

AGRICULTURAL SCIENCES

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CONVERGENCE OF AGRICULTURAL AND LINGUISTIC SCIENCES AT A COMPETENCE-BASED APPROACH TO TRAINING THE APK SPECIALISTS

The article is devoted to the role of the Department of Foreign Languages in the educational process of the Agricultural Academy. Being non-graduating, such departments have a high scientific potential, and they are of great importance for the formation of highly qualified and fully developed specialists for argoindustrial complexes. The Department of Foreign Languages at the Federal State Budgetary Educational Institution of Higher Education “Izhevsk State Agricultural Academy” in Izhevsk is not an exception. The department’s teaching staff continuously works on the improvement of educational process enhancing classical teaching methods with innovative forms and techniques. Research and implementation of these methods and technologies allows a modern teacher to improve significantly the effectiveness of foreign language teaching as well as to increase students' interest to the country and culture of the language learned. To get students interested and motivated to learn a foreign language is one of the principle goals for every teacher at the Foreign Languages Department. Training highly qualified and competitive specialists capable of responsible and effective activity in the Russian and International labour markets, and just interesting interlocutors, educated and intelligent people is impossible without the knowledge of foreign languages. The formation of communicative competence is the main purpose of teaching foreign languages in a non-linguistic University. These are the tasks of a foreign language teaching. A special role at the classes teachers assign to topical presentations as a scientific approach to learning a foreign language. Work on the formation of presentation skills allows students to improve their skills of speaking a foreign language, a deeper understanding of the issue discussed, operating professional terminology of the study. The work carried out is reflected in annual publications of teaching guides, training books, books for reading, manuals for improving language knowledge and skills. Besides, they conduct students-researches in various fields of macro- and microlinguistics.

Key words: foreign language in non-linguistic university, methods of foreign language teaching, discourse, theory of language and of translation, English lexicology.

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MORPHOFUNCTIONAL CHARACTERISTICS OF THE HENS' REPRODUCTIVE BODIES OF VARIOUS CROSSES IN POSTEMBRYONAL ONTOGENESIS

Studies have been conducted to study the formation of reproductive organs of chickens in postembryonic ontogenesis and its effect on egg productivity. As the objects of study, two groups of laying hens of the final hybrids of the Hisex Brown and Hisex White crosses were used. In each group, 105 heads at the age of 100 days were selected. The data obtained have indicated a slight excess of the development of reproductive organs in the white cross-laying hens by mass of the ovary at the beginning (75 %) and in the end (2.4 %) of the egg-laying cycle, relative growth of the ovary mass, the number of follicles (0.2–0,4 pcs), and the relative increase in the mass of the oviduct. With the layers of brown cross, the intensive development of reproductive organs occurs later, and the decline of the development in ontogenesis is bigger than with the white layers, in terms of the mass of the ovary and the number of follicles. The smallest decrease in ontogenesis for all morphofunctional characteristics of the ovary was recorded in the chickens of the Hisex White cross that indicates a better development and a low rate of extinction of the reproductive function of the ovary for the white layers. The results of histological examination of the ovaries indicate the presence of greater potential in the manifestation of intensive egg production also in chickens of the Hisex White cross compared to the Hisex Brown cross. This fact confirms that the Haysex White cross-country layers surpass the crosscut Hisex Brown in terms of egg productivity. During the study period, white cross hens laid 331.2 eggs per an average hen, against 319.9 eggs in “Hisex Brown” cross. The intensity of egg production for laying hens was also higher by 3.2% (93.6 vs 90.4% for the birds of the brown cross).

Key words: ovary, oviduct, hybrid chickens, egg productivity, “Hisex”.

