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NONTRADITIONAL FEED ADDITIVES IN PIGS FEEDING

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Abstract

The article reveals the problem of providing pigs with the main nutrient and biologically active elements of nutrition with the help of protein-vitamin-mineral additives of the new generation. The aim of the research was to investigate the efficiency of using non-traditional protein-vitamin-mineral supplements based on composting with worms in pigs.

In agricultural production, along with the humus, there are broad opportunities for the use of worm biomass. One ton of organic waste when processed by worms gives in addition to 600 kg of humus fertilizer up to 100 kg of worm's biomass. The body of worms contains amino acids, including irreplaceable ones. The composition of biomass includes numerous enzymes, vitamins, and trace elements. Dry matter of composting with worms tissue is 17-23%, including crude protein up to 60%, lipids 6-9%, and nitrogenous extracts from 7 to 16%. One hectare of land, inhabited by worms, annually yields 40 thousand kg of protein flour at a cost of 0,01 Euro per 1 kg. Worms can be successfully fed to pigs, poultry, pond fish, fattening bulls. To prepare the feed flour from rain worms are separated from the substrate, washed, dried and crushed. Such flour by the amino acid composition approaches the meat flour, surpassing it in the content of all essential amino acids.

In Ukraine, the Institute of Animal Husbandry of UAAS and the Limited Liability Company "Agrofirm" Hermes "have been conducting in 2001 research on feeding pigs of various technological groups of biologically active additives. This is an environmentally friendly product for the processing of cattle manure by the culture of a red Californian worm into a compost, followed by hydrolysis of the latter into a liquid extract of "Gumysol T". Modifications to the drug, which have been infused with biologically active compounds, have been developed.

With the help of composting with worms food industry waste - apple excrement you can get nutritious and environmentally friendly forage flour. It can be used to balance rations of pigs and poultry. The authors of the project prove the effectiveness of such a feed.

Essentially new insulates and extracts from natural non-traditional sources (sapropel, compost, by-products of composting with worms) are gaining popularity. For example, the feed supplement "Biogel" is a humic extract from sapropel refers to nonspecific stimulating drugs of natural origin.

The best source of nutrients and biologically directed substances is humic derivatives. They are widely used for the production of BAMD for pigs. In particular, the drug humate sodium "Freya" is a fine powder of dark brown color, odorless, taste, non-hygroscopic, non-volatile, resistant, non-toxic, non-toxic to animals, has a marked intoxication effect.

Keywords: feeding of farm animals, pig breeding, production efficiency, protein-vitamin-mineral supplement, non-traditional feed factors, composting with worms.

Formulation of the problem. It is impossible to efficiently grow pigs without creating a strong forage base, organizing uninterrupted feed supplies and balanced feeding. For the transition of modern pig production to the yearly concentrate type of feeding, the problem was acutely caused by the provision of animals with minerals, vitamins and other valuable elements of nutrition. Therefore, the domestic and world industry has regulated the production of various types of feed additives, which are recommended for the cultivation of pigs [2, 23]. Modern protein-mineral-vitamin supplements (PVMS) are mixtures, which include a large number of components. You can buy standard PVMS s for each sex-age group - multi-year-old piglets, young growth and fattening, sows and buds [20, 24, 37]. All of them include: protein, lysine, zinc, iron, calcium, potassium, phosphorus, selenium, copper, manganese, iodine, as well as vitamins for balancing the diet [50]. However, most of the protein-vitamin-mineral supplements existing on the shelves of Ukraine consist of synthetic components whose effects on the organism of animals are insufficiently studied. First of all it is about the ability of unnatural components of DBMD to be deposited in the body of pigs and transformed into products of pig production [22]. In addition, synthetic ingredients of feed additives can cause pathological disorders of the gastrointestinal tract, skin, reproductive system [31, 36, 47]. Therefore, the problem of providing agricultural animals and, in fact, pigs with the main elements of nutrition due to natural fodder factors and the development of non-traditional PVMS s, is of relevance to science.

