

AGRICULTURAL SCIENCES

A. A. Astrakhantsev

Izhevsk State Agricultural Academy

METHOD FOR IMPROVING TECHNOLOGY OF INDUSTRIAL PRODUCTION OF POULTRY MEAT

At the present stage of development, poultry producing enterprises are forced to constantly improve the technologies applied to. A relative issue is the development of a method of improvement in the technology of keeping hens of the parent herd. As a method of improving the technology, it was proposed to regulate the level of litter when keeping hens of the parent herd at the beginning of their laying period. For the purpose, three bird groups were formed: the control group, the first and second experimental ones. Birds from the control group were kept on a thick litter with a thickness of 5–7 cm throughout the entire period of operation. The first experimental group for twenty days (aged 156–175 days) was kept on a litter with the thickness of 3 cm, and then with a thickness of 5–7 cm. The second experimental group for twenty days (aged 156–175 days) was kept without litter and further, on the litter with the thickness of 5–7 cm. Regulation of the litter layer in the studied groups had an impact on the safety and level of rejection of the poultry population. A smaller dropout rate was observed in the second experimental group. And in the second experimental group, the level of egg productivity of chickens never showed up negative dynamics. Moreover, the eggs yield suitable for incubation in this group by 0.5–0.8 % was higher and amounted to 94.9 %. In the second experimental group, the indicators of feed and water costs for the production of 10 eggs were minimal – 2.08 kg and 3.7 liters, respectively. In an economic assessment, profit from the product sales had reached higher in the second experimental group (871 thousand rubles) by 23.2 and 16.91 thousand rubles than in the control and the first experimental group, respectively. As a method for improving the technology of industrial production of poultry meat, we propose to use the method of regulating the thickness of litter when keeping hens of the parent herd at the beginning of the laying period with the litter complete removal for the period of 20 days.

Key words: chickens; productivity; improvement method; litter; hatching egg.

Author:

Astrakhantsev Anton Anatolievich – Candidate of Agricultural Science, Associate Professor, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: antonzif@list.ru).

V. M. Yudin, A. I. Lyubimov, S. A. Savelieva

Izhevsk State Agricultural Academy

INFLUENCE OF TECHNOLOGICAL FACTORS ON THE EXTERIOR INDICATORS OF THE UDDER AND MILK PRODUCTIVITY OF BLACK-MOTLEY COWS

In the countries with developed dairy cattle breeding, along with the purchase of highly productive animals, the latest production technologies milk including are being introduced.

According to the results of the studies, the exterior indicators of the udder, as well as the scoring, have witnessed the best results for the animals of the first study group, where milking unit MU 480 was used. The highest exterior indicators had the following measurements: by the height of attachment of the posterior udder lobe for cows from the study group 2 – 2 lactations – 31.23 cm; the width of the milk mirror – 24.11 cm (2nd group, 3rd lactation); the length of the anterior lobe of the udder – 22.43 cm (1st group, 3rd lactation); the distance between the front and rear nipples – 17.00 cm (2nd group 3rd lactation); the length of the front and rear nipples – 7.31 cm (1st group, 2nd lactation); udder girth – 142.33 cm (2nd group, 3rd lactation). When having analyzed the functional properties of the udder in the first group (Duovak 300), with aging, indicators for the intensity of feedback milk flow have decreased by 6.4%, and the duration of milking has lessened from 14.41 to 13.09 minutes, and a daily milk yield has reduced by 1.5 liters. One hundred days' cow milk yield is higher in the second study group – from 26.1 kg to 236.4 kg. With aging, the correlation between measurements and daily milk yield decreases in both groups, turning into a weak negative one. However, speaking of the differences between the groups, the indices of the second study group are considerably higher than for the first study group (+ 0.78–0.39). As for the mass fraction of fat in the second group, an increase of 0.05 % occurs with age, and a negative correlation between the mass fraction of fat and protein is observed with age.

