

процестердің жоғары жылдамдығы туралы қорытынды жасауға мүмкіндік береді, оның негізгі себебі гидробионттардың бөтен түрлерімен (паразиттер, ұлулар, балықтар) экологиялық байланысы болып табылады.

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RESEARCH OF THE CHEMICAL COMPOSITION OF QUAIL MEAT WHEN ADDING A MINERAL FEED ADDITIVE TO THEIR DIET

ANNOTATION

The article shows studies of the analysis of the chemical composition of quail meat when a mineral feed additive is added to the diet. The relevance of the work is associated with two important conditions. Firstly, it is closely related to the development of a new mineral feed additive based on the opoka rock obtained from the Taskalinsky deposit of the West Kazakhstan region. Secondly, the cultivation of healthy and productive poultry in order to ensure the food security of our country is one of the main objectives of our experiment. Conducted meat studies to assess the indicators of the chemical composition in order to use the feed additive on experimental poultry (quails) made it possible to obtain the following results: their total amount is 100. Moisture in all samples was no more than 72.0, dry matter - no more than 21.0, protein - no more than 4.0, fat - no more than 3.9, ash - no more than 0.7. Thus, a comprehensive analysis of the results obtained on the basis of scientific and experimental studies of the chemical composition of meat to assess the indicators revealed the harmlessness of mineral feed additives when used in the diet of quails, as well as an improvement in the general condition of birds.

Key words: *moisture, dry matter, protein, fat, ash, opoka, quail, mineral feed*

Introduction. An optimized and balanced diet is the basis for animal production and has a real impact on the profitability of this sector. A typical dietary strategy relies on nutrients—such as plant or animal materials—that are rich in micro- and macroelements. The compound feed features additives to supplement individual components—including microelements—essential to animals. Although administered in small quantities, they are crucial to the proper growth and functioning of organisms. Due to their properties, microelements are classified as a group of nutrients responsible for regulating life processes. They are substrates in the synthesis of many cell structures, actively participate in metabolic pathways and act as signal molecules responsible for initiating catalytic cascades in immunological reactions. They regulate osmotic pressure and the pH balance in physiological fluids [1].

Copper, manganese and zinc are essential in poultry nutrition. Feeds low in these nutrients can contribute to homeostasis disorders [2].

Weak immunity, muscle deformation or even growth inhibition [3,4].

Inorganic salts, mostly due to their low price, appear to be the most popular form of micronutrients in animal nutrition. Unfortunately, this formulation is not fully bioavailable. Large amounts of unconsumed microelements are excreted. An additional disadvantage of this type of supplementation is the problem of storage and transport of such feed mixes, mainly associated with the separation of fractions, which reduces the homogeneity of the material. Also, such forms may form free radicals, as in the case of sulphates, which affect animal health [5].

Alternative forms of micronutrient supplementation are organic forms, including chelates, in which the microelement ion is locked into a complex ligand structure [6]. Popular are amino acids, carbohydrates or lipids chelates, which additionally provide other nutritional components [7]. This is a more expensive option than the mentioned inorganic forms, but it is characterized by high bioavailability.

The relevance of growing healthy and highly productive poultry is closely related to product safety and plays a huge role [8-9]. One of the important components of biological additives is a sorbent, which has the ability to remove toxins from feed, since feed usually contains radionuclides, heavy metals and mycotoxins. According to the latest statistics, more than 30% of deaths and culls of animals and poultry occur due to atony, diarrhea, hepatitis and metabolic disorders. The main reason is poor-quality feed, damage by various toxicants, including mycotoxins that have recently become widespread.

The flask rock is a mineral sorbent based on highly dispersed silica that binds mycotoxins such as aflatoxin B1, toxin T-2, zearalenone, heavy metal salts, chemical toxins, radionuclides and other metabolic products in feed due to the large absorbing surface. For 1 g of the flask, an absorbing surface of at least 150 m is created due to the micropores present in the mineral, which are easy to get for sorption of molecules with the smallest size from 2 to 90 nanometers. Silicon, as we know, affects the growth and strengthening of tissues, the development of the skeleton, plays an important role in the mineralization of bones with a lack of calcium, chlorine, phosphorus, fluorine, sodium, and sulfur. Each feed additive that contains flask increases the sorption activity of the regulated sorbent bentonite by almost 2 times both with isolated and mixed intake of the main mycotoxins into the body, such as T2 toxin and zearalenone [10].

