

ABSTRACT

**of the thesis of Apdraim Gulbanu on the topic:
«Veterinary and sanitary assessment of quail products when using the feed additive vermiculite» for the degree of Doctor of Philosophy PhD of the educational program 8D09102 - Veterinary Sanitation**

The relevance of the topic. In recent years, quail farming has become a new and promising area of industrial poultry farming in the country. This industry allows us to meet the physiological needs of consumers in such important food products as quail meat and eggs. The growing interest in this industry in our country is due to the fact that quail meat has a delicate consistency and juiciness, which makes it suitable not only for adults, but also for children. In addition, quail meat contains important nutrients that make it a valuable source of biologically active elements. The high content of B vitamins, macro- and microelements, as well as hydrolyzing enzymes in quail meat significantly reduces the load on the pancreas. Therefore, quail meat is a particularly valuable food for diabetics.

In general, the poultry industry strives to improve production performance and accelerate poultry growth through breeding changes, which can negatively affect the quality of the final product. The quality of animal and poultry meat is influenced by many factors, including mineral nutrition. The problem of mineral nutrition in animal husbandry and poultry farming is solved through complete feeds and the use of various additives. Special attention should be paid to natural minerals, which have a wide range of beneficial properties.

One of the most promising natural minerals for use in agriculture is vermiculite. This purple mineral is formed as a result of weathering of biotite, golden mica, some types of chlorite and other magnesium-containing silicates. The generalized formula attributed to this mineral is $(\text{Mg, Fe, Al})_3 (\text{Al, Si})_4 \text{O}_{10} (\text{OH})_2 \times 4\text{H}_2\text{O}$. Small amounts of other elements such as calcium (Ca), titanium (Ti), potassium (K), and chromium (Cr) may be present in vermiculite, depending on the origin of the deposit.

The main deposits of vermiculite are located in the USA, South Africa, Russia and a number of other countries. There are also deposits of this mineral in Kazakhstan. The country annually requires tens of thousands of tons of vermiculite for agriculture, which is associated with its widespread use. Vermiculite is often added to animal and bird feeds to enhance growth and health, reduce toxic substances, and reduce production costs.

Veterinary and hygienic and morphological characteristics of meat of animals and birds can be improved due to the use of vermiculite. However, there is still insufficient data on how the use of locally produced vermiculite affects the quality of quail farming products.

The purpose of the work: Veterinary and sanitary assessment of quail products when using the feed additive vermiculite.

Research objectives:

- Study of the technology of obtaining and characteristics of the feed additive «Vermiculite»;
- Assessment of the effect of the feed additive «Vermiculite» on the growth and productivity of quails;
- Study of hematological and biochemical parameters of quail blood when using the feed additive «Vermiculite»;
- Veterinary and sanitary assessment of the quality of quail meat and eggs when using the feed additive «Vermiculite»;
- Study of the chemical and mineral composition of quail meat and eggs when using the feed additive «Vermiculite»;
- Analysis of the amino acid and fatty acid composition of quail meat and eggs;
- Investigation of residual amounts of heavy metals in meat and eggs when using the feed additive «Vermiculite»;
- Morphohistological examination of the muscle tissue and internal organs of the quails of the control and experimental groups.

Methodology and research methods. The methodological basis of this work was the works of domestic and foreign scientists involved in the veterinary and sanitary assessment of poultry in the use of mineral feed additives. Generally accepted methods were used for scientific research: veterinary and sanitary expertise, biochemical, physiological, histological and statistical methods.

Post-slaughter veterinary and sanitary inspection of bird carcasses. At the end of the experimental period, quails from the control and experimental groups were slaughtered for subsequent veterinary and sanitary control. Ten quails from each group were selected for analysis, which were subjected to the manual decapitation procedure. The quail carcasses were then kept for 24 hours in a refrigerator at a temperature of 4 °C. Meat quality studies were conducted in the laboratory of the Department of Veterinary and Sanitary Expertise and Hygiene of the Kazakh National Agrarian Research University.

Veterinary and sanitary examination of the quality of quail eggs. Egg sampling and analysis were performed in accordance with the requirements of GOST 31655-2012 "Edible eggs (guinea fowl, quail, ostrich)". A total of 60 egg samples were examined.

Investigation of the chemical composition of meat and eggs. Laboratory studies of quail meat were conducted in an accredited laboratory of the Food Safety Research Institute of the Almaty University of Technology.

