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**INFLUENCE OF MINERAL UNCONVENTIONAL FORAGE ADDITIONS
ON THE EXCHANGE OF MACRONUTRIENTS IN THE ORGANISM OF PIGS**

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Study and analysis of influence of mineral of unconventional forage additions: double-base compositions of DMC (dry mineral concentrate) from liprotom, DMC with Echinacea purple) and complex (DMC from liprotom and by Echinacea purple) on the exchange of separate macronutrients, in particular, calcium, phosphorus, potassium, sodium and iron, in the organism of pigs, and also their content in the chyme of gastrointestinal tract and serum of blood. A positive effect of produced water on the functional state of young pigs was investigated and was scientifically justified its introduction in the required amount in the feed additive intake.

Keywords: *calcium, phosphorus, potassium, sodium, iron, dry mineral concentrate, Echinacea purple, is mineralized water, liprot, complex feed addition, complex bioactive preparation.*

Raising of problem. In the conditions of the intensive using of animals in case a limit set of basic forage ingredients authenticity lack of mineral substances increases in their rations. That's why for realization of the special researches from determination level of fitness natural raw material for the use in a role of her, as mineral additions, and also search of new, unconventional ways in the decision of ecological problems on territory of Ukraine has actual character.

As to this time investigational not enough problem of influence of natural minerals, water mineralized in particular in combination with protein of microbiological origin and stimulant vegetable components that influence on the increase stability of organism of animals, there was a necessity study of influence mineral unconventional forage additions on the exchange of separate microelements, in particular, calcium, phosphorus, potassium, sodium and iron in the organism of pigs .

Analysis of the last researches and publications the decision of problem is founded in that. In the last few years quite a bit researches appeared and scientifically reasonable recommendations, touch application of different mineral unconventional forage additions to the ration to the sapling of pigs [1,3-5,9]. In connection with strengthening of ecological requirements in relation to the ingredients of different forage additions of natural and synthetic origin the problem of the use ecologically of clean products purchased the special actuality. Not having regard to that mineral feeding of animals of power food value it is not, an important role belongs to it in providing of exchange processes in organism. It is well-proven separate scientists, that mineral additions substantially promote efficiency of the uses of the concentrated

forage in a stock-raising.[4,8] However, all-round complex biochemical and physiology researches from influence of unconventional bioactive forage additions on the processes of digestion and metabolism for animals are conducted not enough. The decision of these questions gives an opportunity to the correct and more effective use of forage additions.

Aim and task. Study and analysis of influence of mineral unconventional forage additions : double-base compositions (of SMK (dry mineral concentrate) from liprot, SMK with Echinacea purple, liprot with Echinacea purple and complex (SMK from liprot and by Echinacea purple) on the exchange of separate macronutrients, in particular, calcium, phosphorus, potassium, sodium and iron in the organism of pigs.

To the tasks of researches entered:

- it is determination of exchange of calcium, phosphorus, potassium, sodium and iron for piglets under the action of the investigated forage additions;

- it is determination of concentration of calcium, phosphorus, potassium, sodium and iron in the chyme of piglets for introduction of the forage additions investigated by us by an overlay of fistulas method on intestinal is a digestive channel;

- it is determination in the serum of blood of experimental animals of content of calcium, phosphorus, potassium, sodium and iron.

Materials and methodology of researches. Researches were executed on the base of laboratory of physiology of recreation and transplantation of embryos, analysis of zoochemistry and experimental base of Institute of the pig breeding the name of O.V. Kvacnitskiy UAAN.

In physiology exchange experiments studied influence of forage mineral additions on the exchange of calcium, phosphorus, potassium, sodium and iron in an organism to the sapling of pigs. A test carried out on methodology by M.A. Kovalenko [7]. Three groups of animals-analogues were formed for four heads in each. Feeding of piglets came true according to the norms of feeding of pigs of corresponding age.

In experiments from the study of digestion for experimental animals used methodology of imposition of fistulas on empty and iliac bowels and stomach by O.V. Kvacnitskiy [2].

