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PRODUCTIVITY AND KILLING QUALITY OF RABBITS UNDER THE ACTION OF COMPLEX PROBIOTIC ENZYME ADDITIVE "CELOZYME-PROBIOL"

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Abstract

The aim of this work is to study the effect of biotic enzyme additive "Celozyme-Probiol" on the productivity and slaughter quality of rabbits.

The object of research - rabbits of the white giant breed, about the biotic enzyme supplement "Celozyme-Probiol".

The subject of research - the safety of young animals, growth dynamics, slaughter qualities of rabbits.

In this regard, the following tasks were set: - to study the effect of biotic supplements in combination with the enzyme preparation on the preservation and growth dynamics of experimental rabbits; - to determine the effect of probiotic enzyme supplementation on the mass of internal organs, slaughter and hematological parameters of rabbits; - calculate the economic efficiency of the use of probiotic additive "Celozyme" and the enzyme preparation "Probiol" in the cultivation of young rabbits.

Based on the research, it was found that feeding a complex supplement "Probiol-Celozyme" to young rabbits for fattening can reduce feed costs during the fattening period by 9%, increase carcass weight by 11.7% and poultry safety by 3% compared to control.

In general, the level of profitability under the action of the complex additive "Probiol-Celozyme" increased by 25.6%.

Keywords: rabbits of the white giant breed, about biotic enzyme additive "Celozym-Probiol", feed costs, growth dynamics, slaughter qualities, blood parameters, economic efficiency.

Actuality of theme. Rabbit breeding is one of the promising industries, which occupies a special position in modern animal husbandry. The main products of rabbit breeding are high-quality dietary meat, as well as raw materials for fur products: skins and down. Due to the high protein content, low cholesterol, balanced amino acid composition and good digestibility, rabbit is used in medical nutrition for various diseases in the diets of children and the elderly. High fertility and precocity of rabbits makes it possible to get a significant amount of meat from them in a short time. It is known that the productive performance of rabbits and the quality of their meat depends to a greater extent on a full, balanced in energy, nutrients and minerals feeding.

Currently, rabbit breeding is best studied breeding and keeping of these animals, and the issue of feeding is studied relatively less, even less studied the use of various feed additives in feeding rabbits.

In recent years, to restore and maintain the microflora of the digestive tract, as well as for the treatment and prevention of gastrointestinal diseases in animals are actively used drugs containing natural intestinal microflora - probiotics, prebiotics and enzymes. Interest in them in the world has increased sharply due to the consequences of uncontrolled use of antibiotics, which can increase the variability of pathogenic microflora and the development of multiple drug resistance, as well as due to concerns about antibiotic residues in livestock products. Based on the above, the topic of the master's thesis is relevant.

Analysis of recent research and publications. Features of the structure of the digestive system of rabbits. To date, the nutrition of rabbits includes a set of mechanical, microbiological and chemical processes that are involved in the sequential breakdown, absorption and use of nutrients from feed and are characterized by certain age characteristics. The breakdown of feed nutrients in rabbits begins in the oral cavity by the action of enzymes of four pairs of salivary glands, which break down the starch contained in the feed, to glucose, which is partially absorbed by the oral mucosa. The development of different parts of the digestive system of young rabbits do not develop evenly and only at the age of 90 days the animals are physiologically ready to consume plant foods [6, 15].

A characteristic feature of the diet of young rabbits is the frequent consumption of food in small portions. With free access to food, the frequency of meals in adult rabbits is 25-30 times a day with a duration of eating within 10 minutes. Young rabbits consume food 48 more often, this is due to the anatomical, physiological and age characteristics of the structure and function of the digestive tract. In particular, at the age of 30 days, when weaning rabbits from the rabbit uterus, the intensity of feed consumption reaches 60 times a day, but over time it gradually decreases to the norm of adult rabbits at the age of 90 days. Shredded and partially digested food enters the stomach through the esophagus [19, 27].