Key words: cattle; black-and-white breed; machine milking; morphological and functional properties of the udder; udder shape; udder measurements; milking technology.

Autors:

Yudin Vitaliy Maratovich – Candidate of Agricultural Sciences, Associate Professor, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: vitaliyiudin@yandex.ru).

Lyubimov Alexander Ivanovich – Doctor of Agricultural Sciences, Rector, Professor at the Department of Feeding and Breeding of Agricultural Animals, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: rector@izhgsha.ru).

Savelieva Ainara Yurievna – Administrator, AO «Tander» (11, Metallurgists St., Izhevsk, Russian Federation, e-mail: ainara.sawa.wasi@gmail.com).

V. A. Bychkova, O. S. Utkina

Izhevsk State Agricultural Academy

USE OF STABILIZERS IN PRODUCTION OF FERMENTED MILK DRINKS

Yogurt is of great popularity among fermented milk products. The product is characterized by a thick consistency, high content of dry skim milk residue and of protein. For a faster and more reliable solution of issues related to the formation of desirable organoleptic properties of yogurt, milk-processing enterprises use a variety of stabilizers, which are now on the market in large quantities. The aim of our research was to study the quality of yogurt and its storage stability depending on the stabilizer used. We have tested stabilizers of the Geleon series, which are produced by SOYUZNAB group (Moscow region) and GRINDSTED SB 550A manufactured by Danisco (Moscow). According to our research, for the production of yogurt it is most appropriate to use the stabilizer Geleon 106 C or Geleon 112 C. These stabilizers will contribute to the production of yogurt with a thick consistency and

high moisture-holding capacity, that will stay preserved in the run of storage. The presence of milk proteins in these stabilizers will reduce the introduction of milk powder to normalize yogurt by mass fraction of SOMO and of protein.

Key words: consistency stabilizers of fermented milk drinks; food additives in the production of yogurt; organoleptic parameters of yogurt; viscosity of fermented milk drinks; degree of seneresis; storage capacity.

Authors:

Bychkova Veronika Anatolievna – Candidate of Agricultural Sciences, Associate Professor of the Department of Technology of Livestock Product Processing, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation 426069, e-mail: barsik72@gmail.com).

Utkina Ol'ga Sergejevna – Candidate of Agricultural Sciences, Associate Professor of the Department of Technology of Livestock Product Processing, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: utkinaolga1982@yandex.ru).

S. D. Batanov , O. S. Starostina

Izhevsk State Agricultural Academ

INTERBREED BREEDING AS A POSSIBILITY OF INCREASING OF THE CATTLE PRODUCTIVITY

To identify the directed influence of pedigree origin on the rhythm of growth and development of young cattle and to determine the “fluctuations” in the number of blood elements, researches have been conducted on a number of pure-bred black-motley and crossbred bull-calves and heifers obtained from crossing black motley cows with bulls of Hereford breed. The experimental livestock population was divided into three groups enrolling 10 heads: group #1 – purebred black-motley bulls and heifers, group #2 (the 1st experimental) – mixed first – young generation (Hereford X black-motley breed), group 3 (the 2nd experimental) – mixed second-young generation. On the research completion, a significant dependence of the growth and development the indicators on the young cattle’s origin have been revealed. Thus, live weight of the bull-calves and heifers of the experimental groups (the first and the second generation) by 18 months of their age had exceeded in average by 7.4–14.8 % and 6.4–13.3 %, respectively, compared to those of the young control groups. A similar regularity had been revealed for the average daily weight growths, and those were meaningfully higher for the crossbred youngs by 14 % on average than for those of purebred herd mates. Blood analysis had also justifiably revealed changes in the state of the organism of purebred and crossbred animals. Thus, indicators of protein metabolism in crossbred bull-calves’ and heifers’ blood corresponded to the most intensive growth and advance: the concentration of total protein, the amount of albumin and globulins in the total blood volume was higher on average by 2.2–9.0 %. The morphological composition of blood of the experimental animals corresponds to the age dynamics and the level of growth intensity for young animals. So, with an increase in the growth rate and age of animals, the amount of hemoglobin and red blood cells in the blood decreases, and it is physiologically justified. The content of morphological elements in the blood of bull-calves and heifers of the experimental groups (the first and the second generation) has exceeded on average by 3.0–9.0 % their mates’ blood counts from the control groups. The positive dynamics of blood enzymes synthesis (AST, ALT) had been detected in connection with the growth and development of the analyzed livestock.