Analysis of autumn research and publications. In recent years, ecological production is becoming popular, which involves the use of only natural means of production, raw materials, etc. Therefore, in pig farms in many countries, eco-farms refuse from synthetic feed additives, veterinary drugs, stimulants and other agents of chemical synthesis. The development and implementation of non-traditional natural fodder and feed additives has become widespread in the world. For example, in order to provide pigs with complete protein, complexes of protein and amino acid supplements on the basis of soybeans, beans, nut, beans [10, 19, 30, 34, 35] were developed. Perspective direction in fodder production is the creation of compositions based on the waste of certain technical productions [11, 13, 17], natural minerals [1, 5, 27, 28, 43, 44, 48] and algae [4, 14]. In particular, dietary supplements from keratinous raw materials [1, 18, 26, 45] which are derived from waste

from the leather industry and poultry industry [3, 6, 7, 8, 21, 49, 52] are valuable in the dietary plan. Farmers engaged in breeding pigs, offer a large variety of a variety of bio additives, produced by domestic and foreign producers. For example, the Swiss company SHENCON produces PVMS for multi-year-old pigs. These are specialized products that are made only of natural ingredients (no antibiotics, GMOs, hormones, steroids, artificial growth stimulants, etc.). In the production, components that adversely affect the quality of pork (fish, meat, meat-bone meal, synthetic proteins and amino acids) are not used. Advantages of eco-additives are obvious: they are made of natural ingredients; make it possible to get high quality feed on the farm 2-3 times cheaper than with feed mills (minimizing feed costs by 1 kg of growth); helping to get healthy, well-developed piglets; reduce the overall morbidity and incidence; help to achieve high growth rates of animals on fattening (guaranteed average daily increments 750-950 grams); reduction of fattening period from birth to slaughter to 5.5-6 months; improvement of product quality and pork production economics [53].

Trouw Nutrition (The Netherlands) produces feed concentrates, feed additives, as well as feed additives not only for pigs, but also for other animals and birds that are bred in agriculture. The price for its products is slightly higher than that of competitors, but is characterized by a set of purely natural components. To date, the company has a number of key benefits: the development of compound feeds and concentrates is carried out by Dutch specialists using the research base Trouw Nutrition and taking into account the qualitative indices of raw materials in Ukraine; availability of an extensive network of regional representative offices throughout Ukraine with regional warehouses, which maintains a wide range of feeds to meet the operational needs of farms; technical support for key clients by Dutch experts from Trouw Nutrition; Calculation of rations with the help of the BOSS corporate program ("BOS") Express-analysis of raw materials and finished products at the MasterLab laboratory installed at the plant [38, 41].

The most promising in the context of recent events in Ukraine and in the world is the production of eco-supplements to rations based on vermiculite side products. On the one hand, it is the stimulation of environmentally friendly utilization of household waste, which became relevant in view of the decree of the Cabinet of Ministers of Ukraine on the obligatory sorting of garbage and the dangerous situation that has developed in

our country on most landfills. On the other hand, the production of feeds based on vermiculture is an element of eco-products that can not have a negative impact on animals. Therefore, the purpose of our research was to investigate the effectiveness of using non-traditional protein-vitamin-mineral supplements based on vermiculture in pigs.

To achieve the goal, the following objectives were set: to study the composition and nutrition of feed additives based on vermiculture, to study the productivity, metabolism and quality of pork for feeding PVMSs of domestic and foreign producers.

Objects and methods of research. The study subjects were eco-supplements for pigs based on vermicular by-products. The specialized scientific literature is worked out, the direction of research is substantiated. In this case, analytical and synthetic methods are used.

Research results. In agricultural production, along with the bio-humus, there are broad opportunities for the use of worm biomass. One ton of organic food when processed by worms gives 600 kg of humus fertilizer - 100 kg of worm biomass, which has a high nutritional value. The body of worms contains amino acids, including especially important ones - lysine and methionine. The composition of biomass includes numerous enzymes, vitamins, and trace elements. Dry matter of vermiculture tissue is 17-23%. They contain crude protein up to 60%, lipids 6-9%, and nitrogenous extracts from 7 to 16% [55]. Traditionally, the main source of feed protein for livestock is agriculture. But no hectare of the best land can match the productivity per hectare, where "rainbow" worms grow. Thus, 1 hectare gives 350 kg of protein, corn (grain), clover - 1000 kg, and 1 hectare, inhabited by worms, per year gives 40 thousand kg of protein flour. Worms can be successfully fed to pigs, poultry, pond fish, fattening cattle in raw and cooked form, in quantities that satisfy their need for proteins. Meat of animals thus acquires high commodity properties [54].