It is known that poultry meat has a number of advantages over other meat products due to the relatively weak development of connective tissue. Thus, it contains a large amount of full-fledged and easily digestible proteins. The essential amino acids of meat in the human body contribute to active growth and development, better metabolism, necessary for the normal functioning of all important body systems. The nutritional value of meat depends not only on the quantitative content of proteins in it, but also on their quality and usefulness. Muscle tissue proteins are complete because they contain almost all the essential amino acids. It should be emphasized that amino acids that are not combined in large quantities in the bird's body must be supplied with combined feeds. [11].

As you know, for a good life of the quail organism, a constant supply of a complex of nutrients and biologically active substances is necessary. Grain of cereals is a traditional source of energy in the diet of quails. Therefore, barley and oats were chosen as one of the feeds. The optimal energy level allows you to achieve high productivity with lower feed and protein costs. To reduce the cost of poultry production, it is more profitable to use not only cheap local cereals (wheat, rye, barley and oats), but also flour milling waste (wheat and barley bran) [12].

In recent years, feed additives of natural origin, including those made from plant raw materials, have been increasingly used to increase the productivity of farm birds [13-16]. Huge economic damage to poultry and livestock in general is caused by diseases caused by poor-quality feed and improper organization of sanitary and hygienic measures. Then there are issues of proper feeding of animals and birds, keeping them in environmentally friendly conditions [17].

At the moment, dwellings built from natural raw materials are gaining significant relevance. Since they have high thermal protection. In an effort to profitability of production in an economy, poultry farmers, as well as livestock breeders, are forced to use more modern technologies that can ensure a high level of health and productivity of animals and birds [18-21]. One of the most progressive methods is the use of mineral and biologically active substances in the diet of animals and birds. Mineral and vitamin mixtures play an important role in this. And the analysis of data from foreign and Kazakh studies shows that the use of feed additives in nutrition has always been effective

[22]. Premixes and mineral-vitamin mixtures are expensive for farmers. Recently, there has been interest in the use of an alternative local mineral. Stocks in the total feed balance increased [23-24].

Material and methodology. Research work was carried out in the period from 2020 to 2022. in the clinic of the Higher School "Veterinary and Biological Safety" and the laboratory of the Scientific Research Institute of the NAO "WKATU named after Zhangir Khan". The mineral feed additive was developed and patented by the supervisor, N.S. Montaeva. From a composite mineral feed additive, an additive based on the flask rock was selected as an experiment. It is extremely necessary for the formation of bone and connective tissues, the normal metabolism of fats, proteins, carbohydrates, macro - and microelements, vitamins.

Scientific experience with the use of mineral feed additives in the diet of quails was made on the basis of the Institute of Veterinary Medicine and Animal Husbandry of Zhangir Khan WKATU. From the total output of quails, four analogous groups were formed (taking into account the live weight and physiological state): Each of them had 6 laboratory quails: the first and second groups - control, the third and fourth groups - experimental, which received an additive at a dose of 40 mg/kg feed. They fed 3 times a day. The conditions of keeping, stocking density, observance of the optimal zoohygienic parameters of the microclimate, the front for feeding and watering birds of all groups were the same. Access to water and food was free. The birds were labeled with iodine and fucorcin. For the pre-start and start-up age period, the birds were purchased from the Megamix company (Uralsk) the required amount of loose balanced feed. The product is certified. GOST R 51851 - 2001.

Used scale brand Electronic Kitchen scale SF-400. The livestock safety index is calculated by the generally accepted method and is expressed as a percentage.

At the end of the experiment, a control slaughter of birds was carried out, 6 heads from each group. Slaughter, anatomical cutting of carcasses and assessment of the meat qualities of quails of the experimental and control groups were carried out in the laboratory of the Research Institute of the West Kazakhstan Agrarian Technical University named after Zhangir Khan in accordance with the methodology for anatomical cutting of carcasses, organoleptic evaluation of the quality of meat and eggs of poultry. Organoleptic characteristics: appearance, color, texture, smell and condition of the muscles on the cut, the state of fat, transparency and flavor of the broth were taken into account according to ST RK 1731-2007 "Meat and meat products. Organoleptic method for determining quality indicators. The work used physical and chemical research methods described in GOST 31470-2012 "Poultry meat, offal and semi-finished products from poultry meat. Methods of organoleptic and physico-chemical studies".