Rabbits are herbivores with a single-chambered stomach. The digestive system carries out metabolism between the body and the environment. Through the digestive system, the body receives food with all the necessary substances - proteins, fats, carbohydrates, minerals, vitamins, and released into the environment part of the metabolic products and undigested food residues. As herbivores, rabbits are biologically adapted to eating large amounts of bulky, coarse and high-fiber foods.

In rabbits, food passes through the entire gastrointestinal tract for about 72 hours. The digestive tract is an empty tube consisting of mucous membranes and muscle fibers. It begins in the mouth and ends with the anus. Along the entire length of the digestive tract has specialized departments that are designed to move and digest food.

The digestive tract in rabbits is quite well developed, the length of the intestine is 18.5% of body weight. The digestive tract of rabbits consists of: the oral cavity, pharynx, esophagus, stomach, small and large intestines, rectum and anus (anus), as well as digestive glands (salivary, pancreatic and liver) [32].

The digestive system of rabbits is very well developed, because rabbits have to eat roughage, which is very rich in fiber. This food is difficult to digest, so it needs a good treatment in the gastrointestinal tract.

The digestive system of rabbits begins in the oral cavity, in which the primary processing of food by chewing teeth and wetting with saliva. A newborn animal has only sixteen deciduous teeth. Teeth begin to change permanently until about the eighteenth day of life of the rabbit. Unlike other mammals, the rabbit has only twenty-eight permanent teeth.

The peculiarities of rabbit digestion are that they have very poorly developed muscles of the stomach and intestines. Therefore, food in these animals moves through the digestive tract not due to muscle contractions, but due to the receipt of new food. Due to this feature, rabbits can never starve.

From the esophagus, mushy food enters the stomach, where it mixes with gastric juice. It is constantly secreted by the glands of the mucous membrane of the body. Gastric juice contains hydrochloric acid and the enzyme pepsin, which is highly acidic. Under its action, feed proteins are broken down into amino acids. Depending on the type of food eaten, the food is in the stomach of the rabbit for 3-10 hours. After a few hours from the beginning of the meal, half of the food remains in the stomach, and the other due to the wavy contractions of the stomach muscles move to the intestine [35].

In rabbits, the stomach has the shape of a curved bag. This organ is located in the anterior half of the abdominal cavity on the right side. The volume of the rabbit's stomach is 180-200 ml. With free access to food, the frequency of eating in adult rabbits is 25-30 times a day for 5-10 minutes.

The enzymatic activity of digestive juices in rabbits is higher than in other herbivores. The total acidity of digestive juice varies from 0.18 to 0.35%, the content of free hydrochloric acid from 0.11 to 0.27%. Gastric juice does not digest fiber. Under the action of smooth muscle, the contents of the stomach move into the duodenum.

Under the action of gastric juice which is allocated continuously there is a splitting of nutrients of forages. Depending on the nature and quality of feed, up to 10 ml of gastric juice is produced in one hour. In the stomach, complex feed proteins are broken down into simple protein compounds by gastric juice. The biological feature of rabbit nutrition is the phenomenon of coprophagy. Soft feces dry matter contains 35% crude protein, 18% fiber and 12% ash [17].

The total length of the rabbit's intestine varies from 4 to 6 m, which is approximately 8-10 times longer than the body. The ratio of the length of the intestine to the length of the body is 2-3 times greater than in carnivores. This is due to the fact that krill are adapted to consume a significant amount of bulky roughage, rich in fiber.

The small intestine starts from the stomach and is divided into three main parts:

- duodenum (the first and shortest part of the small intestine 40-60 cm long, into which the bile ducts and pancreatic ducts);

- empty intestine (the longest part of the intestine, suspended in the form of many loops on the large mesentery);

- ileum (is an extension of the small intestine).

The small intestine is localized in the right hypochondrium and has a length of 275-320 cm. The mucous membrane of the small intestine is more specialized for digestion and absorption of food: it is collected in folds, called villi. They increase the absorption surface of the intestine.

