

# The Importance of Vitamins and Microelements in Cattle Organisms

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## Abstract

This article presents the results of experimental trials on 15 large horned animals (3, 12, and 18 months old) at the Qo'niratbay mexri farm in Nukus district of Karakalpakstan Republic. The trials evaluated the effectiveness of Antimyopatic-2 and E-selenium preparations. An average weight gain of 683.3 grams per animal was observed when 2 ml of Antimyopatic-2 was administered per animal, while an average weight gain of 500 grams per animal was observed when 2 ml of E-selenium was administered. Animals fed the same diet without any administered medication showed an average weight gain of 150 grams.

**Keywords:** Vitamin, biochemical reactions, rickets, Antimyopathic-2, E-selenium, Microelement, iron (Fe), zinc (Zn), iodine (I), selenium (Se), fluorine (F), copper (Cu), manganese (Mn), cobalt (Co), minerals.

## Introduction

Vitamins, macro and microelements are organic compounds that perform vital functions in the animal organism, and their deficiency can lead to various diseases. They participate in metabolism, strengthening immunity, normal cell function, and many other processes. Vitamins serve as catalysts for biochemical reactions in animal organisms. They regulate metabolism, ensure the growth and development of cells, and support the immune system. For example, vitamin A improves vision, vitamin D strengthens bones, and vitamin C performs an antioxidant function. Vitamins are mainly introduced into the body through food products. Vitamin A is found in abundance during the vegetation period of plants, that is, in green mass, carrots, and tomatoes. Vitamin D is present in fish oil, meat, and bone meal. B group vitamins are found in bread and oat groats. Vitamin C is abundant in citrus fruits, strawberries, and cabbage. Vitamin E is found in vegetable oils and nuts. Vitamin K is present in green vegetables. The deficiency of vitamins can lead to conditions such as hypovitaminosis and avitaminosis. For example, a deficiency of Vitamin A can cause night blindness, Vitamin D deficiency can lead to rickets, and Vitamin C deficiency can cause scurvy. The deficiency of B group vitamins may result in disruptions of the nervous system's activity. An excess amount of vitamins can lead to hypervitaminosis. Therefore, it is necessary to include vitamin supplements in animals' rations only upon the recommendation of a veterinary doctor. It is possible to provide the body with essential vitamins through a balanced

diet. Vitamins are of great importance for the health of animals. Their adequate intake ensures the normal functioning of the body and are the main factors in protecting against diseases.

The importance of microelements in the body:

The health of animals is determined by various factors, one of which is the provision of essential substances for the organism. Among these substances, trace elements hold a special place. Trace elements are chemical elements that occur in small amounts in the organism but perform vital functions. They are part of hormones, enzymes, and other biologically active compounds. Without them, many biological processes in animals occur incorrectly, which leads to the emergence of various diseases and negatively affects the planned production of products.

Essential nutrients are necessary for the healthy and complete development of any living creature. Like humans, animals also need microelements to ensure metabolic processes, immune system, and cell activity. Microelements are elements that exist in very small quantities in the body but perform vital functions. Their deficiency or excess can significantly affect animal health, productivity, and even survival ability. Microelements are found in small quantities in animal organisms - in milligrams and even micrograms. They are divided into two types:

- Non-exchangeable (essential) microelements – iron (Fe), zinc (Zn), iodine (I), selenium (Se), fluorine (F), copper (Cu), manganese (Mn), cobalt (Co), and others.
- Optional (less important ) microelements – chromium, molybdenum, vanadium, nickel, etc.
- Iron is a key component of hemoglobin, responsible for the task of transporting oxygen from the lungs to tissues. Additionally, iron is also essential for muscles, enzymes, and the immune system. Zinc is very important for immune system activity, the rapid healing of wounds, and overall health. It participates in the composition of more than 300 enzymes. Iodine is a key component of thyroid hormones. These hormones are responsible for the growth, development, and metabolism of the organism. Selenium has antioxidant properties, nourishes cells, fights inflammation, and strengthens the immune system. It plays a role in the absorption of iron, the activity of enzymes, and the health of the nervous system. Fluoride plays an important role in strengthening teeth and bone tissues. Its deficiency can lead to damage to tooth enamel. If sufficient amounts of trace elements are not obtained from food, trace elements can be replenished through biologically active supplements or medicinal preparations upon the recommendation of a doctor.
- The excessive intake of microelements can be toxic for the organism. For example, an excess of selenium can reduce egg cell count, while copper can affect the liver. Therefore, it is recommended to introduce microelement supplements into animal diets based on the instructions of a veterinary doctor.

