

## ANNOTATION

**dissertation work of Kushmukhanov Zhenis on the topic «Veterinary and sanitary evaluation of poultry meat at application of licorice root extract» submitted for the degree of Doctor of Philosophy (PhD) on specialty 6D120200 – «Veterinary sanitation»**

**Relevance of the research topic.** Poultry farming is a knowledge-intensive and dynamic branch of modern agro-industrial complex, which came out of the economic crisis with the least losses compared to other livestock sectors of the country. It is no coincidence that innovations and high technologies developed by domestic and foreign scientists are widely used in this segment of agriculture. The production of poultry products within the framework of general livestock breeding has been mastered. The latest achievements of science can be widely implemented in this area.

According to the Bureau of National statistics Agency for Strategic planning and reforms of the Republic of Kazakhstan, since 2014, the country's poultry population has increased by 29%, from 35 million heads to 45,1 million birds. 17,2% of poultry as of August 1, 2024 are in private farms; 1% are in peasant or farms and individual entrepreneurs; 81,8% belong to agricultural enterprises. Thanks to the above data, it can be seen that the pace of development of poultry farming in the country has increased significantly. At present, due to the increasing demand for poultry products, producers are facing great challenges.

One of the main problems of poultry farming is to improve the quality of poultry meat and poultry meat products, ensuring the competitiveness of products. Veterinary and sanitary expertise occupies a special place in improving the quality of poultry meat and poultry meat products. Veterinary and sanitary measures and research, conducted in strict compliance with hygienic requirements, provide consumers with products of high nutritional and biological value, make it possible to insure the population from diseases transmitted through poultry products.

In this regard, increasing the productivity of birds by feeding them with quality feed, obtaining high-quality, highly nutritious products has undoubtedly become one of the urgent tasks of our time. It should also be noted that in addition to poultry products produced in the country, a lot of poultry products from abroad come to the trading places. It is necessary to take into account the type of nutrition in which imported poultry products are fed, the correct performance of veterinary and sanitary measures at slaughter, compliance with storage and transportation conditions, as well as the influence of the human factor.

Based on scientific data, A.D. Darbaev and Sh. Avezimbetov (1998, 2021) used licorice root extract for farm animals, including cows and calves. They wrote that productivity and reproductive properties of cows increased, biological value of milk increased, which had a positive effect on the growth and development of offspring.

Ya. Lykasova (2000) found that the use of licorice root reduces the amount of heavy metals and organochlorine pesticides in the body of animals and birds.

Supplementing the diet of domestic animals and poultry with plants containing biologically active components has shown good results as natural feed additives. These supplements improve animal and bird growth, digestibility of nutrients contained in feed and immune status (Valieva R.D. 1999, Nedilko O.V. 2015, Alaghavani M. 2019).

Licorice contains biologically active components such as flavonoids and glycyrrhizin. The root of this herb contains up to 1-9% of glycyrrhizin, which has antioxidant, antiviral, anti-infectious and anti-inflammatory pharmacological properties (Bazekin G.V. 2000, Ovchinnikova O.Yu. 2010).

Analyzing the results of many years of research, it can be seen that the ways of feeding farm birds with a mixture of local licorice root, determination of its effective amount, influence on the quality of meat are not fully studied, and it can be concluded. that this problem is an urgent problem of veterinary science and practice today.

### **This dissertation study aimed**

Improving quality and maintaining safety of poultry meat using licorice root extract and veterinary and sanitary evaluation.

### **Research objectives**

1. Study of the influence of licorice root extract on the growth and safety of quails;
2. Study of organoleptic and physico-chemical parameters of quail meat at application of licorice root extract;
3. Study of biochemical and hematological indices of quail blood at application of licorice root extract;
4. Study of amino acid, fatty acid, vitamin and mineral composition of quail meat at application of licorice root extract.
5. Assessment of nutritional and biological value of quail meat at application of licorice root extract.

### **Materials and research methods**

Research work was carried out in the period 2017-2024 laboratory "Veterinary and sanitary expertise" and educational and scientific-production center "Zhardem-Vet", conducted research experimental research work in poultry farms of districts of West Kazakhstan region, testing center LLP "Nutritest", laboratory of the Faculty of Veterinary Medicine, Orenburg SAU, Orenburg, Russian Federation.

As research objects of experimental work: licorice root extract, obtained at the enterprises of LLP "Lacricia Priuralia", quails of poultry farms "Amangaliev", "Kubaev".

Determination of nutritional value. Determination of moisture content in meat was carried out by drying the weight according to GOST 9793-2016 "Meat and meat products. Method of moisture determination", the amount of protein in meat - by the Kjeldahl method according to GOST 25011-81 "Meat and meat products. Methods of determination of protein", fat - according to GOST 23042 - 2015, "Meat and meat products. Methods of determination of fat" and ash according to GOST 31727- 2012 (ISO 936:1998), "Meat and meat products. Method for determining the mass fraction

of total ash”. Energy value of poultry meat was calculated according to GOST 34567-2019 “Meat and meat products.

Determination of mineral substances. The amount of macro- and microelements was determined in accordance with the standards: calcium - GOST R 55573-2013 “Meat and meat products. Calcium determination by atomic absorption and titrimetric methods” and phosphorus - GOST 32009-2013 (ISO 13730:1996) “Meat and meat products. Spectrophotometric method for the determination of the mass fraction of total phosphorus” (trilometric method), sodium, potassium and magnesium - GOST R 55484-2013 “Meat and meat products. Determination of sodium, potassium, magnesium and manganese by flame atomic absorption method”, iron - GOST 26928-86 “Food products. Method of determination of iron”.