The pancreas also lies in the right hypochondrium and secretes several liters of pancreatic secretion per day into the duodenum, which contains enzymes that break down proteins, carbohydrates and fats, as well as the hormone insulin, which regulates blood sugar.

The liver is located in the right hypochondrium. Blood passes through it and is filtered, flows down the portal vein from the stomach, spleen and intestines, complex metabolic processes (nitrogenous compounds, carbohydrates, fats) take place, and toxic metabolic products are neutralized. The liver produces bile, which converts fats for absorption into the blood vessels of the intestinal wall. Bile accumulates in the gallbladder, and from there through the bile duct enters the duodenum. During the embryonic period, the main hematopoietic processes take place in the liver. Its removal leads to the death of the animal [13].

In the small intestine, the stomach contents are exposed to bile, intestinal and pancreatic juices, which helps to break down nutrients into simple components and their absorption into the blood and lymph.

The contents of the small intestine enters the large intestine, where it stays for several hours.

The large intestine is represented by the cecum, large colon, small colon and rectum. There are no villi on the mucous membrane of the large intestine, but there are depressions - crypts, where there are common intestinal glands that secrete a small amount of juice, containing a lot of mucus, but few enzymes. Intestinal microbes cause the fermentation of carbohydrates (in the cecum and colon, fermentation processes, breakdown and digestion of fiber), and putrefactive bacteria - the destruction of residual products of protein digestion, and such harmful compounds as indole, skatole, phenols, which in can cause intoxication, which occurs, for example, in protein overfeeding, dysbacteriosis and lack of carbohydrates in the diet. These substances are neutralized in the liver. Water (up to 95%) and some minerals are intensively absorbed in the large intestine.

Due to the strong peristaltic contractions of the muscles of the colon, the contents of the colon enters the line, where the formation and accumulation of fecal masses.

Excretion of feces into the environment occurs through the anal canal (anus). An adult rabbit excretes up to 0.2 kg of feces per day, and during the day it looks like hard balls, and at night it has a soft moist consistency. The chemical composition of feces is different [10].

Rabbits have a physiological feature - coprophagy, or eating their own feces (only at night). By eating soft feces directly from the anus, rabbits receive additional nitrogenous substances (it contains 28.5% protein), B vitamins and vitamin K.

Thanks to the 2-fold passage of food through the digestive tract is better digestion and absorption of nutrients. Deprivation of rabbits of coprophagy has a negative effect on the growth of young animals, pregnancy of rabbits and intrauterine development of rabbits. In addition, eating nocturnal feces, rabbits can become infected with coccidia oocytes, so rabbit chatters from 20 days of age are administered coccidiostats.

Coprophagy is a normal physiological process. Due to coprophagy, the passage time of food through the gastrointestinal tract in rabbits increases by 20-25% and thus increases the digestibility of food eaten. Coprophagy is important in providing rabbits with B vitamins, resulting in a sharp decrease in the need for them.

Due to coprophagy, microbiological digestion takes place in the stomach of rabbits, despite the fact that hydrochloric acid of gastric juice exhibits bactericidal and bacteriostatic properties. After all, the bulk of microorganisms enter the stomach of rabbits due to coprophagy. The phenomenon of coprophagy promotes the additional absorption of essential amino acids and some vitamins. Due to coprophagy, the time of feed passage through the digestive tract of rabbits increases by 20–25%, which increases the digestibility of nutrients in the feed consumed.

With the transition of rabbits from milk consumption to eating plant foods, the development of cavity digestion occurs, as the small intestine creates conditions for the intensive development of the microflora. The intestinal microflora in rabbits enhances nitrogen metabolism through the use of proteins of microbial origin. Microorganisms of the small intestine affect the digestion of carbohydrate components of feed, act on the activity of enzymes of the mucous membrane, releasing hydrolase and a number of other enzymes into the intestinal lumen and thus promote better absorption of feed nutrients and their conversion into high quality products. This process is stimulated by vitamin and mineral supplements, the introduction of which into the diet of rabbits has a great biological effect [7, 1].