To prepare the feed meal, rain worms are separated from the substrate, washed, dried and ground. Such flour by the amino acid composition approaches the meat, surpassing it by the content of all essential amino acids, with the exception of glycine, whose quantity is lower (3% vs. 6%). Amino acid composition of California worms is the following (% of total protein): lysine - 8; histidine - 1.7; arginine - 6; aspartic acid - 11.7; tryptophan - 3; threonine - 5; serine - 5; glutamic acid - 15.9; proline - 6.9; glycine-5; alanine - 5.5; valine - 3.9; isoleucine - 3.4; leucine - 8.2; tyrosine - 2.9; phenylalanine - 3.4; cystine - 3.1; methionine - 3.4.

As experts point out, from 1 hectare of production area per year, it is guaranteed to get up to 40 tons of dry feed meal at a cost of 0,01 Euro per 1kg. The rate of digestion of such a feed 3: 1 is the best of the known coefficients of biotransformation of nutrients into living biomass. This is one of the most beneficial operations for the conversion of waste into a complete protein. In nature there is no other such powerful reproduction of industrial sources of valuable protein. The useful feed rate increases by 20-25%. Protein derived

from worms is used with a high effect for all types of animals, poultry, fish both in raw and in processed form. As a result, livestock products of high commodity qualities are obtained. From the practical experience of pig breeding in Europe, it is known that feeding to piglets in a daily ration is 20-30 pcs. Worms provide faster development [55].

In our country, the Institute of Animal Husbandry of UAAS and the Limited Liability Company "Agro-firm" Hermes "have been conducting in 2001 research on the use of feeding pigs of various sex-age groups of biologically active additives. This is an environmentally friendly product for the processing of cattle manure by the culture of a red Californian worm in a vermicompost, followed by the subsequent hydrolysis of the latter into a liquid extract of Gumysol T. The active substances are soluble salts of humic acids, lactobacillus, bifidobacteria and Bacillus subtilis. In addition, the composition includes the amino acids, vitamins, micro- and macro elements, enzymes, and the like. As additive developers point out, "Gumysol T" acts as an antioxidant, probiotics, a ligand of macro- and microelements, an adsorbent of heavy metals, and a stimulant for the growth of beneficial microflora on the body of pigs. It has bactericidal and fungicidal qualities. It positively affects the protein metabolism in the body, exacerbating anabolic processes, stimulating the immune system of the body. By alternating the periods of BMD with the aftermath, it is possible to obtain the maximum possible effect from the use of the drug for almost all of the ontogenesis of the pig [31]. Specialists note that to acustom pigs to "Gumysol T" should be gradually, within 4-6 days, increasing the level in the diet every 2 days, respectively, 50 or 33% of the total dose [33].

As noted by O.C. Котляр and Г.В. Здор: "... modifications to the drug have been developed:" Gumysol TM "(livestock modernized) with high content of humic compounds; "Gumysol TMS" (livestock, modernized, with flavor additives); "Gumysol TME" with trace elements. Modifications of the drug are used in feeding pigs, piglets and subsp. The results show its high efficiency "[31].

In the literature it is known to include dry apple flour as non-traditional biologically active supplements for swine rations in the amount of 20% of dietary intake to improve productivity and improve the quality of pork, as well as increase the profitability of production [2, 40].

О. И. Ириков and Ю.И. Забудский [29] offered a technology for obtaining BCMMD, based on the use of a new source of animal protein of domestic production, with unused food for human consumption, and utilization of food industry waste - apple puddles with the help of vermicomposting. As a result, the cost of feed meal is cheaper and the cost of livestock products is reduced, as well as the pollution of the environment is reduced.

The method of production of feed meal, which includes the introduction of rain worms into the substrate of apple extract, vermicomposting, followed by drying and grinding, characterized in that the crushed substrate, cooled to 80-90%, is placed in the openings at a temperature of not lower than 15 ° C, or in the heating

room, are populated with worms and vermicompost for 20 days, dried worms and vermicompost by the convection method for 2 hours at 21 ° C and for 2 hours. at a temperature of 24-27 ° C in vacuum, the resulting dry mass is crushed in a mill to a particle size of 0.02-0.03 mm [29].