Animal organisms respond to adverse changes in the external environment with specific reactions. Animals brought from high-yielding, different-environment areas are highly sensitive to these changes, and they exhibit decreased productivity, infertility, diseases, increased susceptibility, increased expenditure, and an incomplete chemical composition of the ration, which is characterized by the appearance of these pathologies. Examples of such signs include the appearance of goiter (iodine deficiency) in humans and animals, depigmentation of the skin and endemic parakeratosis (copper deficiency), short stature in humans, and stunted growth in animals (excess strontium), etc.

According to the opinions of M.P. Kuchinskiy, it is noted that there are also subregions in Uzbekistan where mis and rux do not reach. In particular, the biogeochemical aspect of rux elements in livestock in most regions of Uzbekistan requires special attention. [4]

The Jomboy district of Samarkand region belongs to a subregion characterized by carbonate-magnesium salinity and iodine deficiency, located in the middle course of the Zarafshan River. The soil is arable-swampy with clay characteristics, containing Fe - 0.95-1.4%, Mn - 800-1000, Cu - 12-18, Mo - 7-7.3, I - 4.3-4.8, Co - 7-8, Zn - 40-47 mg/kg, while the average in plants is Fe - 550, Mn - 264, Zn - 31, Cu - 4.5, Mo - 3.4, I - 0.4, Co - 0.47 mg/kg, and in the animal diet, Cu - 5.7-7.0, Zn - 26.0 mg/kg.

**Research objective:** To study the process of vitamin and mineral substance exchange in the organisms of livestock raised under the conditions of the Karakalpakstan Republic.

**Research tasks:** Analyze the feed rations of livestock raised at the 'Qo'niratbay mexri' farm in the Nukus district of the Karakalpakstan Republic;

Test the 'Antimiopatic-2' drug, which contains several vitamins and minerals;

Test the 'E-selen' drug, which contains vitamin E and selenium mineral;

**Research Materials and Methods:** The scientific research work was carried out on the basis of experimental studies of 15 cattle aged 3, 12, and 18 months, raised in the "Qo'niratbay mexri" farm in the Nukus district of the Karakalpakstan Republic, as well as in the educational laboratory of the "Veterinary Medicine and Food Safety" department of the Nukus branch of Samarkand State Veterinary Medicine, Livestock and Biotechnology University.

**Research results:** The research was conducted on 15 large ruminant animals, 3, 12, and 18 months old, at the Qo'niratbay mexri farm in Nukus district of Karakalpakstan Republic, divided into three groups of 5 animals each. Group 1 consisted of 5 3-month-old animals, Group 2 of 5 12-month-old animals, and Group 3 of 5 18-month-old animals. The live weight of the experimental large ruminants was measured on a scale before the administration of the preparations. Group 1 received Antimiopatic-2 at a dose of 20 ml per animal, Group 3 received E-selenium at a dose of 5 ml per animal, intramuscularly. Group 2 served as the control group and did not receive any preparation. The preparations were administered to the respective groups three times at 15-day intervals, and after 60 days, the live weight of the experimental large ruminants was measured again on a scale. The research results are presented in Table 1.

**Effects of vitamin and mineral supplements on cattle growth Table 1.**

№	Experimental animals	Amounts of administered drugs	The live weight of animals at the beginning of the experiment	The live weight of animals at the end of the experiment	difference
1.	I- Experimental group	"Antimiopathic-2" 20 ml / 1 head	112 kg	153 kg	41kg
2.	II- Experimental group	not given	208 kg	217 kg	9 kg
3.	III- Experimental group	"E-selen" 5ml / 1 head	314 kg	344 kg	30 kg

The table shows that the average weight gain per calf was 683.3 grams in the I experimental group injected with 20 ml of Antimyopathic-2 preparation, 500 grams in the III experimental group injected with 5 ml of E-selenium preparation, and an average of 150 grams per day in the II control group that received no injections but the same diet.

Conclusions: Microelements are very important for the animal organism, and their proper consumption is a key factor in raising healthy and productive animals. Both deficiency and excess have negative effects. Therefore, farmers, livestock breeders, and veterinary specialists should pay serious attention to microelements in feed.

The experimental results showed that when the Antimyopathic-2 preparation was administered, the average weight gain of each calf was the highest, i.e., 683.3 grams, while in the control group, which was fed the same diet at the same time, the live weight gain was 150 grams.

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