Rabbits do not equally digest food of different species. To date, the need for rabbits in energy and digestible protein has increased, due to more intensive use and improvement of quality indicators of rabbits of modern breeds and the introduction of new technologies for keeping and feeding [8, 9]. The stomach of rabbits is relatively small - about 8 cm wide , but gastric juice has a large digestive effect due to high acidity. The grass is digested in the gastrointestinal tract of rabbits for 2-3 hours, concentrated feed - for 3-5 hours.

One of the features of the physiology of digestion is the inability of rabbits to absorb non-protein nitrogen from urea, ammonium salts and biuret. Therefore, to enrich feed with these substances, as practiced in feeding ruminants, in rabbit breeding does not make sense [6, 8].

In the first days after weaning from the mother in young rabbits there is a slight decrease in the digestive

power of digestive juices. This is especially noticeable in the early weaning of young animals at the age of 28-30 days. At weaning at the age of 40-45 days such decrease is almost not appreciable, and at weaning in 60 days it is practically not observed.

With early weaning in the first days there is a decrease in feed intake in the first two days, then feed consumption increases sharply, which can lead to animal diseases. Therefore, in the first 7-10 days it is necessary to limit the amount of feed, especially roughage and bulk.

One of the features of the internal organs of rabbits is an unusually long cecum. In it, the feed fiber is subject to bacterial processes, and the breakdown products are partially absorbed by the body.

The small intestine is about 300 cm long and about 140 cm thick, and a third of it is in the cecum.

Basic feeds and types of rabbit feeding. Alfalfa, sainfoin, clover, wheatgrass - the best food for rabbits. Clover and sainfoin are eaten by rabbits better than alfalfa, but feeding in large quantities of clover adversely affects the reproductive functions of rabbits. Alfalfa is rich in both fiber (20-30%) and protein (14-18%), which makes it a convenient component for the preparation of feed mixtures. It contains amino acids (lysine, tryptophan, trionine), calcium (1.5%) and potassium (2.5%). Dehydrated alfalfa (herbal flour) product is scarce and expensive, so it is injected into the granules no more than 40% [27].

Of all the legumes, rabbits willingly eat soy, the green mass of which is rich in protein and fat.

The need of rabbits for green fodder can be largely met by using wild grasses, especially if the herbs complement each other in nutrition and digestibility.

Yarrow (yarrow) grows in meadows, fields, forest glades. It increases appetite, improves digestion, has astringent properties, so it is useful to feed with foods that have a laxative effect (for example, with the tops of roots).

Nettle is given as a protein supplement to sucrelent and lactating rabbits, young animals. The green mass is used before flowering, as later it quickly thickens. Before feeding, nettles are scalded with boiling water, crushed, mixed with feed or bran. In fresh form it has a slightly laxative effect, so it is effective in gastrointestinal diseases. In summer, nettles are harvested for hay (dried under a canopy tied in brooms).

Cumin deserves special attention. It has a mild anticoccidial and antiseptic effect.

Wormwood is one of the means to increase appetite and stimulate digestion. It contains essential oils that have a stimulating effect on the heart, digestive tract and kidneys. Wormwood is given in small quantities in a mixture with other herbs (not more than 2 times a week). It is good to prepare for the winter.

Rabbits willingly eat plantain, tansy, dandelion (they should be given to young animals no more than 30% by weight of all green fodder), sorrel, wild clover, field thistle, mother-and-stepmother, Ivan tea, etc. Winter oilseed rape and mustard can be fed to animals before the seeds appear. When giving the green mass of Sudan and sorghum in rabbits there is a digestive disorder. Corn in the stage of milk-wax ripeness willingly eats rabbits, but it is rich in carbohydrates that cause fermentation in the stomach. Therefore at its feeding it is necessary to limit access of animals to water.

Some herbs (buttercup, celandine, milk thistle, hellebore, datura, belladonna, etc.) contain alkaloids, saponins and other poisons that cause poisoning and death of rabbits. They are most dangerous for young and pregnant rabbits. In poisonous plants, toxic substances are contained constantly or at certain stages of growth [1].

