ABSTRACT AND REFERENCES

ECOLOGY. TECHNOLOGY AND EQUIPMENT OF FOOD PRODUCTION

METHOD OF ASSESSMENT AND PREDICTING OF INFLUENCE OF TECHNOGENIC POLLUTION ON URBOECOSYSTEM AIR (p. 4-7)

Tatiana Kudryavska, Alina Dychko

Disadvantages of the concept of maximum admissible concentrations call into question the reliability of modern methods for assessment and prediction of environmental conditions, so there is a need to develop new approaches. These approaches are based on the bioindication methods, as they are sensitive, reliable and sufficient for an adequate environmental assessment. The method of assessing the pollutant impact on the urboecosystem state was first introduced in the paper. It differs from the known by the fact that it uses biomonitoring data and considers environmentally admissible concentrations, defined on the basis of the determined dependence of abortiveness indicator of plant-bioindicator pollen on the pollutant concentration value for assessing the environmental condition. Also, the adequacy of this method was verified on the example of Kyiv. Environmentally admissible concentrations for significant abiotic factors and environmentally safe limits for relatively significant were determined. It is shown that existing standards exceed the values of environmentally admissible concentrations and environmentally safe limits by about 20 %.

Keywords: maximum admissible concentration, environmentally admissible concentration, urboecosystem, abortiveness, bioindicator.

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INVESTIGATION OF KINETICS CONFORMITIES WITH A LAW OF DECOMPOSITION OF AGGLOMERATES OF MICROORGANISMS IN THE CONDITION OF ACOUSTIC CAVITATION (p. 8-11)

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Our results show that the amount of agglomerates of microorganisms decreases during the sonication and the concentration of individual microorganisms in suspension increases proportionally to the sonication time, the radius of colonies of cellular microorganisms decreases. Concentration of microorganism colonies increases linearly with time. This allows to calculate the rate of colonies decomposition into smaller. The total surface of the particles, participating in the aggregate formation is proportional to the aggregate concentration in the system and the surface, involved in the bonds between the particles in a single aggregate. Cavitation energy is spent on the destruction of bonds between particles in the aggregate, which is obviously proportional to the surface of surface segments of individual cells, connecting them with the neighbors in the colony. The reaction order on the aggregate concentration in the system is different from the first one. We have proposed an equation, which describes the destruction process of cell colonies of microorganisms under the influence of ultrasound.

Keywords: cellular agglomerates, acoustic cavitation, ultrasound, clusters, decomposition kinetics, cell disintegration

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DEVELOPING LAND MANAGEMENT PROJECTS FOR GROUNDING CROP ROTATIONS USING GEO-INFORMATION MODELING (p. 11-16)

Svetlana Kokhan, Ivan Shkvir, Antonina Moskalenko

The problems of the heavy use of agricultural lands, leading to the development of degradation processes are defined. The necessity of automating a number of stages involving the development of land management projects for ensuring ecological and economic justifications of crop rotations and streamlining lands is shown.

Composing blocks of the geo-information model for concerning the geo-imaging of eco-technology crop land groups, taking into account a potential hazard of erosion processes and the intensity of land use, are substantiated. Blocks of primary data, data processing and the presentation of modeling results are singled out.

The developed algorithm of the geo-imaging of eco-technology crop land groups can significantly reduce the time limits of analyzing spatial data for decision-making and carrying out the project design work.

The areas of eco-technology crop land groups by the example of a model household are determined, and the types of recommended crop rotations, crop groups and activities are distinguished.

Keywords: eco-technology groups, geo-information modeling, crop rotation, geospatial data base

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IMPROVING DESIGN CIRCULATORY OXIDATION DITCHES (p. 17-20)

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It is known that conventional biological treatment facilities for small units are very expensive. In this regard, there arises a considerable interest, both in this and other countries, in developing new, simple-designed and practical in operation, but in addition, economic and effective ways of wastewater treatment. These qualities are attributed to circulatory oxidation ditches, which allow solving the problem of wastewater treatment in small volumes.

Improving the design of oxidation ditches, and their running efficiency respectively by using the flow circuit of a compound circulatory oxidation ditch with a mixed liquor dehydration bed is recommended in the paper. It uses only one type of aerators, namely, siphon jet aerators of a mining type, and the channel is located along the perimeter of a sludge drying bed, which is placed above the water level and is separated from it by a pebble bed bank (about 1 m high and 0.5 - 1 m wide), serving as a filter baffle plate. A sludge drying bed bottom is made of reinforced concrete. The bottom has a slope across the width of the bed from its center towards edges that provides filtering of the sludge liquid phase into the channel through troughs. Due to such sludge bed location the area of treatment facilities diminishes. In addition, in the developed channel design there is a bridge throughout its length, equipped with chutes, giving access to staff for removing a mixed dried sludge and to transport means for collecting it.