Key words: biological features; age; crossbreed young; breed; hematological parameters; transaminase activity.

Authors:

Batanov Stepan Dmitrievich – Doctor of Agricultural Sciences, Professor at the Department of Technology of Livestock Product Processing, Vice-Rector, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, tel.: 77-17-99 (1025), e-mail: stepan-batanov@mail.ru).

Starostina Ol'ga Stepanovna – Candidate of Agricultural Sciences, Associate Professor at the Department of Technology of Livestock Product Processing, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, tel.: 77-17-99 (1025), e-mail: starostinao.starostinat@yandex.ru).

**A. I. Lyubimov, Ye. N. Martynova, O. G. Pushkariov,
Yu. V. Isupova, O. S. Utkina, Ye. V. Achkasova**
Izhevsk State Agricultural Academy

SOME ASPECTS AFFECTING MILK PRODUCTION OF THE BLACK-MOTLEY COWS

Studies were conducted to investigate milk productivity of black-motley cows, with the regard of the calving season and the linear affiliation of animals. It had been found out that a comparative analysis of the productivity of various lines bulls-producers' daughters disposes certain characteristics being close to the seasonality of calving. The highest results of qualitative indicators for milk productivity were obtained, in the context of the linear affiliation of the daughters of bulls, at different seasons of their calving, which, in turn, had affected the highest indicators of the amount of milk fat and protein.

Key words: cattle; bulls; origin; calving season; line; milk productivity; milk yield; mass fraction of fat; mass fraction of protein.

Authors:

Lyubimov Alexander Ivanovich – Doctor of Agricultural Sciences, Rector, Professor at the Department of Feeding and Breeding of Agricultural Animals, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: korm@izhgsha.ru).

Martynova Yekaterina Nikolayevna – Doctor of Agricultural Sciences, Professor at the department of Feeding and Breeding of Agricultural Animals, Izhevsk State Agricultural Academy, (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: korm@izhgsha.ru).

Pushkariov Oleg Georgievich – Candidate of Agricultural Sciences, Associate Professor, Dean of the Faculty of Continuing Professional Education, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: fdpo@izhgsha.ru).

Isupova Yulia Viktorovna – Candidate of Agricultural Sciences, Associate Professor at the Department of Feeding and Breeding of Agricultural Animals, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: korm@izhgsha.ru).

Utkina Ol'ga Sergeevna – Candidate of Agricultural Sciences, Associate Professor at the Department of Technology of Processing of Livestock Products, Izhevsk State Agricultural

Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: tppzh@izhgsha.ru).

Achkasova Yelena Valerievna – Candidate of Agricultural Sciences, Associate Professor at the Department of Feeding and Breeding of Agricultural Animals, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: korm@izhgsha.ru).

Ye. S. Klimova, M. R. Kudrin, Ye. V. Maksimova, A. D. Reshetnikova
Izhevsk State Agricultural Academy

CONTAMINATION OF ENVIRONMENTAL OBJECTS BY EIMERIA OOCYSTS

Protozooses of the cattle are widespread in all livestock enterprises that leads to contamination of environmental objects by *Eimeria* oocysts. Analyzing the results of the studies received, we have determined that regardless of the season of the year, maximum degree of infection is observed in the group of calves from 4 to 6 months of age, and the most seeded are floors, walls and feeders. For full devastation, it is necessary to carry out systematic treatment and prophylactic treatments of animals, thorough mechanical cleaning and timely removal of manure, high-quality disinfection of premises with the use of highly effective means.