Coarse feed is the main source of fiber. The main food of this group is hay. The value of roughage is that it is nutritious and provides a sufficient amount of diet. Eating roughage helps to grind the incisors in rabbits. In the process of digestion of roughage, a large amount of heat is released (from 1 kg of feed about 1000 kcal), which is used by the body to normalize body temperature.

The best for rabbits is legumes and legumes, obtained by mowing plants before flowering or at the beginning, dried in the shade.

Bean hay is about 2 times richer in protein than cereals. Any hay should be green and have a pleasant smell. Hay from wild grasses differs in good quality: meadow, steppe, and forest. Hay from grass mown after flowering, dried in direct sunlight, as well as from stagnant or rain-soaked grasses contains less nutrients, is coarse, worse eaten and absorbed by the body.

In large farms for growing and breeding rabbits hay is harvested from sown annual and perennial grasses: alfalfa, clover, clover, oatmeal. Sometimes winter rye, triticale, winter wheat, millet are mown on hay, but the nutritional value of such hay is low. When harvesting and storing hay, advanced methods are used, such as flattening the green mass, pressing, drying in skirts by means of active ventilation, selection and storage of hay in bales and rolls. Hay is stored in skirts under a canopy or covered with plastic wrap and straw.

When feeding hay to rabbits, there is a large loss of food, as through the mesh feeders and the floor fall leaves and the most valuable parts of the plant, and the animals gnaw only the stems. Therefore, on industrial farms use grass briquettes from hay. Produce briquettes in the form of dense tiles of regular rectangular shape, length 140-170, width 50-80 and thickness 25-60 mm. Nutritional value of feed briquettes (about 0.70-0.85 feed units and 85-120 g of digestible protein per 1 kg). Compared to loose feed, briquettes are stored longer, convenient for transportation and distribution to animals [13].

One of the effective ways to preserve grass on large farms is to prepare haylage. This food is not sour, similar in quality to green mass. When harvesting haylage, the grass is only dried and placed in storage. Store it in hermetically sealed towers, as molds develop when air enters. Haylage can replace hay and roots. Feeding it in the winter diversifies the diet of rabbits.

It is believed that rabbits do not eat straw, but use only a small amount of straw flour. Rabbits can be fed and sex - rye, wheat, peas and millet, in small quantities, replacing hay. The floor should be moistened, and even better steamed and mixed with concentrates and succulent feeds.

To grind the incisors, rabbits need to be given branch fodder (branches of deciduous and coniferous trees), which is delivered to farms in winter and early spring after pruning gardens and felling in forests. Needles are rich in vitamins, macro - and micronutrients. It improves appetite, gives shine to the hair, stimulates sexual desire in adult rabbits and growth energy in young, gives the rabbit aroma and tenderness, has phytoncide, antiseptic and anthelmintic properties, is effective in treating diarrhea, lung and eye diseases. Needles should be fed in small twigs every other day or in the form of coniferous flour to enter the composition of the granules.

Branches of stone fruit trees - cherries, sweet cherries, apricots - rabbits are better not to feed because of the content of hydrocyanic acid in the bark.

Rabbits also eat the branches and buds of all trees and shrubs, except wolfberries, elderberries, willows, as they contain poisonous substances.

Young shoots of deciduous crops are harvested for the winter in June-July. Cut branches 0.5-1 cm thick, form them into brooms and dried under a canopy. Dry branches can replace up to 50% of roughage. Shredded green branches can be ensiled in a mixture with different crops of the green conveyor [14].

Succulent feeds include roots, melons, silage. They are well digested, increase the milk yield of rabbits. In roots, most of the nutrients are easily digestible carbohydrates, they are low in fiber, calcium and phosphorus. Useful for rabbits beets sugar, fodder, carrots, turnips.

Sugar beets are best fed closer to spring, as it has less water, more energy and it is better stored.

Turnips are an uncommon food, but they are more nutritious than fodder beets and last longer.