Today, in poultry farming, an urgent scientific and practical task is the rationing of microelements in poultry feeding, which perform specific physio

logical functions in metabolism, affect growth, development and reproductive functions, functions of hematopoietic organs and endocrine glands, ensure the permeability of cell membranes, take part in protective reactions of the body, affect the microflora of the digestive tract.

Currently, there is a special interest in the prevention and treatment of many metabolic disorders with the help of microelement preparations, in which vital microelements are contained in the form of a complex with bioligands, natural carriers of microelements.

Industrial poultry farming involves the use of highly productive poultry in order to maximize the production of eggs and meat with minimal feed costs. However, the growth of body weight and the synthesis of eggs are not only priority for the functions of the body, but they are almost always ahead of the growth of bones, the development of the skin, internal organs in birds. To ensure health, increase the rate of growth and development of internal organs and to balance them with the rate of muscle growth, the body of the bird must be provided with a sufficient level of essential minerals.

Results and its discussion. The experiment lasted 114 days. In the experimental groups, the death of birds was not observed. In the experimental birds of the control groups, which received the usual food, after 2 weeks, general depression was noted: they were lethargic, moved little, and began to peck at each other. Pathological anatomical autopsy of specially killed birds showed no visible changes. In the birds of the experimental groups, a strong excitation of the central nervous system was observed in the first 4-5 days. At this time, they were very restless. However, after a few days their general condition returned to normal.

At the initial stage of research, the effect of a mineral supplement on the general condition of birds was studied. Then organoleptic studies of meat and eggs were carried out. To conduct

organoleptic and chemical studies of meat according to generally accepted methods, material (pieces of muscle tissue) was taken from the carcasses of birds (Fig. 1).



Figure 1 – sampling of poultry meat of control and experimental samples

The chemical composition of meat may change due to the inclusion of various feed additives in the main diet. Based on these data, we determined the percentage of moisture, protein, fat, ash and dry matter in the pectoral and femoral muscles of quails in the control and experimental groups using a feed additive in their diet. Fat was determined using a filtering dividing funnel. This method is based on the extraction of fat by a mixture of chloroform and ethyl alcohol using a filtering dividing funnel followed by separation of the extract, removal of solvent and drying of the isolated fat. The mass fraction of the protein was studied by the Kjeldahl method. The mineralization of the organic matter of the sample, followed by the determination of nitrogen by the amount of ammonia formed, is the basis of this method. Dry matter was determined according to GOST 33319-2015, and ash according to GOST 34567-2019. Figure 2 shows the method of protein determination using special equipment.

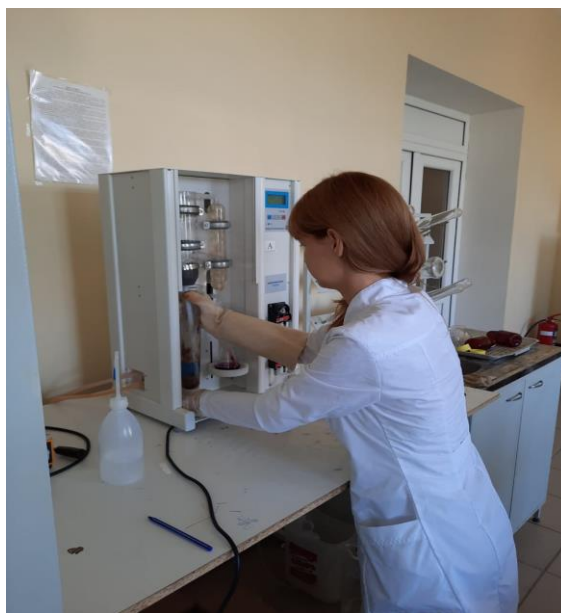


Figure 2 –Method of protein determination

According to the results of studying the chemical composition of meat of control sample No. 1, the moisture index is 70.4, dry matter is 21.0, protein is 4.0, fat is 3.9, and ash is 0.7. The results of the study are shown below in Table 1.