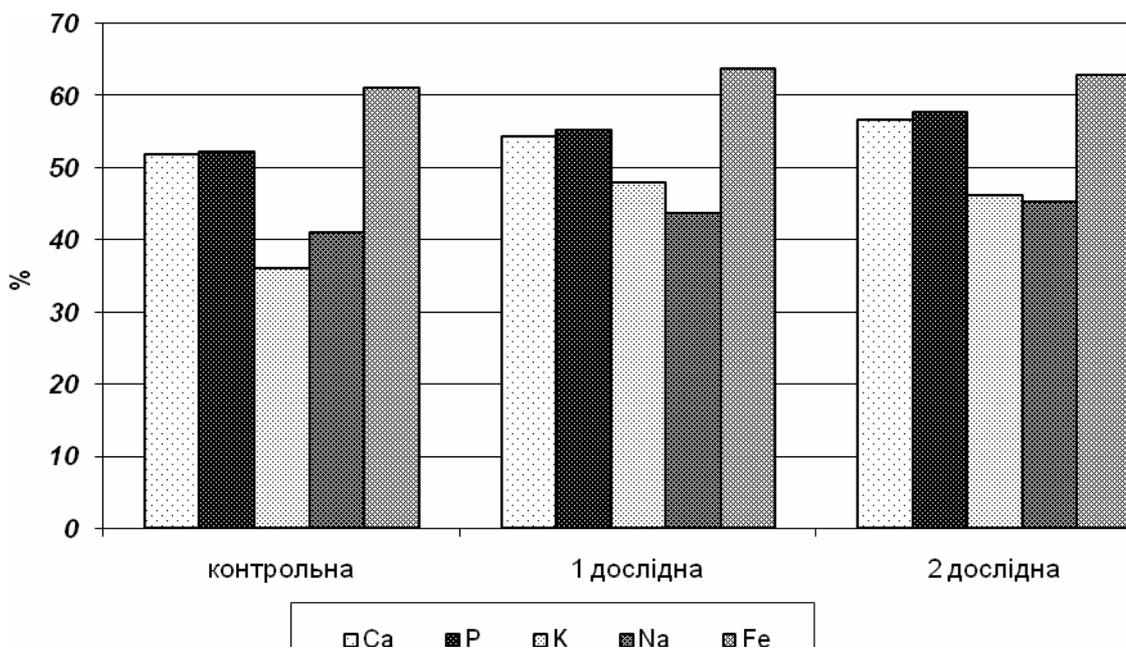
In the serum of blood and chyme of gastrointestinal tract content of calcium was determined: after a reaction from ocrezokftaleincomplecsonom; content of phosphorus - by Fiskie-Cybarrow; content of iron was conducted by the method of atomic absorbing spectrophotometry; to potassium and sodium - by the method of flaming photometry; activity alanin - and aspartataminottransferaz determined a dinitrofenilgidrazin method by Reytman-Frenkel [6].

Results of researches. As a result of feeding to the animals of twocomponent and complex feed addition an amount of mineral elements is in forage of animals experience and control groups differed unimportant (except content of potassium).

The level of mineral elements in a ration educed influence on the best mastering of phosphorus, potassium and natrium. Comparatively with control, in the organism of piglets of the second experience group of mastering of phosphorus it was anymore on 10,4 % ($p \leq 0,05$), to potassium - on 49,1 % ($p \leq 0,01$) and to the natrium - on 21,6 % ($p \leq 0,01$). After the amount of potassium in the first experience group we are mark an increase on 54,9 % ($p \leq 0,01$).

After the coefficients of mastering of mineral elements level them was on the whole the greatest in the second experience group, comparatively with control and first. However between two experience groups on such indexes, as potassium and iron, there was an insignificant increase in the first, where set CMK from liprot (pic. 1).

So, feeding to the animals of complex feed addition (CMK, liprot and Echinacea is purple), comparatively with double-base (liprot and Echinacea is purple) assisted mainly the receipt of the best indexes after digestible of nutritives, mastering of nitrogen and mineral elements and as a result - by the height of piglets.



Pic. 1. Mastering of mineral elements is for the actions of forage additions

So, using classic methodology in relation to implementation of operations from imposition of fistulas on a stomach and thin bowels undertaken studies for the actions of new unconventional environmentally sound forage additions in the rations of piglets, it was succeeded to set physiology conformities to law of mineral exchange by us in the processes of their digestion.

The marked features of content of mineral elements in a digestive tract complement also and level of processes of exchange of them under act of different composition forage additions in the ration of piglets. It is found out, that in the process of digestion - depending on composition of feed addition and between by his components - changes and concentration of the investigated mineral substances in a

chyme. Under the action of complex feed addition, that she was got by the animals of the third experience group, the reliable increase of concentration of mineral elements is traced in the investigated departments of gastrointestinal tract. At the same time it is not set considerable changes after the amount of calcium and phosphorus in the chyme of stomach, potassium - in an empty bowel and to phosphorus - in iliac.

