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|     |  |     |
|-----|--|-----|
|     | ПРОБІОТИКИ У ЛІКУВАННІ<br>НОЗОКОМІАЛЬНИХ ЗАХВОРЮВАНЬ<br>ВЕРХНІХ ДИХАЛЬНИХ ШЛЯХІВ.  |     |
| 47. | КАЛІНІЧЕНКО О.Ф. СУЧАСНА<br>ЮРИДИЧНА ПРАКТИКА НОТАРІАТУ<br>В УКРАЇНІ.  | 604 |
| 48. | KARKACH P., KUZMENKO P.,<br>FESENKO V, BILKEVICH V, MASHKIN<br>Y. PRODUCTIVITY OF SWINE FED<br>POLIOCRYLAMIDE AND MINERAL<br>VITAMIN ADDITIVES.                    | 611 |
| 49. | КАРПЮК З. К., ХМЕЛЬОВСЬКИЙ<br>Ю. Л., ПАВЛУШЕНКО М. О.,<br>КАЧАРОВСЬКИЙ Р. Є. КРАЄЗНАВЧО-<br>ТУРИСТИЧНІ РОЗВІДКИ<br>У РОКИТНІВСЬКОМУ РАЙОНІ<br>РІВНЕНСЬКОЇ ОБЛАСТІ. | 621 |
| 50. | КВАСНИЦЯ Р.Б. СВІТЛО ДИЗАЙН В<br>ОРГАНІЗАЦІЇ ПОДІУМНОЇ<br>СЦЕНОГРАФІЇ.   | 646 |
| 51. | КЛОЧКО О.О. ПЕРФОРМАНС ЯК<br>ІННОВАЦІЙНА ТЕХНОЛОГІЯ<br>ПРОФІЛАКТИКИ АДИКТИВНОЇ<br>ПОВЕДІНКИ.   | 657 |
| 52. | КОЗОПАС В.С. ВІДДАЛЕНІ<br>РЕЗУЛЬТАТИ ОПЕРАТИВНИХ<br>ВТРУЧАНЬ<br>ВНУТРІШНЬОСУГЛОБОВИХ<br>ПЕРЕЛОМІВ П'ЯТКОВОЇ КІСТКИ<br>МЕТОДОМ НАКІСТКОВОГО<br>ОСТЕОСИНТЕЗУ.        | 672 |

**PRODUCTIVITY OF SWINE FED  
POLIACRYLAMIDE AND MINERAL VITAMIN  
ADDITIVES**

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**Formulation of the problem.** Good results [1] were obtained when feeding polyacrylamide in cattle and they became a prerequisite for conducting experiments on its effects on other types of farm animals, in particular on swine.

One of the reasons for reducing the efficiency of pig production in many complexes is low productivity of sows,

slow growth of piglets and a significant number of dead born piglets [2, 3]. All this is to a large extent conditioned by the combination of low-quality feeds with insufficient content of their vital nutrients, vitamins and other biologically active substances or their absence.

Mineral elements enter the body of animals mainly as structural material, participate in the processes of digestion of nutrients of feedstuffs, their absorption, synthesis, decomposition and allocation of metabolic products from the body. They create the necessary conditions for the normal function of enzymes, hormones, vitamins, stabilize acid-alkaline balance and osmotic pressure [4]. However, feeds meet the need for mineral elements by only 50-80%. As a rule, their shortage is compensated by the use of mineral additives in the composition of feed or feed additives and mixtures.

The use of mineral additives is one of the factors for increasing the productivity of swine. In fact, the composition of individual premixes includes more than 100 different micro-ingredients, namely: trace elements, vitamins, amino acids, aromatic substances. In recent years, in many countries of the world with intensively developed pig breeding, various studies are conducted on the revision and

clarification of the norms of mineral nutrition of animals, the study of new effective mineral supplements, the improvement of their use, the use of non-traditional [polyacrylamide] feed. It is not yet fully disclosed their function as sorbents of toxins, substances that promote radionuclide excretion from the body, and their therapeutic effect in diarrhea in piglets [5,6].

**Analysis of recent research and publications.** The lack of nutrients in feeding swine affects negatively not only on the productivity of pigs but also on the maturation process of cells responsible for immune responses. Particularly detrimental effects on productivity and reproductive functions of pigs are insufficient in rations of protein, amino acids, vitamins, macro and microelements. Their sources are not only corn, animal feed, but also waste from various industries, non-traditional feeds [7,8].

This reason caused the necessity of conducting experiments on the effect of feeding of polyacrylamides and mineral-vitamin additives (MVA) and the balance of rations on certain trace elements and vitamins on sows productivity, quality of received products, reproductive ability and health of pigs in conditions of the Polissya of the Kiev region. Experiments were carried out at the pig complex of

"Kyivske" in the Kyiv region.

**Material and methods of research.** For the experiment 36 mothers of Large White breed of 2-3rd farrowing were selected. The age, live weight, fertility, milk yield, as well as the intensity of the development of the piglets prior to weaning were taken into account. The experiment consisted of comparative (25 days) and basic (60 days) periods. Sows were divided into four groups: control (1) and three experimental (2-4) - nine heads in each.

