 \rightarrow {}^7F_{0,1,2,3,4}$ transitions of 4f - electrons Eu^{3+}, in the luminescence excitation spectra, the bands are associated with the transition of 4f-electrons to excited electronic states. It is established that the Eu^{3+} ions replace Y^{3+} ions in the oxide, and then in yttrium oxyfluoride, with the increase in their concentration the phases Eu_2O_3, EuOFand$(Eu_xY_{1-x})_5O_4F_7$ are formed.

Keywords: Index terms: ethyl acetate, yttrium trifluoroacetate, europium trifluoroacetate, yttrium oxyfluoride, yttrium oxide, luminescence.

EXPERIMENTAL STUDY OF UNSTEADY COMBUSTION PROPANO-AIR MIXTURE IN A PIPE WITH ANNULAR BAFFLES

S. A. Lisakov, A. I. Sidorenko, E. V. Sipin, J. A. Galenko, A. N. Pavlov

As a result of the work, an experimental study of the process of unsteady combustion of a stoichiometric Propano-air mixture was carried out. The design of the installation for experimental explosions is developed and the method of research is offered. The reaction vessel of the experimental setup is a pipe with one open end, an inner diameter of 0.5 m and a length of 4 meters. In the reaction vessel, ring partitions were placed with the installation step S=0.5 m and the shading degree of the cross section BR=0.3. The experimental study was carried out for a different number of partitions and ignition sources with different energy. With the increase in the number of partitions, the maximum speed of the flame front practically linearly increases from 35 m/s for 1 partition to 240 m/s for 7 partitions. With the addition of one additional partition, the maximum speed of the flame front increases by about 35 m/s.as a result of the study, the adequacy of the previously developed computer model is checked on the obtained experimental data. The developed computer model is adequate and applicable for the calculation of the parameters of non-stationary combustion in pipes with regular obstacles. The relative error of the flame front velocity calculation does not exceed 18%.

Keywords: transient burning, Propano-air mixture, the flame front speed, computer modeling, pipe with annular baffles, the degree of shading section, coal mine, electropotential, pyrotechnic igniter, the reaction vessel.

THE USAGE OF BASALT FIBER TO DEVELOP METAL AMD COMPOSITE LINKING

S.A. Milovanov, V.B. Markin

The use of polymeric composite materials in modern technical equipment is determined by lower metal intensity and excellence of its weight. In this respect, polymeric composite materials has proved themselves as construction materials having not only high specific performance of durability and stiffness, but also corrosion resistance, which allows their usage in chemical, oil and gas industries, reduces repair terms and thus promotes for lower energy consumption and reduces environmental threat of production, especially if it has to do with atmosphere pollution. However full replacement of metals by composite materials will cause technical and technological problems, that is why the development of mating elements to link composites and metals has become topical. For high load constructions it feasible to use monolithic metal-composite combinations, that put emphasis on the adhesion characteristics of the elements. We can say today that one of the tasks of development and implementation of reinforced plastics is the development of different methods of fiber filler treatment and, as a rule, the study of the possible correlation of composite material durability and the force of adhesion interaction at the edge. The ways of metal and composites linking, their characteristics and ways to transfer load are studied in the article.

Keywords: basalt fiber, low temperature plasma, high frequency discharge, polymer composites, mating elements to link composites and metals, modification of fiber surface.

INFLUENCE OF TECHNOLOGICAL PROCESSES ON PHYSICO-MECHANICAL PROPERTIES OF VIBROSTOOD POROUS PERMEABLE METAL-CERAMIC MATERIALS