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THE USE OF HONEY MICROFLORA IN THE PRODUCTION OF FUNCTIONAL HERBED WHEY DRINK

One of the problems of the dairy industry is the rational use of whey obtained in the production of products such as cottage cheese, cheese, protein paste, casein. Research in the article are devoted to the development of technology of production of functional fermented milk beverage based on curd whey, which has a high biological value and has medicinal properties, with pure natural ingredients used, including honey, herbal extracts and natural vegetable dye and flavour. As a starter for the drink, acidophilic stick ferment and microorganisms of honey, i.e. yeast have been used. The

authors have developed a method of preparation of industrial honey-based leaven. To determine the effect of the components on the activity of the starter cultures and to determine the optimal formulation 6 product samples have been made. Honey and turmeric extract were present in all samples, the prototypes differed from each other with added extracts of medicinal herbs and the presence of a lemon flavour. The technology of beverage production comprising the steps had been developed: fermentation of pasteurized, clarified whey was carried out at a temperature of 38 ± 1 °C 5 % honey starter, and 1 % starter of *Lactobacillus acidophilus* culture. During fermentation, into the serum honey, turmeric extract, extracts of medicinal herbs and flavoring have been introduced, while being subjected to fermentation it has been periodically stirred. The product has been fermented for 5 to 6 hours to an acidity of 70 to 80 °T, then cooled to a temperature of 28 ± 1 °C, filtered and bottled, capped, thermostated at 28 ± 1 °C for 3-4 hours until the beverage has reached acidity of 100–110 °C. Then the drink has been cooled to 11 ± 1 °C and kept for 24 hours for self-gassing. The finished product was fully consistent with the developed requirements. Lime blossom slightly inhibits the ferment due to high bactericidal properties, though it remains active enough to obtain a qualitative product. Leaven is particularly active where there is an extract of St. John's wort and chamomile and/ or lemon flavour. The optimal formulation of whey drink includes 9 % honey, 0,8 % turmeric extract, 0.5 % lemon peel extract, 15 % herbal extract (lime blossom or chamomile and St. John's wort).

Key words: serum, honey, yeast, leaven, medicinal herbs, fermentation, functional product.

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CONDITION AND USE OF THE LAND FUND IN UDMURT REPUBLIC

Land is an invaluable and irreplaceable wealth of society. It is the main natural resource, material condition of life and activity of people, base for placement and development of all branches of a national economy, the main means of production in agriculture, and the main source of food. Therefore, the general regularity of land functioning and organization of the territory are studied by the land management science which considers the land as a means of production and natural resource necessary for the functioning of all sectors of both production and non-production spheres of the national economy. Land management science and practice form the system of state land management aimed at the regulation of land relations as a mechanism for the organization of rational, full and effective use of land resources of the Russian Federation. Hence, there is a need to ensure such an order under which the farming use of land, satisfaction of other public interests will not lead to the loss of useful land properties, their degradation, and reduction of

areas and, as a consequence, cause dangerous social and economic consequences and a threat to the sustainable development of society. All this determines the relevance of the study of the land fund of both the Udmurt Republic and the Russian Federation as a whole. This article describes the characteristics of the land fund of the Udmurt Republic, considers the distribution of land resources over the territory of the Republic, as well as the changes in the categorized areas of the land fund of the Republic in 2017.

The main changes are related to the reduction of agricultural land, which had decreased by 388 hectares due to the transfer into the category of settlement land, industrial land and of the land for other special purposes, and the land of specially protected areas and objects. No changes had been observed in forest, water and reserve lands.

Key words: land fund, land category, area, agricultural land, settlement land, lands of the forest fund, protected land, industrial lands, lands of water fund, reserve lands.