Pumpkin rabbits almost do not eat, but it can be fed in a mixture with concentrates, preferably steamed.

Fodder beet is the most productive crop, so it is advisable to grow it in backyards. From the area of 0,015-0,02 hectares it is possible to collect 1,5-2 t of beets and to provide it to rabbits for all winter and spring periods.

From this group of forages it is possible to note also cabbage, but as additional forage. During her feeding, there is a digestive disorder, especially in young animals. The advantage of cabbage is that it can be used in winter as green fodder. It is rich in vitamin K.

Carrots (red and yellow) are eaten by rabbits with great desire. This is a valuable vitamin root, which contains a large amount of carotene (provitamin A), vitamins B1, B2 and C, minerals, carbohydrates, but little fiber.

Rabbits are also fed turnips, turnips, kuuzika, radishes, Jerusalem artichokes, melons. Of the tubers, the most valuable food is potatoes. It has a lot of starch (12-24%). Potato protein has a high biological nutrition. It is better to give potatoes boiled in a mixture with concentrates [18, 20].

Concentrated feed is the main source of proteins, fats and carbohydrates, they account for 50-65% of the nutrition of rations. From grain feeds most useful for rabbits is oats, barley, wheat. Oats positively acts on the reproducible function of animals, quite nutrient and does not cause obesity.

Oats, wheat, sorghum, barley is desirable to give in a mixture with other feeds. Wheat as a monocorrus can cause a bloating of the intestine, and with prolonged feeding violates mineral exchange. The grain of barley is covered with hard digestes, so before feeding them, it is necessary to release them from the film. Barley improves digestion, nutritious and is especially recommended for lactating rabbits and young animals for fattening. Bran - a source of vitamin B and fiber - stimulates dairy performance. Maize is rich in fat and is a valuable component of the feed mixture, but as a monocorrus causes obesity.

Bean grain feeds, rich in protein, are arranged in a mixture with cereals. The rabbits willingly eat the seeds of the Espartz. It should be borne in mind that protein burning, especially when monotonous feeding of the seeds of rabbits in the second half of the supply, causes abortions, and often the death of rabbits from paralysis on the soil of intoxication.

Fish and meat bone flour in rabbits are poorly used in kind due to the risk of poisoning. It is used as a protein additive in granular feed.

It should be borne in mind that in concentrated feeds there are no certain vital amino acids and trace elements and almost no vitamins A, D, and others.

With the development of industrial rabbit, there is a need for mixes. The mixed fodder in addition to the mixture of grain crops includes minerals and vitamins, they are more balanced by nutrition [3, 16].

Almost in rabbit you can use any feed, except for the bird, which includes a turtle. When feeding non-traditional mixed fodders in the diet of rabbits it is necessary to introduce gross and juicy feed [14].

The most valuable feed, to a greater extent of the corresponding intensive forms of industrial rabbits, are granulated full feed.

The formulation of full-run granulated mixed fodders is developed by research institutions for different age groups of rabbits with different physiological conditions.

It is known that in a separate method of crushing feeds of the most valuable parts of hay and grass reaches 30% or more, and the loss of concentrates - up to 10-16%. Granulated feeds allow you to avoid this. Production of granules is mechanized, labor costs for distribution of feed are sharply reduced. In feed granules, nutritiousness is better. When using granules, the danger of toxicoinfections is excluded, since feed in the granulation process is treated with high temperature.

One of the main components of full-sized granular mixed fodders is a protein-vitamin herbal flour, the amount of which reaches 30-40% by weight or 25-30% for energy nutrition. For balancing of full granules, protein and amino acids in their composition necessarily include sunflower meal or soybean meal.

In granular feed mixes for lactating rabbits and rabbits-weaned, it is necessary to add dry skim milk or ZSM. The granules become stronger if they are manufactured instead of water or steam use serum or mason [6, 15].

In private farms in the feed of rabbits add food waste - potato cleaning, cabbage sheet, bread balances, porridge, etc. Waste should be fresh and not containing inedible impurities. It is impossible to feed the potatoes and sprout potatoes.