Currently, an urgent issue is the study of contamination of environmental objects by eggs and oocysts of animal parasites. At the same time, the current state of methodological support for laboratory control of parasitic pollution of environmental objects lags far behind analogous international standards. Since the source of infestation are infected animals and parasites carriers (adult animals), livestock enterprises have long been on the list of permanently disadvantaged farms. In the conditions of the Udmurt Republic there is often marked a direct transmission of oocysts *Eimeria*, i.e. while in contact with infected animals via contamination of feed, waterbowls, feeders, bedding, stall walls and maternity boxes, pastures. The indirect pathway is referred to the personnel maintenance when transferring the pathogen on shoes, clothes, care items, transport; mechanical vectors are present in the developing cycle of sporozoa: rodents, insects, synanthropic birds and even cats.

Key words: eimeriosis; oocyst; protozooses; contamination of environmental objects; extent and intensity of invasion; cattle; scrapings; flushes.

Authors:

Klimova Yekaterina Sergeevna – Candidate of veterinary Sciences, Associate Professor, Department of Infectious Diseases and Pathological Anatomy, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: catia.calinina2012@yandex.ru).

Kudrin Mikhail Romanovich – Candidate of Agricultural Sciences, Associate Professor, Department of Private Livestock, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: kudrin_mr@mail.ru).

Maksimova Elena Veniaminovna – Candidate of Veterinary Science, Associate Professor, Department of Infectious Diseases and Pathological Anatomy, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: lenamakssimova@mail.ru).

Reshetnikova Aleksandra Dmitrievna – Associate Professor, Department of Infectious Diseases and Pathological Anatomy, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: alexa.reshetnikova17@gmail.com).

IMPACT OF CROP PROCESSING ON THE GRAIN YIELD OF PEAS AKSAYSKIY USATIY 55

In modern farming, the non-root application of micro-digests is becoming increasingly important. Such upfeeding, according to studies, maintains an optimal balance of nutrients in the critical phases of plant development. Timely extracorporeal feeding provides plants with the necessary fertilizers, promotes the regulation of physiological and biochemical processes in them and protects against the impact of adverse environmental factors. The greatest effectiveness of non-root feeding can be achieved if they are applied to with taking into account the results of soil analysis and foliar diagnostics.

The results of studies are presented, the purpose of which is to determine the influence of treatment of the sowings of the seed peas Aksayskiy usatyi 55 crops with micro fertilizers. The efficiency of using such micro-solutions as boric acid, molybdenum-acid ammonium, zinc, copper and cobalt sulphates has been studied.

On average, in 2 years the highest yield of pea grain – 2,80 t/ha was obtained during treatment of crops with boric acid. In other options the productivity had increased by 0,24–0,45 t/ha, in comparison with productivity in control option (2,35 t/ha). The correlation analysis of yield with elements of its structure showed a close direct correlation of it with the number of beans and seeds on the plant, the weight of seeds from the plant and 1000 seeds ($r = 0,71–0,87$), the average - with the length of beans ($r = 0,36$).

With the increase in the yield of pea seeds of the Aksayskiy usatyi 55 there rises the amount of energy in the yield. Thus, on average in two years the largest amount of energy was obtained in the crops treated with boric acid (49532, 56 MJ/kg). Therefore, the energy cost for obtaining 1 kg of production was 6, 12 MJ. Respectively, the energy coefficient – 2,89 increases proportionally. Thus, treatment of crops with boric acid proves energetically effective.

Key words: Sowing peas; treatment of crops; micro-crops; yield.

Author:

Mil'chakova Anna Vladimirovna – Candidate of Agricultural Sciences, Associate Professor, Department of Plant Cultivation, Izhevsk State Agricultural Academy (16, Kirov St., Izhevsk, Russian Federation, 426033, e-mail: milannavl@mail.ru).