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THE EFFICIENCY OF THE DRUG DEBUZZER PRACTICING AGAINST ECTOPARASITES OF CHICKENS

Poultry is one of the dynamically developing branches of farming. Along with the task of improving the quality of poultry products, there is also the task of increasing the amount of poultry for meat and egg production. However, while following modern techniques in farming it is necessary to pay attention to the treatment of birds against ectoparasites. Nowadays, the drugs based on synthetic pyrethroids are widely used for bird's treatment. New effective drugs are being searched based on natural ingredients. The article is aimed at studying the effectiveness of the DEBUZZER drug in treating chickens against ectoparasites. The object of the study are the chickens of a private subsidiary poultry farm divided into 2 groups by their age and methods of maintenance, thus 15 heads in each group. By its consistency, the DEBUZZER contains finely ground fossil silica (SiO₂ content 88–89 %), and ethereal oils of repellent action. This preventive looks as a light gray powder with a peculiar ethereal oil aroma. In the group of chickens at the age of one month, the intensity of invasion appeared to be lower might be due to prolonged con-

tact with adult birds, as the result – a number of mallophaga eggs laid in the pen frame was quite big. The chickens of the second group had high intensity and extensiveness of invasion because they had contacted an adult flock in the process of joint ranging, the invasion reoccurred. The DEBUZZER drug at double treating with an aqueous suspension spraying of 100 g/m² showed 100% extend extensibility.

Key words: ectoparasites of chickens, Menoponidae, insectacaricidical drugs, DEBUZZER.

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THE STUDY OF HEMATOLOGICAL AND BIOCHEMICAL PARAMETERS OF CALVES' BLOOD IN CORRECTION OF HYPOMICROELEMENTOSES BY MEANS OF MINERAL SALTS AND CHELATE COMPLEXES OF FE, MN, CO, ZN, CU

For treatment and prevention of hypomicroelementoses microelement inorganic salts of are used. These substances have sufficiently low digestibility and high toxicity [11]. Therefore, the use of substances devoid of these disadvantages is relevant. As an example, chelate complex compounds of trace metals and of amino acids meet these requirements.

It should be noted that the current schemes of introducing micronutrient compounds into the diet do not always take into account their antagonism, which impedes their absorption and incorporation into metabolic processes. That significantly reduces the efficiency of their use. We have attempted to solve these problems by using chelate complexes and introducing them into the diet in a way as to minimize the antagonistic effect of microelements. The efficiency of the use of inorganic salts of Fe, Mn, Co, Zn, Cu and chelate complexes of these trace elements with glycine according to the proposed scheme was also compared. At this somewhat a more sound effect of the latter on some hematological and biochemical parameters of animals had been noted.

Key words: microelements, chelate complexes, hypomicroelementoses.

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DEVELOPMENT OF AN ALGORITHM OF POWER LOSS MINIMIZATION FOR THE ASYNCHRONOUS ELECTRIC MOTOR AND SIMULATION OF THE SYSTEM OF AUTOMATED CONTROL BY AN ELECTRIC DRIVE

Asynchronous electric motors occupy a leading position in the global structure of electricity consumption, therefore the development and implementation of an energy-efficient asynchronous electric drive is always economically justified and relevant in the context of increasing energy costs. The aim of the article is to develop an algorithm for minimizing the power loss of the asynchronous electric motor and modeling an automated drive control system that would prove sufficient conceptual and computational simplicity for operation based on general-purpose microprocessors. The article proposes a technique of power loss optimization in the windings of an electric motor operating in a set up regim from a frequency converter with a scalar control. The essential difference of the proposed method is the use of the equivalent circuit of an asynchronous motor, expressed in terms of conductivity of the rotor and of a stator, and using the coefficient of energy efficiency as an indicator of the efficiency of the engine, which determines the relative total power losses in an asynchronous motor. The developed method uses the ability to change the ratio between the active and inductive components of the asynchronous motor's current within the nominal value of the phase current by simultaneously applying voltage to the motor phase and sliding of the rotor and, as a result, changing the indices of the energy efficiency of the induction motor. The system simulation in the MATLAB / Simulink environment is described. The results of simulation have shown that the method is operational and can be practically operated.

Key words: MatLab, Simulink, asynchronous motor, circuit conductivity, current components, adequate scheme, stator's and rotor's current.