The set changes of concentration of mineral elements are in the chyme of stomach and empty bowel. In a control group during an experience period after the total concentration of mineral elements in a chyme between a stomach and empty bowel a substantial difference is set: content of calcium diminishes on 35,43 % ($p \leq 0,01$), iron - 23,21 % ($p \leq 0,001$), and increases phosphorus and natrium on 34,49 % ($p \leq 0,01$) and 35,55 % ($p \leq 0,01$) accordingly.

The concentration of calcium ($p \leq 0,05$), iron ($p \leq 0,001$) diminished in the chyme of empty bowel, and to phosphorus and natrium, opposite, increased ($p \leq 0,01$), comparatively with the indexes of chyme of stomach; in an iliac bowel the amount of calcium and phosphorus ($p \leq 0,001$) went down for certain, and rose ($p \leq 0,05$) potassium. Comparatively with a control group for animals there was complex addition in the ration of that, in the chyme of stomach it was potassium anymore on to a 29,0 %, natrium - on 26,5 % ($p \leq 0,05$), iron - on 11,0 % ($p \leq 0,01$). Content of calcium in the chyme of empty bowel on 20,1 % ($p \leq 0,05$) was anymore, to phosphorus - on 15,3 % ($p \leq 0,01$), to the natrium - on 34,0 % ($p \leq 0,01$), iron - on 13,2 % ($p \leq 0,01$). At the same time the concentration of calcium in an iliac bowel grew on 23,9 % ($p \leq 0,05$), to potassium - on 33,6 % ($p \leq 0,01$), to the natrium - on 34,6 % ($p \leq 0,01$), iron - on 12,3 % ($p \leq 0,05$). Indexes of coefficients of correlation are in a control group between content of calcium, phosphorus, potassium, natrium and iron in a stomach, and also in empty and iliac bowels answer middle and strong connection. For piglets there was complex addition in the ration of that, such copulas increased. Application of CBAP positively affected mineral composition of blood of experience piglets on growing (tab. 1).

1. Mineral composition of serum of blood of experimental piglets (n=5; M \pm of m)

An index	The control group	The experience group	Comparatively with control %
Calcium, mmol/l	2,70 \pm 0,02	2,83 \pm 0,08	104,81
Phosphorus, mmol/l	1,27 \pm 0,02	1,52 \pm 0,11*	119,68
Potassium, mmol/l	4,80 \pm 0,55	6,03 \pm 0,55*	125,62
Natrium, mmol/l	140,47 \pm 8,43	165,36 \pm 10,85*	117,72
Iron, mmol/l	62,46 \pm 10,22	109,22 \pm 34,71*	174,86

Note: *- $p \leq 0,05$ is authenticity of difference between the indexes of control and experience groups.

The analysis of data of table shows that the amount of mineral substances in the serum of blood in case of plugging in the ration of complex bioactive preparation (КБАП) for certain rises: the concentration of phosphorus grew - on to a 19,7 %, potassium - on to a 25,6 %, natrium - on 17,7 % ($p \leq 0,05$), iron - on

74,9 % ($p \leq 0,01$). Such results, from our point of view, it can explain the saturation of rations that provided the increase of activity of intermediate exchange of macronutrients mineral substances for piglets.

Conclusions:

1. Feeding to the animals of forage additions : double-base compositions of SMK (dry mineral concentrate) from liprot, SMK with Echinacea purple and complex(SMK from liprot and by Echinacea purple) on the exchange of separate macronutrients, in particular, calcium, phosphorus, potassium, natrium and iron, assisted mainly the receipt of the best indexes of exchange of mineral elements in the organism of pigs.

2. It is found out, that in the process of digestion depending on composition of feed addition and between by his components changes and concentration of the investigated mineral substances in a chyme. On the whole considerable oscillation of indexes is marked between the least and most concentrations(calcium, phosphorus and iron - almost twice, and to potassium and natrium - three times).

3. At feeding offer by us complex bioactive preparation of CBAP the results of haematological researches(mineral composition) showed that this preparation did not have negative influence on the physiology state of animals, at the same time promotes content of the investigated microelements, in the serum of blood. Yes, concentration of iron, comparatively with control animals increased in an experience group on 74,9 % ($p < 0,01$), to phosphorus - on 19,7 % ($p < 0,05$), to potassium on 25,6 % ($p < 0,05$) and natrium - on 17,7 % ($p < 0,05$).

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