Mazunina Nadezhda Illoryevna – Candidate of Agricultural Sciences, Associate Professor, Department of Plant Cultivation, Izhevsk State Agricultural Academy (16, Kirov St., Izhevsk, Russian Federation, 426033, e-mail: nadya.mazunina.67@mail.ru).

Dmitriyev Alexey Valentinovich – Candidate of Agricultural Sciences, Associate Professor, Department of Agricultural Chemistry and Soil Science, Izhevsk State Agricultural Academy (16, Kirov St., Izhevsk, Russian Federation, 426033, e-mail: agro@izhgsha.ru).

Tikhonova Olga Semisovna – Candidate of Agricultural Sciences, Associate Professor, Department of Chemistry, Izhevsk State Agricultural Academy (16, Kirov St., Izhevsk, Russian Federation, 426033, e-mail: o.s.tih@mail.ru).

V. I. Makarov

Izhevsk State Agricultural Academy

THE EFFECT OF UREA DOSES ON BARLEY YIELD AND ON CHEMICAL COMPOSITION OF GRAIN AND STRAW

Studies to assess the effect of nitrogen (urea) fertilizers on the productivity of spring barley Raushan, chemical composition of the crop (grain and straw) were carried out in 2014–2016. The soil was sod-podzolic medium loamy with a low level of fertility (cultivation index 0.52–0.63). The hydrothermal coefficient in the years of research for the period May – July varied between 0.84–1.31. The highest yield of barley (2.75–2.77 t/ha) was formed when using urea in doses N90-120. Grain increase was 0.91–0.94 t/ha or 49.8–51.1 %. Thus, an increase in doses of nitrogen fertilizers from N30 to N120 was accompanied by a decrease in their feedback yield from 13.9 to 7.8 kg/kgN, respectively. A close positive correlation of linear type was observed between doses of nitrogen fertilizers and the content of this element in barley grain (r and $\mu = 0.92$). Each kilogramme of introduced nitrogen in the composition of mineral fertilizers had. The increase in protein collection at a dose of urea N30 reaches 2.40 kg/kgN. With an increase in quantity of applied fertilizers to N120, the value of the indicator gradually decreases to 1.58 kg/kgN. Increasing doses of urea rise the nitrogen content in barley straw by 0.0014 % per 1 kg of active substance. However, nitrogen fertilizers do not significantly affect the content of phosphorus and potassium in the main and by-product yield of the barley. Under current agroecological conditions of vegetation periods, the potassium content has significantly changed both in barley grain ($V = 17.8$ %) and in straw ($V = 33.7$ %). Varying in concentrations of nitrogen and phosphorus in barley crop over the years differed to a lesser degree.

Key words: nitrogen fertilizers; spring barley; sod-podzolic soils; fertilizer feedback; grain composition; straw composition; protein collection.

Author:

Makarov Vyacheslav Ivanovich – Candidate of Agricultural Sciences, Associate Professor, Professor of the Department of Agrochemistry and Soil Science, Izhevsk State Agricultural Academy (16, Kirov St., Izhevsk, Russian Federation, 426033, e-mail: makaroffVI@yandex.ru).

V. A., Rudenok, T. A. Strot

Izhevsk State Agricultural Academy

CHEMICAL METHOD OF STRUGGLE WITH HOGWEED

Borshchevik Sosnovsky has recently become one of the most widespread artificially bred plants. Problems arising from the contact of unprotected human skin with its surface, transferred this plant to the category of undesirable one. Increasingly, there is a need to get rid of its presence, but the usual methods of struggle, effective in the case of other plants, are much fewer in this case.

Traditional methods such as mowing, plowing, and appealing to herbicides- do not feedback much. Against this background, new methods are becoming relevant, preferably chemical, but not polluting and accumulating in the soil and in surrounding plants. Obviously, it is necessary to use some extraordinary measures.