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PECULIARITIES OF SINTERING OF ULTRAFINE POWDER MATERIALS UNDER CONDITIONS OF HIGH-SPEED LASER PROCESSING

When designing innovative technologies for the recovery and functional coatings modern machinebuilding is based on fundamentals occurring in the systems of processes. However, with the development of high-speed processes of treatment, high-speed laser processing of powder materials in particular, difficulties arise in the description of structure-formation processes because of the lack of adequate numerical models. The development of technology of high-intensity laser sintering of ultrafine powder mixtures is possible only with an adequate physical and chemical description of the high-speed phase transitions phenomena. This paper presents the results of theoretical studies on the modeling of heat and mass transfer under conditions of high-speed laser processing of powder materials. For the purpose of computer simulating a software package for modeling heat transfer and structure formation processes was used in the work, consisting of two software modules adapted in the paper for the laser processing conditions during powder materials sintering.

The balance of heat fluxes in the laser-processing zone has been analyzed, from which it follows that during the solid materials processing the fraction of laser energy absorbed by the sample's surface is determined by the absorption coefficient of laser radiation by the surface and the coefficient AQ, of boiling losses and plasma formation. However, during the processing of powder materials, heat transfer to the underlying layers occurs mainly due to the phenomenon of diffraction of radiation. The latter phenomenon is the principle method of transmitting laser energy to the underlying layers of powder particles, since the radiation wavelength is $\lambda = 1.06 \mu\text{m}$. Taking into account the above factors, a numerical model was implemented that describes the processes of structure formation in ultrafine powder environments, in which the effect of full heating of the powder layer due to diffraction occurs.

Key words: high-speed laser processing, powder material, sintering, structure formation, numerical model.

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EFFECT OF BIPOLAR POLARIZATION IN TECHNOLOGICAL PROCESSES OF AGRICULTURAL PRODUCTION

The article describes the possibility of using the effect of bipolar electrochemical polarization to develop analytical and measuring equipment, as well as to create a unique technology of intravenous electrochemical synthesis of drugs from blood components. A polarograph with an extended wire electrode containing combined cells has been suggested. One cell is equipped with a wire electrode and a pair of auxiliary electrodes, providing the effect of bipolar polarization. It contains a movable slider to remove the potential value at the touch-point. The second cell includes the electrodes: a working and a comparing one. In the process of measuring the slider moves uniformly along the extended platinum electrode. The potentiostat's amplifier polarizes the working electrode by passing a current of such magnitude and direction that the potential of the working electrode at any time corresponds to the potential of the point on the wire electrode touched by the current collector slider. Combining the results of measuring the potential and the current on a single graph allows obtaining the curve of their dependence, which is the desired polarogramme of the measurement process. When the current collector is moved from one end of the wire electrode to the other one, the full range of potentials unfold corresponding to the potentials of the ions that are part of the solution under study. Thus, obtained polarogram provides complete information about the composition of the components of the solution. This curve is fully consistent with the polarogram obtained by the traditional polarograph, but it has been obtained without the use of environmentally hazardous metal mercury, and is not complicated by the traditional distortions of the first and second kind, so much peculiar for the mercury polarograph. A device for quantitative measurement of porosity of metal coatings also has been developed. The investigated part with a porous coating serves as a reference. The potentiostat polarizes the electrode from the coating material to the reference potential. The polarization current is numerically equal to the corrosion current in the coating pores. A device for the treatment of the body by the products of electrochemical synthesis of hypochlorite ion and hydrogen in the blood flow in the blood vessel has been described. The synthesis takes place on a long platinum electrode introduced by the blood vessel of its axis with the help of overhead electrodes due to bipolar polarization with the help of overhead electrodes.

Key words: bipolar electrochemical polarization, electrochemical oxidation; blood detoxification; end-to-end porosity, microgalvanic elements, corrosion fundamentals in the pores of the coating.

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