This oxidation ditch circuit will increase the efficiency of wastewater treatment and decrease the area of treatment facilities.

Keywords: circulatory oxidation ditches, aeration equipment, siphon jet aerators of a mining type

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NORMALIZATION OF WORKING CONDITIONS IN SPECIAL-PURPOSE PREMISES USING METHODS OF ARTIFICIAL AIRIONIZATION (p. 21-25)

Ihor Tolkunov

The paper deals with solving important scientific and technical problem of ensuring safe working conditions for the personnel of departments of the State Emergency Service of Ukraine, which is to normalize working conditions in special-purpose premises using artificial bipolar air ionization of working environment.

It is shown that using modern ventilation and conditioning systems deionize air in the working areas of premises, depriving it of natural ionic composition. This negatively affects the general personnel condition of departments and their efficiency as a whole. Herewith, normative concentration level of light air ions in special-purpose premises can be achieved using artificial air ionization methods, the implementation of which requires specific data on the air ion concentration field formation mechanism in the air of working areas.

The design of adjustable bipolar corona air ionizer was developed, and relations, allowing to determine its design and operating parameters were defined. The analytical relations, the adequacy of which was confirmed experimentally, reveal the air ion concentration field formation mechanism in supply jets of ionized air that allows to estimate the working area air ion mode parameters under their direct influence.

Using the developed device in special-purpose premises will ensure the implementation of occupational safety air ionization requirements and guaranteed safety of their operation, as well as high efficiency of artificial air ionization measures with their implementation cost reduction that is caused by the possibility of using engineering calculation methods in the design and manufacture of devices, based on the corona discharge effect.

Keywords: occupational safety, special-purpose premises, airionization, airion concentration, supply jet

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STUDYING AND SETTING PROCESS PARAMETERS OF MILK LACTOSE HYDROLYSIS (p. 26-31)

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The researches of enzymatic milk lactose hydrolysis by using the β- galactosidase enzyme are given in the paper. For carrying out a lactose hydrolysis, two β-galactosidase enzyme preparations GODO-YNL2 and Neolactase are offered. For setting lactose hydrolysis parameters, the influence of a pH medium, temperature, enzyme preparation doses, the duration of hydrolyzing the milk lactose affected by the β- galactosidase enzyme preparations, was studied. In terms of effectiveness, adaptability and efficiency for the lactose hydrolysis, the GODO-YNL2 enzyme preparation was chosen.

It was found that depending on the degree of lactose hydrolysis the milk sweetness increases, organoleptic indicators of hydrolyzed milk were defined, the milk sweetness index at different degrees of lactose hydrolysis was set, titratable and active acidity indicators of hydrolyzed milk were determined. The technological regimes of hydrolyzing lactose by enzymes were developed and substantiated: the temperature is 4-6 °C, the enzyme preparation dose is 0.01 and 0.02 %, the duration is 18-20 and 13-15 hours; the temperature is 43-45 °C, the enzyme preparation dose is 0.03 %, the duration is 3.5-4 hours. For inactivating the enzyme, and producing high-quality sweet condensed milk, it was suggested carrying out milk pasteurization, after hydrolyzing lactose.

In the subsequent work, it is proposed to use hydrolyzed skimmed and whole milk for manufacturing preserved sweet milk products.

Keywords: lactose intolerance, β- galactosidase, enzyme preparation, degree of lactose hydrolysis, hydrolyzed milk.

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INFLUENCE OF ENRICHING ADDITIVES ON PASTRY STRUCTURE FORMATION AND BAKED MUFFINS (p. 32-36)

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The records, found in literature sources, were analyzed, and it was found that there are no systemized data on a pastry formation when adding powder enriching additives, different in chemical and grain-size composition. The influence of a wheat germ meal and beet fibers on a pastry formation for muffins was studied. Using these additives with different polysaccharide and grain-size compositions favors an effective dough viscosity, elastic and elasticity modules, plastic viscosity, which are positive for the formation of necessary structural-mechanical properties of baked products. It was found that adding enriching additives under study diminishes the adhesion of pastry for muffins that will promote the reduction of technical losses during kneading and forming dough pieces. These properties provide making high-quality baked products.

Keywords: muffins, structural-mechanical properties, beet fibers, wheat germ meal.