Table 1 – Quail meat (control sample)

Name of the parameter, units of measurement	Regulatory documents for test methods	Permissible norms according to regulatory documents	Actually received
Moisture	GOST 33319-2015	From 35-85%	70,4
Drymatter	GOST 33319-2015	No more than 27%	21,0
Protein	GOST 25011-2017	No more than 14%	4,0
Fat	GOST 23042-2015	No more than 15%	3,9
Ash	GOST 34567-2019	No more than 1%	0,7

The moisture index of the second control group is greater than that of the first group. This difference can be clearly seen in Table 2.

Table 2 – Quail meat (control sample 2)

Name of the parameter, units of measurement	Regulatory documents for test methods	Permissible norms according to regulatory documents	Actuallyreceived
Moisture	GOST 33319-2015	From 35-85%	71,0
Drymatter	GOST 33319-2015	Nomorethan 27%	20,9
Protein	GOST 25011-2017	Nomorethan 14%	3,67
Fat	GOST 23042-2015	Nomorethan 15%	3,73
Ash	GOST 34567-2019	Nomorethan 1%	0,7

Based on observations of birds, it can be concluded that our proposed scheme for the use of additives in the diet of quails has a positive effect on the volume of weight, increases appetite and replenishes the body with the necessary vitamins, affects the central nervous system, since from the day of admission they become more mobile. Thus, in Tables 3, 4, you can clearly see the results of the indicators of the two experimental groups.

Table3 – Quailmeat (prototype)

Name of the parameter, units of measurement	Regulatory documents for test methods	Permissible norms according to regulatory documents	Actuallyreceived
Moisture	GOST 33319-2015	From 35-85%	72,0
Drymftter	GOST 33319-2015	Nomore than 27%	20,0
Protein	GOST 25011-2017	Nomorethan14%	3,7
Fat	GOST 23042-2015	Nomorethan15%	3,7
Ash	GOST 34567-2019	Nomorethan1%	0,6

When determining protein in poultry meat, 40 g of boric acid is dissolved in 200-300 ml of distilled water, quantitatively transferred into a volumetric flask with a capacity of 1000 ml and the volume is adjusted to the mark with distilled water. The solution is stored at a temperature of (20 ± 2) °C for no more than 1 month.

Table 4 – Quailmeat (prototype 2)

Name of the parameter, units of measurement	Regulatory documents for test methods	Permissible norms according to regulatory documents	Actuallyreceived
Moisture	GOST 33319-2015	Or 35-85%	71,0
Drymatter	GOST 33319-2015	Nomorethan27%	21,0
Protein	GOST 25011-2017	Nomorethan14%	4,0
Fat	GOST 23042-2015	Nomorethan15%	3,3
Ash	GOST 34567-2019	Nomorethan1%	0,7

Conclusion. The results of organoleptic, tasting evaluation and chemical composition of the meat of Texas quail breed 144-day-old indicate that it corresponds to the reference data of the chemical composition of food products of the Republic of Kazakhstan. The muscle tissue of quails has less connective tissue. In quail meat, it is tender, loose and evenly distributed in the carcass. Quail meat has special taste properties, promotes better assimilation of food and belongs to dietary products. The chemical composition and the value of its individual components determine the nutritional value of meat in human nutrition. Meat is mainly a protein food. It was found that the amount of protein in the meat of quails of the experimental groups was quite high. Proteins make up the main part of the organic substances of muscle tissue and are the main nutritional value. The protein content in the poultry meat of the control and experimental groups was quite high and corresponded to the standards of the chemical composition of food. Therefore, we recommend using the meat of Texas quail, which received a mineral feed additive with feed. The high amount of protein in the meat of quails of the experimental groups indicates a sufficient content of crude protein in the feed obtained. The inclusion of a mineral feed additive in the diet of quails at a dose of 30 g / kg of feed helps to increase meat productivity and improve the quality of poultry meat.