Morphological and histological examination of quail meat. The study of the muscle tissues of birds was carried out in the laboratory of the Department of "Pharmacology and Pathology of Animals" KazNAIU. For histological analysis, muscle tissue was used, including the superficial pectoral and biceps femoral muscles, as well as quail liver tissue. The samples were fixed in 10% formalin, passed through alcohol and embedded in paraffin. Sections 5-7 microns thick were stained with hematoxylin-eosin. All the quails brought for the study were

pathoanatomically examined, a protocol and a slaughter examination act were drawn up.

Static processing of results. The data obtained was subjected to variation statistics using the Microsoft Excel 2019 program. The reliability of the results was assessed using the method of variation statistics and the Student's t-test. The differences between the data were considered statistically significant at a significance level of $P \geq 0.05$.

Scientific novelty of research. The locally produced feed additive «Vermiculite» was used for the first time in the main diet of Texas quails. Studies have shown that the supplement has a positive effect on the development and growth of poultry. Data were obtained on its beneficial effect on livestock safety, productive indicators, as well as on the quality of meat and eggs. In addition, there was an improvement in the physiological, biochemical and sanitary parameters in the body of quails.

The theoretical and practical significance of the work. The theoretical significance of the conducted research lies in obtaining additional data on the effect of the feed additive «Vermiculite» on the body of quails and the quality of quail farming products. According to our research, the positive effect of the additive on the economic performance of birds has been revealed. In particular, the live weight of quails increased by 6.1–9.5%, the average daily increase was 2.9–5.8%, and the gross egg production increased by 3.1%. The feed additive also resulted in a 5.1% increase in eggshell weight and a 10.7% increase in eggshell thickness compared to the control group.

The use of the feed additive «Vermiculite» in concentrations of 3% and 5% to the basic diet of quails contributed to the improvement of hematological parameters, in particular, the level of hemoglobin, which increased by 7.71%. In the experimental groups, there was an increase in the content of calcium in meat by 6.2% and phosphorus by 5.4%. There was also a significant decrease in the residual cadmium content in meat and eggs by 21.3% compared with the control group, and the lead content decreased by 30%. The research results were implemented in the farm of Salem Kus LLP, which is confirmed by the implementation acts, and are also used in the educational process of the Department of Veterinary and Sanitary Expertise and Hygiene of the Kazakh National Agrarian Research University.

The main provisions submitted for defense:

1. Technology of obtaining and characteristics of the feed additive «Vermiculite»;
2. The effect of the feed additive «Vermiculite» on the growth and productivity of quails;
3. Hematological and biochemical parameters of quail blood when using the feed additive «Vermiculite»;
4. Veterinary and sanitary assessment of the quality of quail meat and eggs when using the feed additive «Vermiculite»;
5. Chemical and mineral composition of meat and eggs of quails of control and experimental groups of birds;

6. Amino acid and fatty acid composition of quail meat and eggs when using the feed additive «Vermiculite»;

7. Investigation of residual amounts of heavy metals in meat and eggs when using the feed additive «Vermiculite»;

8. Morphohistological examination of the carcass and internal organs of quails of the control and experimental groups of quails.

The degree of reliability and approbation of the results.

Publication of research results. Based on the materials of the dissertation, 4 publications were published, including

1 in a journal with a high impact factor:

- Effect of vermiculite feed additive on the chemical, mineral, and amino acid compositions of quail meat // Veterinary World (Scopus) – 2023. - Vol.16(11). P.2431-2439. doi: www.doi.org/10.14202/vetworld.2023.2431-2439

3 articles - in scientific publications recommended by the Science and Higher Education Quality Assurance Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan:

- Veterinary and sanitary assessment of the quality of quail eggs while using the vermiculite feed additive // Научный журнал: «3i: intellect, idea, innovation - интеллект, идея, инновация». - 2023. - №4(3). – С.3-10. https://doi.org/10.52269/22266070_2023_4_3

- Ветеринарно-санитарная оценка качества мяса перепелов при применении кормовой добавки «Вермикулит» // Научный журнал: «Ғылым және білім». - 2023. - №4-1(73). – С.97-107. <https://doi.org/10.52578/2305-9397-2023-4-1-97-107>

- Бөденелердің өсу динамикасына «Вермикулит» азықтық қоспасының әсерін зерттеу // Научный журнал: «Ғылым және білім». - 2024. - №4-1 (77). – С.181-189. <https://doi.org/10.52578/2305-9397-2024-4-1-181-189>

The structure and scope of the dissertation.

The dissertation contains the following sections: introduction, literature review, materials and research methods, results of own research, conclusion, proposal to the author, list of references and appendices. The work is presented on 165 pages of computer text, contains 24 tables, 26 figures. The list of references includes 217 sources.