

INFLUENCE OF NATURAL CEOLYTES ON PRODUCTIVITY, MORPHOBIOCHEMICAL STATUS OF BLOOD AND PORK QUALITY

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Introduction

Ceolyte-containing rocks are called „the minerals of the XXI century”. The use of the minerals under investigation promotes the reduction of animal morbidity, favors the increase in the animal productivity and improves product quality [4, 5,7]. So, the problems of animal body resistance to the environmental conditions are of the actual significance in animal husbandry, especially in pig-breeding. [1,3,8]. Unfavorable factors of biosphere together with the deficiency or surplus of macro and microelements exert negative influence on animal productivity, product quality, immune status of the animal body [6, 7, 9]. Ceolyte is a natural mineral having antisito mechanism of action. It can delay pathogenic microflora, the mineral has sweat-metabolic and dehydration properties [5,10].

Taking into consideration the unique properties of natural minerals-ceolytes- we used them as additives to the ration of pigs to carry out the investigation.

Materials and methods

The investigation was carried out on the basis of the farm „Vozrozhdenie.”The experimental part of the investigation was done at the department of animal hygiene in Kharkiv State Zoovetezinary Academy.

The objective of the investigation was to study the effect of ceolytes on animal productivity, animal health and pork quality. Pigs of Large White breed were selected for the experiment. The experimental animals were kept in the same conditions of feeding and housing as the control ones. In the first experiment 3% ceolyte flour was added to the ration of the pigs; in the second experiment 6% ceolyte from dry matter was added.

The pigs of the control groups received the main ration that provided them with the necessary amount of protein, macro- and- microelements, but without ceolyte additives.

During the experiment such parameters as temperature, humidity, the rate of air velocity, light, ammonia and carbon dioxide concentration were taken into consideration

The effectiveness of the additives was estimated by the results of the live weight with the calculation of growth intensity rate and pig quantity. In the blood tests the number of erythrocytes and leucocytes was determined in Goryaev's chamber, the content of hemoglobin was determined by G.V. Derviz, A.I. Vorobyov (1969), protein content- was determined by the refractometer; protein fractions – by electrophoresis method.

The mineral composition of organs and tissues was determined in the atom-absorbntional spectrophotometer AAS-30 by Britske, 1980. The content of calcium was determined complexometrically with the indicator of Muresside; inorganic phosphorus-was determined by Puls's method, modification made by V F Koromyslov and I P Kondrahin,` 1985.

Results and Discussions

The clinical values: the content of basic elements in blood and hemoglobin were considered in Test 1.

The data received show that the addition of ceolyte to the ration of pigs improved all clinical values of blood in the animals. It is known that the biotic doses of some microelements and their complexes can significantly influence blood formation, morphological structure of blood and its protein level. (Ivanov D.P, 1957; Struk M.I, et al, 1970). To diagnose pathological processes in the organism it is very important to evaluate protein metabolism status, especially the role of protein in the immune mechanism. The protein content of blood is in constant dynamic equilibrium with the protein content of the tissues of the whole body (Vasilyeva E. A, 1974). Rihter V. et al., 1982). The content of crude protein and its fractions in blood serum was also determined. It was effected by the dose and the time of ceolyte administration but on the whole it is in the physiological norm. In both experiments the level of protein in the blood serum of the experimental pigs was slightly higher as compared with the same value in the pigs of the control group. The level of globulins in the blood of the experimental pigs was higher than in the control pigs. Gamma-globulin fraction in which the specific protein antibodies are concentrated is able to neutralize toxins and antibodies. The level of mineral metabolism in the blood of the pigs in Experiment 1 was determined by the presence of some microelements in the blood. The content of calcium in the blood serum of the pigs under investigation was in the range of physiological norm. But it was a little lower as compared with the pigs of the control groups.

The decrease in the level of calcium in the pigs of the experimental groups can be explained by the sufficient amount of the above element in the composition of feeds and additives as

well as by the provision of the body with this element. It is quite possible, that is the sign of its antagonistic properties to phosphorus as the level of phosphorus, on the contrary, was the lowest one in the blood of the pigs in the first control group. Na and K are macro elements that play an important role in the transmission of the nervous impulse, penetrating properties of membranes, in the support of the cell pressure, etc. The level of the above elements in the blood serum of the experimental pigs was practically the same.

In Test II the level of phosphorus, Na and K in the blood was slightly higher in the pigs that received mineral additives. The level of calcium was the same, the level of iron was lower.

The effect of ceolyte meal on the quality of the products of the slaughter was studied by the determination of chemical and mineral composition of the longest meat muscles of the back, liver, heart, kidneys and by the number of physical and chemical values of fat.

The comparative analysis of the chemical composition of the longest meat muscles of the back in pigs in Test 1 showed that there were no significant differences in the level of ash, dry and organic matters. The same results were received in Test 2.

The results of both tests show that the changes in the chemical composition of the longest meat muscles of the back are not significant in pigs of both control and experimental groups.

The same picture was revealed when the chemical composition of heart, liver and kidney was studied. The determination of the chemical composition of kidneys shows that the amount of dry matter was higher and the water content was lower in the tissues of the pigs in the experimental groups as compared with the control one. ($P > 0,95$).

The chemical composition of the backbone fat in pigs that received ceolyte was a bit different as compared with the control pigs. The level of water and protein was lower ($P > 0,95$), but the level of fat was higher. The coefficients of refractions of melted fat in pigs of both groups were nearly the same, but there was a tendency to increase in the experimental animals.

The data received showed that the content of silicon, copper and manganese in different tissues and organs of the pigs in the experimental and control groups ranged significantly. The level of silicon and manganese in the tissues of heart was much higher in the experimental pigs ($P > 0,999$ and $P > 0,95$).

Micro mineral composition analysis of ash in the liver showed that the level of Cu and Si in the liver of the experimental pigs was higher ($P > 0,999$ and $P > 0,95$) as compared with the one of the control group.

It may be the effect of the synergic and antagonistic properties of microelements [3, 4, 10] including Si. The direct regularity between the supply and the content of micro elements in organs and tissues is well known [6,9].

Conclusion

Having summarized the results of the experiments the following conclusion should be done: the addition of ceolytes in the ration of pigs at optimal conditions of microclimate allows to activate the processes of metabolism in the organism, to increase the immune status of pigs to produce ecologically pure pork and to restrict the use of antibiotics and sulphanilamides. No disturbances in mineral metabolism were revealed in the pigs that received ceolytes in the dose of 3-6% of dry matter of the ration. The addition of ceolyte promoted the increase in the level of Cu, Mn and Si in the organs and tissues and phosphorus, Na and K - in the blood serum.

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