In the main period of the experiment, the diet of the control group remained unchanged, and in the diet of dams from experimental group, polyacrylamide and mineral-vitamin additives were administered, taking into account the actual presence of mineral elements and vitamins in feed and the needs of animals in them. In the diets of the dams of the 2nd group, polyacrylamide was fed on the basis of 0.5 g per 1 kg of live weight, and the third group - MVA in the following amounts (mg): sulfuric acid iron - 200, copper carbonate - 15, zinc - 84, Cobalt - 3, manganese chloride - 69, potassium iodide (stabilized) - 170 micrograms, vitamins A - 2,8 thousand IU, O - 736 IU, B<sub>1</sub> - 1,4 mg; B<sub>2</sub> - 8.4 mcg per head per day; 4th group - polyacrylamide and mineral-vitamin additives.

It should be noted that feeding polyacrylamide and MVD for 60 days and 10 days before the far rowing was stopped. The first far rowing took place in the winter and spring, and the second - in spring and summer.

**Research results.** In the first far row, the average weight of the newborn piglets in the nest was 12.9-15.4 kg, with a fertility of 104-110 piglets per group in general, and in the nests of separate groups the number of births was distributed in this way : 2nd group - 105, 3rd-107, 4th-110 and control - 104.

Sows of the 4th group, in addition to that characterized by high fertility, gave birth to a large mass of piglets (1.3 kg). From the dams of the group received we more piglets and in the second far rowing - 105, while in the control - 97. It should be noted a significant number of dead born piglets in the control group - 7-13 heads in the first and second far rowing. However, for animal from experimental groups, this indicator was lower - 1-5 heads.

At the first far row, from the sows of the 2nd experimental group we received 6,3-8, 4-12 heads ( $P > 0,99$ ) more live piglets than from animals in the control group. In the second far rowing we received better results from the number of live piglets from pigs of 2-4 experimental groups

compared with the data from the control group. The difference between the number of live piglets of control and experimental groups was as follows: 2-14, 3-12, 4-20 heads ( $P > 0.99$ ), which is 17%, 14% and 27%, respectively. The true difference in live weight of piglets of control and experimental groups at birth was not significant, but the average live weight of the nest was greater by 2-3 kg ( $P > 0.95$ ).

The survival of the offspring in animals of experimental groups on the 30th day weaning period was the first farrowing sows of the control group of 85.6%; 2nd-93.2; 3rd-95.2; 4th-94.5% ( $P > 0.99$ ) and on the second farrowing, respectively - 81.9%; 90.7; 94.7 and 94.1% ( $P > 0.99$ ). However, the average live weight at weaning in animals of all groups was practically the same. Significantly higher milk productivity of dams compared to the control group (41.3-43.2 kg) were observed in animals of experimental groups (45.5-56.7 kg).

The biochemical composition of the blood of experimental dams on the 100th day of fertility confirmed our predictions that polyacrylamide increases the presence of gamma-globulins in blood proteins. At the same time, the total composition of proteins remains unchanged, at the same



time, the percentage composition of albumins of the second and fourth experimental groups decreases to 38.39 and 38%, and the number of gamma globulins increases, respectively, to 26 and 25.38%. To study the effect of feeding polyacrylamide and mineral vitamin additives on growth, development and quality of meat, the experiment was extended to young pigs from obtained farrowing. After weaning from the dams from each group 20 piglets were selected for the experiment.

During 25 days (comparable period), the ration of piglets of control and experimental groups were the same. In the main period of the experiment (150 days), the animals of the control group were fed with standard feed additives, and additional polyacrylamides and MVA were given to the experimental animals.

In the comparable period growth of live weight of pigs from experimental and control groups was practically the same as in in the first and in the second experiments .

A great difference in the growth of live weight of animals in control and experimental groups was observed in the first two months of the experimental period, but in the following months it decreased. When comparing the live weight of pigs in the experimental livestock at the end of fattening it

was evident that weight of animals of the 2nd group by 9%, and it - by 22% ( $P > 0.99$ ) was greater than in the control.

The average daily growth of animals of the 4th group amounted to an average of 656 g, which is 23.3% more compared with the control group, and in the 2nd and 3rd groups was higher than in the control group, respectively, by 9.7 and 9.4% (first experiment).

In the second experiment, the average daily weight gain for the whole period was 518 g in the pigs of the control group, the 2nd - increased by 8.3% ( $P > 0.99$ ), the 3rd - by 8.1%, and by 21.4 % ( $P > 0.99$ ).

**To study the effect of feeding of polyacrylamide and mineral vitamin additives on digestibility of feed nutrients at the age of 4.5 and 7 months, two balance experiments were conducted on young pigs.** Significantly higher digestibility of organic matter, protein, non-nitrogenous extractives is evident in animals of the 4th experimental group. However, there is no evidence of differentiation in the digestion of fat and fiber in pigs of all experimental groups.

Feed costs per kg of live weight gain of pigs during the entire period of growing and fattening were the largest in the control animals (5.3 ft., units), in other groups, respectively:

2nd - 5.1; 3rd - 5,0; 4th - 4.9 pounds. unit (first experiment).

The slaughter rate in all groups of animals was unequal and was 74% in the control group; 2nd experiment - 76; 3rd trial - 75th and 4th research - 78% (first experiment).

The Institute of Hygiene of Food of the Academy of Sciences of Ukraine did not establish the toxic effect of polyacrylamide. The assessment showed high palatable qualities of meat in animals of all groups.

**Conclusions.** Feeding of polyacrylamide and mineral vitamin additives to pregnant sows affects the reproductive function, increases the yield of viable pigs, increasing their resistance.

The introduction of polyacrylamide and the MVA during the period of growing and fattening pigs increases the average daily gain of live weight, promotes better use of animal feed and does not affect the quality of meat after slaughter.

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