Determination of vitamins content. Vitamins were determined according to the “Guide to methods of quality control and safety of biologically active food additives” R 4.1.1672-2003, Ch2, p.1.

Determination of fatty acid composition. The fatty acid composition of quail meat was determined according to “Methods of gas chromatographic determination of fatty acids and cholesterol in foodstuffs and blood serum”. MVI.MN 1364-2000.

Determination of amino acid composition. Meat samples were investigated for their amino acid content by “Method for the determination of amino acids in foods by high performance liquid chromatography”. MVI.MN 1363-2000.

### **The main provisions for defense**

1. Determination of the effect of licorice root extract on growth performance of quail.
2. Effect of licorice root extract on hematological and biochemical indices of quail blood.
3. Veterinary and sanitary evaluation of quail meat quality when using licorice root extract, determination of chemical, mineral and amino acid composition.
4. Evaluation of nutritional and biological value of quail meat using licorice root extract.

### **Description of the main results of the study**

According to the results of microbiological examination, the MAFANM index was significantly lower in the meat of quails fed licorice root extract compared to the control group. *Staphylococcus aureus* and *Salmonella spp.* was not identified.

The biochemical parameters of quail blood showed that the amount of total protein in the blood of quails in the experimental group was 10% higher and albumin was 12% higher. In contrast, bilirubin levels decreased by 20%, indicating an improvement in liver function. It was also found that the levels of glucose, cholesterol, creatinine, alanine aminotransferase, aspartate aminotransferase, urea and alkaline phosphatase were lower than in the control group.

According to the chemical composition of quail meat with licorice root extract, the moisture content was 1.9% lower than in quail meat of the control group, protein was 2.7% higher, fat was 3% higher, and the energy value of meat was 6 kcal higher.

As a result of studies conducted in the control group on the biological value of meat, it is shown that the biological value is lower than that of quail meat in the experimental group, that is, the content of amino acid score is higher by 1.5%.

There is a variation in total amino acids in the amount of healthy fish, the total content in the control group was 18058 mg%, while in the experimental group it was higher by 2.6%.

Quail meat in the control group contained vitamin A  $6.9 \pm 2.65$  mg%, vitamin B1  $0.25 \pm 2.35$  mg%, vitamin B2  $0.47 \pm 2.27$  mg%, vitamin E  $0.18 \pm 2.48$  mg%, vitamin PP  $8.1 \pm 2.16$  mg%, vitamin C. was  $0.15 \pm 2.93$  mg%. In the experimental group vitamin A decreased by 2.9%, vitamin B1 by 7.5%, vitamin B2 by 7.9%, vitamin E by 18.2%, vitamin PP by 2.5%, vitamin C by 16.7%.

The content of mineral substances in meat of quails of the control group: sodium  $33 \pm 2.38$   $\mu\text{g}\%$ , potassium  $251 \pm 2.17$   $\mu\text{g}\%$ , calcium  $19 \pm 2.52$   $\mu\text{g}\%$ , magnesium  $24 \pm 2.38$   $\mu\text{g}\%$ , phosphorus  $17 \pm 2.48$   $\mu\text{g}\%$ , iron  $3.1 \pm 2.31$   $\mu\text{g}\%$ , while in the experimental group sodium 10.8%, potassium 3.1%, calcium 17.4%, magnesium 17.3%, phosphorus 19.1%, iron 3 increased by 2%.

The total amount of fatty acids in quail meat of the control group was 13508 mg, whereas in the experimental group this value was higher by 0.7%.

#### **Justification of the novelty and importance of the results obtained.**

The effect of licorice root extract on quail growth parameters and chemical composition of quail meat was determined. Comprehensive studies of nutritional and biological value of poultry meat, biochemical indicators, biochemical and hematological indicators of blood of quails using licorice root extract were carried out. Veterinary and sanitary examination of quail meat quality using licorice root extract was carried out. Organoleptic indicators of quail meat were determined, physico-chemical and microbiological indicators were studied. Hematological and biochemical indices of quail blood were analyzed. In addition, the mineral composition of quail meat was determined.

According to the results obtained, it was found that the use of licorice root extract has a positive effect on the veterinary and sanitary parameters of quail meat and it can be used as part of the basic diet of quails.

The results of the dissertation work can be used in the educational process of students and masters of veterinary specialties, doctoral students in the field of veterinary sciences, students of veterinary training courses.

#### **Description of the doctoral student's contribution to the preparation of each publication.**

All results and conclusions given in the dissertation work were obtained and formulated with the direct participation of the doctoral student in accordance with the individual plan of scientific research of the doctoral student. The doctoral student mastered all research methods, took an active part in the discussion and publication of the obtained results, preparation and design of scientific articles for publication in domestic and foreign editions.

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In total, 6 scientific papers were published on the topic of the dissertation, including 1 article in peer-reviewed scientific journals included in the Scopus database, 3 in the publications recommended by the Committee for Control in Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan, 2 - in the proceedings of international scientific conferences.

**The scope and structure of the thesis.**

The dissertation is outlined on 103 pages of computer text. The dissertation consists of the introduction of literature review, materials and methods, results of own research, discussion and conclusion. The work contains 154 sources of used literature, 17 figures and 15 tables.