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ТҮЙІН

Мақалада бөдене етінің рационына азықтық қоспа қосылған кезде оның химиялық құрамын талдау нәтижелері берілген. Зерттеудің өзектілігі екі маңызды факторға байланысты. Біріншіден, бұл Батыс Қазақстан облысындағы Тасқала кен орнынан алынған опокалы тау жынысы негізінде жаңа минералды азық қоспасын жасаумен тығыз байланысты. Екіншіден, Қазақстан Республикасының азық-түлік қауіпсіздігін қамтамасыз ету мақсатында дені сау және өнімділігі жоғары құстарды өсіру біздің эксперименттің негізгі мақсаттарының бірі болып табылады. Тәжірибелік құстарға (бөденелерге) минералды жемшөп қоспасын қолдану мақсатында құрғақ заттың, ылғалдың, майдың, күлдің және ақуыздың көрсеткіштерін бағалау мақсатында жүргізілген ет зерттеулері келесі нәтижелерді алуға мүмкіндік берді: олардың жалпы мөлшері 100. барлық үлгілер 72,0, құрғақ зат – 21,0, белок – 4,0, май – 3,9, күл – 0,7 артық емес болды. Осылайша, көрсеткіштерді бағалау үшін еттің химиялық құрамын ғылыми-тәжірибелік зерттеулер негізінде алынған нәтижелерді жан-жақты талдау бөдене рационында пайдаланылған кезде минералды жемшөп қоспасының қауіпсіздігін, құстардың жалпы жағдайының сонымен қатар бөдененің тағамдық құрамының жақсарғаны анықталды.

РЕЗЮМЕ

В статье представлены результаты анализа химического состава мяса перепелов при добавлении в их рацион кормовой добавки. Актуальность исследования связана с двумя важными факторами. Во-первых, тесно связана с разработкой новой минеральной кормовой добавки на основе породы опока, полученной из Таскалинского месторождения Западно-Казахстанской области. Во-вторых, выращивание здоровых и высокопродуктивных птиц в целях обеспечения продовольственной безопасности Республики Казахстан является одной из главных задач нашего эксперимента. Проведенные исследования мяса для оценки показателей сухого вещества, влаги, жира, золы и белка с целью применения минеральной кормовой добавки на подопытных птицах (перепелах) позволили получить следующие результаты: их

общая сумма равна 100. Влага во всех образцах составила не более 72,0, сухое вещество – не более 21,0, белок – не более 4,0, жир – не более 3,9, зола – не более – 0,7. Таким образом, комплексный анализ результатов, полученных на основе научных и экспериментальных исследований химического состава мяса для оценки показателей выявил безвредность минеральной кормовой добавки при использовании в рационе перепелов, а также улучшение общего состояния птиц.

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ОЦЕНКА АДАПТАЦИОННЫХ КАЧЕСТВ ЗАВЕЗЕННОГО ПОГОЛОВЬЯ КРУПНОГО РОГАТОГО СКОТА ПОРОД МЯСНОГО НАПРАВЛЕНИЯ В УСЛОВИЯХ ЗАПАДНО-КАЗАХСТАНСКОЙ ОБЛАСТИ

Аннотация

Рассмотрены особенности адаптационных качеств и влияния процесса акклиматизации импортированного крупного рогатого скота (КРС) герфордской и абердин-ангусской пород при адаптации в природно-климатических условиях Бокейординского района Западно-Казахстанской области. Данный процесс сопровождается морфологическими и биохимическими структурными преобразованиями в крови. В период адаптация привозного скота 2020 года завоза к новым условиям сопровождалась снижением количества гемоглобина на 14,2% ($68,67 \pm 10,21$ гр/л), эритроцитов 43,4% ($2,83 \pm 0,78 \cdot 10^{12}$ /л), увеличение лейкоцитов на 13,9% ($18,00 \pm 0,59 \cdot 10^9$ /л) и лимфоцитов 21,0% ($14,28 \pm 1,45 \cdot 10^9$ /л), уменьшение нейтрофилов на 53,3% ($0,28 \pm 0,01 \cdot 10^9$ /л) и моноцитов 20,6% ($1,23 \pm 0,10 \cdot 10^9$ /л), снижение гематокрита в крови на 28,2% ($16,52 \pm 4,48\%$) и уровня тромбоцитов на 40,8% ($59,20 \pm 14,79 \cdot 10^9$ /л), трехкратное увеличение неорганического фосфора $1,97 \pm 0,17$ ммоль/л по отношению к общему кальцию, по