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STUDY OF SPICY RAW MATERIALS VACUUM MICROWAVE CONCOCTION AND DRYING (p. 36-40)

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The paper deals with defining the influence of microwave energy source power and vacuumizing depth on spicy raw materials heating duration, studying the mass and moisture content kinetics in the microwave concoction and microwave drying under vacuumizing conditions. The purpose of the paper is to establish the kinetics of microwave concoction and microwave drying of the mixture of crushed roots of spicy vegetables under vacuumizing conditions and to obtain practical information on rational modes of their implementation. The object of research is microwave concoction and microwave drying processes under vacuumizing conditions. A mixture of crushed roots of spicy vegetables such as parsley, parsnip, celery, dill was used as the subject of research. The microwave mixture concoction was carried out within the moisture content 560...100 %, and microwave drying - 100...10%.

It was determined that the final temperature of the product decreases from 93°C to 76°C with the increase in the vacuumizing depth in the working chamber within 80...40 kPa. The duration of its achievement with increasing the heating power from 0.5 kW to 2 kW reduces by 3.9...4.1 times, and with increasing the vacuumizing depth from 80 kPa to 40 kPa - by 21...25 %.

In microwave concoction, the change in vacuumizing depth from 80 kPa to 40 kPa affects the moisture removal intensity mainly during periods of warming and constant speed and generally leads to the process duration increase by 13...20 %. In microwave drying, slight difference in the results of changes in weight and moisture content is observed only at the initial stage, but there is almost no difference in achievement duration of the final value of moisture content. Rational values of processes duration at different values of heating power and vacuumizing depth were defined. It is recommended to maintain a residual pressure 40...60 kPa to preserve physicochemical properties of raw materials.

Keywords: spicy vegetables, microwave concoction, microwave drying, vacuumizing depth, kinetics, mass, moisture content.

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INFLUENCE OF SUNFLOWER SEEDS DEHULLING CONDITIONS ON WAX TRANSITION IN SUNFLOWER OIL (p. 41-47)

Serhiy Teslenko, Anna Netreba, Kateryna Vriukalo, Georgiy Sadovnychiy, Leonid Perevalov

Despite numerous developments, it is impossible to obtain dehulled kernel when dehulling sunflower seeds by existing dehulling machines in a single pass. The need to reduce the amount of husks under existing process conditions (moisture-heat oil seed meal treatment, oil seed cooked meal pressing) dictates that fewer related substances, such as wax-like substances, free fatty acids, etc. transit in sunflower oil that improves its commodity and consumer properties. One of the main methods, ensuring kernel separation from the husk, is seeds preparation for dehulling, dehulling, separation of the obtained dehulled seeds. The dehulling method selection depends on several factors, the main among which are physicomechanical properties of seeds and their morphological parts. New dehulling technology is proposed in the paper, which includes seeds calibration (if further more thorough kernel and husk separation is necessary), drying in a fluidized bed dryer (if cooling temperature increase is necessary), cooling to subzero temperatures and dehulling at the same temperatures. The expediency of seeds pre-cooling before dehulling was proved in the paper. This, in turn, gives better dehulling results, provides higher kernel integrity and smaller chaff and oil dust amounts. The new method allows to obtain sunflower oil with low content of waxes and wax-like substances during further extraction. It follows that the obtained sunflower oil has higher quality.

Keywords: sunflower seeds, dehulling conditions, dehulling, husk, sunflower oil, wax-like substances

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STABILIZATION OF AIR-NUT SEMI-PRODUCT STRUCTURE BY SURFACTANTS (p. 48-53)

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The study of foaming capacity and stability of the foam, based on egg-white in the presence of fat have shown that fat is the antifoaming agent and leads to the foam destruction. Experimental investigations of the egg-white effect on foaming capacity and foam stability in the presence of fat, surfactants (GMS, LACTEM, lecithin's, DATEM, SSL) with different NLB values are presented in the paper.

The influence regularities of the surfactant concentration on foaming capacity and foam stability of systems, based on egg-white in the presence of fat were first defined in the paper. It was established that the surfactant concentration determines foaming capacity and stability of egg-white based foam systems, containing a fatty phase. It was determined that nonionic surfactants with low HLB increase foaming capacity and foam stability. The optimal ratio GMS: white was defined, which is 1:12,5. Surfactants with low HLB and presence of charge, namely anionic, amphoteric, lead to desorption of whites from the interphase surface aqueous solution-air that does not allow to obtain the system with the high foaming capacity and foam stability. It was established that reasonable concentration of DATEM and SSL in respect to providing high foaming capacity and stability of foam white systems, containing fat is the concentration up to 0.2 %. The obtained results allow to improve the air-nut semi-finished product technology by increasing stability due to introducing a certain surfactant concentration that allows to manufacture these products using industrial methods in catering establishments and confectionery shops.

Keywords: foam, emulsion, foam-emulsion, surfactant, interphase adsorption layers.

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