M. S. Kanapinov, G. M. Kashkarov, A. A. Sitnikov, N. P. Tubalov, O. V. Yakovleva

Porous permeable cermet materials (PPMM) obtained with the use of self-propagating high-temperature synthesis (SHS) technologies have a number of advantages, including: low energy intensity of production, the possibility of using mechanical engineering waste and metallurgy, fabrication of neutralizer filters with high physical - mechanical and functional properties. Filters obtained from SHS-technologies have sufficient mechanical strength, corrosion resistance and vibration resistance. The problems of increasing the mechanical and vibration-resistant characteristics can be solved either by selecting the components of the charge, or by controlling the technological regimes of preparing the components and fabricating SHS materials. The purpose of the study is to study the influence of technological processes (blending time, charge preheating temperature and SHS material release time) on the physico-mechanical properties (stiffness coefficient, modulus of elasticity, natural vibration frequency, etc.) of SHS materials obtained later as filters - neutralizers of exhaust gases of internal combustion engines. Porous permeable cermet materials were obtained using self-propagating high-temperature synthesis technology. Research in the work was based on the fundamental positions of metal science, inorganic chemistry, combustion physics, technical physics, X-ray diffraction. The basic components of the charge are Fe_2O_3 (alloyed steel) + Al_2O_3 (electrocorundum) + Al. The mechanical mixing time of the charge is determined in an amount of (5 ÷ 8) hours, the preliminary (before the SHS process) preheating the mold with the charge within (573 ÷ 1023) K, the tempering time (4 ÷ 24) hours.

Keywords: SHS - materials, metal oxides, charge, porous permeable cermet materials, modulus of elasticity, mechanical blending of charge, preheating, release time.

INVESTIGATION OF POWDER MATERIALS OF NON-FERROUS METALS OBTAINED BY ELECTROEUROUS METHOD

V.V. Soloviev, S.V. Konovalov, E.D. Kriukova

The method of obtaining powder materials - the method of electro-erosion dispersion (EDD), which has wide application in industry is considered in the article. Particles of powders based on non-ferrous metals obtained by interaction of dissimilar electrodes by the method of electroerosive dispersion were investigated. Morphological features of the formation of powder particles are revealed. A graph of the change in the mass of the electrodes over time is presented. The elemental composition of the powder material was determined using elemental analysis of granules.

Keywords: spark erosion dispersion, morphological analysis, non-ferrous metals, *the powder particles, powder particles, elemental analysis of granules.*

PROSPECTS OF APPLICATION GLASS FIBER REINFORCED PLASTICS FOR THE MANUFACTURE OF TOOLS FOR SOIL TREATMENT

M. I. Anan'ev, A.V. Ishkov

The results of the analysis of theoretical and experimental studies aimed at determining the factors affecting the wear of the lancet hoe in the process of soil treatment are presented in the article. Requirements to the material are formed on the basis on the analysis.

Finite element models of steel and fiberglass plastics paws are constructed and loaded in accordance with the actual operating conditions. It is shown that in the lancet hoe made of fiberglass plastics with a thickness of 5 mm, there are deformations, the value of which is 1.5 times less than the deformations in the steel hoe. The durability of the fiberglass plastics hoe will obviously exceed the durability of the steel one.

The possible mechanism of fiberglass plastics fracture during bending on model samples is analyzed.

Thus, the simulation of the stress state of fiberglass plastics and steel hoe showed that the replacement of steel pointed hoes with fiberglass plastics is expedient and effective.

Keywords: tools for soil treatment, wear, soil composition, soil hardness, improved wear resistance, fibreglass, stress distribution

THE INVESTIGATION OF HYDROGEN ABSORPTION-DESORBTION WITH THE ALLOY BASED ON Ti-Al-Nb SYSTEM

B.K. Karakozov

This paper presents the kinetics of hydrogen sorption determined in a special installation of VIKA with Ti-23,5at% Al-21,5at% Nb alloy under isothermal conditions at temperatures of 450, 500 and 550C. It is defined that the maximum amount of absorbed hydrogen is observed in the material of the alloy sorbed at a temperature of 550 C and is about 0.289 mass%. It is established that the max-imum hydrogen release from the alloy ranges at temperatures 700 ... 790°C. The active yield of hy-drogen is observed at a temperature of 750°C. It was also found that the maximum hydrogen re-lease is 85% of the hydrogen return in samples of alloys saturated at a temperature of 550°C. As a result of the experiments, the dependence of the hydrogen pressure on the sample temperature was obtained. The X-ray diffraction analysis of the alloy samples shows an increase in the intensity of the diffraction peaks identified as lines <221> and <002> of the orthorhombic phase Ti2AlNb of the sample material after saturation of the Ti-23.5at. % Al-21at. % Nb alloy in hydrogen medium. Hydrogen saturation of the Ti-23,5at% Al-21,5at% Nb alloy does not lead to a change in the phase composition and the orthorhombic structure of the alloy is preserved.

Keywords: intermetallic compound, absorption-desorption, phase analysis, structure, plasticity, alloy, hydrogen, cyclic stability, sorption properties.