In the literature, there is information about the methods of struggle with various plants. The most acceptable of them have been tested in the course of research in this paper. Preference was given to the more common, low-priced and easily accessible options. To ensure the most reliable results, the research process was divided into several stages. At the first, the selected reagents were tested on a more accessible plant in the city – dandelion. The tests were carried out initially in laboratory conditions, and then the tests were transferred to plants growing in natural conditions. Assessment of the results obtained from differing versions of the tests had shown the correctness of the chosen technique and of a set of chemical reagents.

The results obtained were applied to for the tests on the cow parsnip. The peculiarity of working with this plant is that the Hogweed has an unusual arrangement of the stem. The hollow inside the stem is filled in to a certain height, starting from the root, with physiological fluid. This design of the stem allowed to introduce solutions of selected reagents into the stem, or to introduce reagents in the form of dry compositions. The stem interior also allowed testing the technology of synthesis of chemical reagents from the components of the physiological solution electrochemically, i.e. on the surface of metal electrodes. The tests had revealed the most effective reagent, which was finally tested. Influence of *potassium nitrate* had been experienced, too. The reagent time disposal was established required to obtain the desired effect, the concentration limits effective under these conditions were established, too, and the results of the exposure were shown in the form of photographs of the cross-section of the plant.

Key words: Borschevik Sosnovsky; chemical reagents; new methods; dry composites; *potassium nitrate*.

Authors:

Rudenok Vladimir Afanasievich – Candidate of Chemical Sciences, Associate Professor, Izhevsk State Agricultural Academy (16, Kirova St., Izhevsk, Russian Federation, 426033, e-mail: Rudenva@rambler.ru).

Strot Tatyana Aleksandrovna – Candidate of Agricultural Sciences, Head of the Department of Agriculture and Land Management, Izhevsk State Agricultural Academy (16, Kirova St., Izhevsk, Russian Federation, 426033, e-mail: tatyanaastrot@yandex.ru).

TECHNICAL SCIENCES

A. G. Ipatov, Ye. V. Kharanzhevskiy
Izhevsk State Agricultural Academy

COMPARATIVE ANALYSIS OF PERFORMANCE OF CERAMIC ANTIFRICTIONAL COATINGS

The main reason for the failure of machine parts is the wear of the contacting surfaces in tribological conjugations. The main way to reduce the wear rate of the frictional surface is to increase the wear resistance by providing higher hardness and chemical inertness of the contacting bodies. The nomenclature of modern structural and anti-friction materials is huge and often their use is possible only in a narrow range of dynamic and thermal loads. The purpose of research. In this paper, we propose to analyze the performance parameters of recovery, antifriction coatings based

on ceramic materials synthesized by short-pulse laser processing. To obtain the coating, we used the proven technology for the production of functional coatings of short-pulse laser processing of fine powder materials based on boron carbides and nitrides. To increase tribological characteristics, the powder composition is additionally doped with graphite and molybdenum disulfide. To determine the performance parameters, we performed metallographic studies of the resulting coatings and comparative tribological tests in the conditions of boundary friction. In comparative tests, we analyzed the performance of coatings with standard antifriction alloys. The resulting recovery, antifriction coatings have a uniform thickness within 15 ... 18 microns, with no visible pores and lack of penetration. The adhesive coating area without traces of peeling, unwanted impurities and visible cracks, which indicates a high adhesion to the base. Wear tests carried out under various kinematic conditions showed that the analyzed coating is highly compatible with bronzes, hard alloys, and with a steel surface. The most optimal combination is formed with ferruginous bronze and hard alloys VK 20, while in low-speed tests, the use of bronze is most attractive, and at speeds above 5 m/s hard alloy VK 20.

The performed studies have high practical potential and can be used in the conditions of repair production and mechanical engineering.

Key words: restoration; wear resistance; wear; ceramic coating; coefficient of friction; tribological conjugation; wear tests.