On the basis of vermiculture, whole BVMD lines are produced. Yes, the universal GADZA 3050 concentrate, intended for piglets on grazing, fattening pigs and sows. This BVMD provides pigs with enough energy and protein. This is promoted by a special protein product that is part of the feed. Promotes optimal growth and development, due to the high content of vitamins and amino acids. It forms a solid health and protection against viral infections (the addition of medicinal herbs actively affects the formation of immunity of animals). This is possible due to the content of a highly proteins product with high digestibility of the protein (about 90%) [9, 15, 25, 51].

Another Feed Additive 5050 GADZA Universal is a multi-component additive for piglets on pigs, fattening pigs and sows. It provides professional and economical feeding of pigs. The benefits of supplements for pigs are: optimal saturation of the body with amino acids, vitamins and minerals; strengthen immunity due to the content of extracts of fennel and anise that improve digestion, relieve spasms of the intestine, accelerating the growth of fattening young animals [22, 51].

Essentially new insulates and extracts from natural non-traditional sources (sapropel, compost, by-products of vermiculture) are gaining popularity. For example, the feed supplement "Biogel" is a humic extract from sapropel refers to nonspecific stimulating drugs of natural origin. It is obtained by extraction of sapropels with an organic harmless extractant. The drug contains water and alcohol soluble mineral organic substances and is a paste of brown color, the preparation is easily mixed with other powdered amino acids and microfertilizers for the production of mixed fodders, fodder mixtures or previous mixtures and vitamin and mineral complexes. The technical properties of the drug guarantee the creation of a homogeneous mixture and its resistance to bundle. The complex effect of organic components of biologically active substances of the additive from sapropel consists in normalizing mineral, vitamin, hormonal metabolism in animals, stimulation of the system of hematopoiesis and immune reactions. The use of "bio gels" in pig breeding allows you to: increase the growth in fattening by 10-25%; reduce the fattening period for pigs by 0.5-1 months; reduce the incidence of young animals; increase the productivity of the parent herd; to receive healthy supplements with high vital energy; reduce the cost of drugs; reduce feed costs to 22% [42].

Such preparations are recommended to be added to compound feed mills in the production of premixes or give animals together with water through drinkers. The average rate of 2.5 g per 1 kg of live weight of an animal. For example, it is recommended to add up to 10 liters of bio-gel per ton of feed. Slaughter of animals for meat and other products after application of the drug can be carried out without restrictions. Contraindications these drugs do not have [16, 42, 54].

The best source of nutrients and biologically directed substances is humic derivatives. They are widely used for the production of BAMD for pigs. In particular, the drug humate sodium "Frey" is allowed to use a feed supplement and is a fine powder of dark brown color, odorless, taste, not hygroscopic, non-volatile, resistant, non-toxic, non-toxic to animals, has a pronounced detoxifying effect. These PVMSs are used in both dry and liquid form. To feed animals, the humate of sodium is effectively fed into feed and premixes. For this purpose, irrigation is carried out in mixers of periodic action with a 1% solution of sodium humate, which prevents diffusion and reduces of feed. Apprenticeship to FCW "Freya" pigs spend from 5 to 60 days of age. The drug is introduced in dry or wet feed (ZNM, feed yeast, meat-bone meal). Daily drug dose: 15 mg per kilogram of live weight. It is dissolved in warm water or milk and is added to the prepared mixture of feed at a temperature of 40-45 ° C evenly. Feeding of humate of sodium increases the average daily gain of piglets by 12-18%, and after the cessation of feeding their growth intensity does not decrease within 30-45 days. The economic efficiency of the humate of sodium "Frey" has been proven by a wide industrial testing. Each kilogram of humate of sodium can provide an extra 10-12 kg of pork [46].

Conclusions 1. Under the conditions of industrial production of pork, the problem of ensuring the animals of various sex-age groups is a major problem of feeding the main elements of nutrition. It can be solved only with the use of protein-vitamin and mineral supplements.

2. The promising direction in fodder production are eco-additives and premixes, made of natural raw materials.

3. Vermiculture and composting can be a cheap and valuable nutritionally raw material source for the production of environmentally friendly PVMS s.

Prospects for further research. In the future, it will be interesting to study the productive effect of feed on the basis of vermiculture on the organism of pigs of various technological groups in the conditions of the forest-steppe of Ukraine.

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