Autors:

Ipatov Alexey Gennadievich – Candidate of Technical Sciences, Associate Professor at the Department of Operation and Repair of Machines, Izhevsk State Agricultural Academy (9, Studencheskya St., Izhevsk, Russian Federation, 426069, tel.: 8 (3412) 59-24-23, e-mail: Ipatow.al@yandex.ru).

Kharanzhevskiy Yevgeny Viktorovich – Doctor of Technical Sciences, Professor, Head of the Laboratory of Physics and Chemistry, Udmurt State University (1, Universitetskaya St., Izhevsk, Russian Federation, 426034, tel.: 8 (3412) 91-62-41, e-mail: eh@udsu.ru).

T. A. Shirobokova, L. A. Shuvalova
Izhevsk State Agricultural Academy

ENERGY ANALYSIS OF THE LIVESTOCK PRODUCTION

Increasing the volume and improving the quality of livestock products cattle breeding, including, largely depend on the conditions of animal welfare. When turning the cattle breeding to an industrial basis, along with improving the breed qualities of animals, ensuring a good feed base, it is necessary to create optimal microclimate parameters inside the premises (temperature, humidity, air circulation intensity, illumination, etc.), and that meet zoo-hygienic and veterinary-sanitation requirements.

Introducing industrial technologies in animal husbandry increases the consumption of heat and electricity, which leads to higher requirements for the quality of energy supply. Economic indicators may not always fully reflect the actual production efficiency of a particular animal product. Currently used methods for estimating the production of livestock products for some economic indicators (given costs, profitability, etc.) in some cases are not correct enough because these parameters have significant fluctuations. They are determined by the pricing policy and this does not allow setting

up the level of necessary energy costs for the production of products.

Currently, the world is experiencing an increasing shortage of energy. This situation requires an approach to the evaluation of mechanized technologies and technological processes that should take into account the energy costs for production of each item of animal products. Therefore, a new direction is being formed – energy assessment and fuel and energy analysis of production manufacture.

Thus, the article presents an energy analysis of illumination systems of «Nazyar» LLC in the Agryz district of the Republic of Tatarstan. The energy efficiency of a new illumination system technology has been calculated. The energy consumption for the production needs in the livestock sector, as well as the volume and cost of output have been determined. The energy intensity of products, specific consumption of fuel and lubricants and electricity have been calculated. The energy efficiency coefficient has been determined for different lighting systems in tethered barns in the LLC «Nazyar» of the Agryz district of the Republic of Tatarstan.

The energy efficiency of the illumination system when using a led lamp is high, in comparison with that of used in the household. Thus, with the same consumption of petroleum products for production in animal husbandry, using the existing lighting system, the consumption of electricity for production in animal husbandry was 6701.4 kWh, which is 2 times higher than using the proposed lighting system (3504 kWh). The volume of output will increase by 1 % - to 387,340 tons, and the cost will decrease by 4 % or 370,398. 4 rubles. The energy intensity of the livestock production is reduced when using the proposed lighting system. With the energy efficiency coefficient of 0.722, the energy intensity of products using the proposed lighting system turns to 0.97 t. u. t/thousand rubles, which is 0.7% lower, in comparison with the existing illumination system. Also, the specific consumption of fuel and lubricants is reduced to 15.81 MJ/t, which is 0.9%, and electricity consumption is reduced by 50 %.

Key words: energy analysis; illumination system; energy intensity of production; energy efficiency coefficient; efficiency of production energy consumption; energy intensity of manufactured products.

Authors:

Shirobokova Tatyana Aleksandrovna – Candidate of Technical Sciences, Associate Professor, Izhevsk State Agricultural Academy (11 Studentskaya str., Izhevsk, Russian Federation, 426069, e-mail: 9048336842@mail.ru).

Shuvalova Lyudmila Anatolievna – Candidate of Agricultural Sciences, Associate Professor, Izhevsk State Agricultural Academy (11, Studencheskaya str. , Izhevsk, 426069, Russian Federation, e-mail: Shuvalova_la@mail.ru).