From mineral feeds in rabbit use chalk, bone flour, kitchen salt, dicalcium phosphate, tricalcium phosphate, phosphorin. In rations deficient in mineral substances, include chalk and bone flour, phosphates of 0.5-1% (by weight). It is not necessary to give rabbits of building chalk, as it can be different poisonous supplements.

Depending on the conditions of rabbits and the feed production system, farms use two types of feeding: combined (mixed) and dry (feeding with complete ration pellets).

Combined type of feeding - widespread on homesteads of amateur rabbit breeders with external cage keeping of animals. When feeding rabbits in the combined type use multicomponent rations: a mixture of concentrates (oats, barley, wheat, corn, soybeans), coarse (hay, straw, chaff), juicy (roots - and tubers, silage, green grass), mineral feed salt, chalk, bone meal) and protein supplements (cake, meal, fish and blood meal, skimmed milk powder, ZCM). The feed is fed in its natural form or in the form of semi-wet mixtures. In addition to homestead farms, the combined type is used in those farms that have cheap feed of their own production.

Dry type of feeding is a prerequisite for intensive industrial rabbit breeding. Large rabbit farms receive complete feed pellets from the feed industry or produce them on site in specially equipped feed mills. At dry type of feeding automatic watering is necessary [1].

In the organization of breeding rabbit farms with industrial technology of production processes, which grow and sell breeding young to amateur rabbit breeders, there is a contradiction between the granular type of feeding on complexes and multi-component diet on homestead farms. Known hypersensitivity of rabbits to the nature and type of food. The transition from granules to the mixture causes indigestion, and often the death of the best animals.

It is established that the most rational type of feeding rabbits is a combination of pellets with roughage or succulent feed. In all seasons of the year, rabbits that received such a diet were characterized by the best reproductive and maternal qualities, high weight of offspring, high precocity of rabbits during suckling.

The type of feeding, regardless of the season of the year, equally affects the absolute growth rate. However, the growth rate of repair young animals, which received a granular feed mixture in combination with alfalfa hay or green mass, increases. Preservation of livestock is almost independent of the type of feeding.

In summer, the cost of all types of feeding rabbits is much cheaper (20-50%) than in winter. Therefore, in the conditions of industrial rabbit breeding, the mass supply of rabbits in spring and summer is economically justified, when there is a large amount of cheap green fodder.

With the dry type of feeding only 7-15% of the annual need of rabbits of the main herd for nutrients is met by feeding them hay (hay briquettes) in winter or green mass in summer. For repair young growth, the addition of grass briquettes or hay is 15-30% of the total nutritional value of feed. The total nutritional value of grass briquettes is equated to the nutritional value of an equivalent amount of hay [10].

The effectiveness of biologically active additives in feeding rabbits. Today there are a number of feed components that stimulate the productivity and growth of animals, poultry and animals. One of them is about biotic drugs, which have a positive effect on strengthening the immune system, improving health and increasing the productivity of various species of farm animals. Numerical data indicate the effectiveness of the effects of biotic drugs on young animals.

It is generally accepted that biotic microorganisms have an effect on non-specific resistance in both humans and animals. The modern consumer market is oversaturated with a variety of protective veterinary drugs and feed additives, which creates an urgent problem in determining their effectiveness, taking into account the safety requirements of drugs for animals, humans and the environment [5, 21, 28].

Industrial breeding of rabbits is designed to maximize the use of their high fertility and growth energy. In the implementation of this important problem, the decisive factors are the level and completeness of feeding, which is determined by the amount of energy, protein, a wide range of nutrients and biologically active substances that enter the body with feed and supplements.

Today in Ukraine and abroad in the feeding of farm animals use a variety of feed additives with a wide range of action, which differ in origin (plant, animal, mineral), a set of biologically active components (vitamin, protein, fat, protein-vitamin, mineral etc.) and production technology.

Prerequisites for effective breeding of rabbits resistant to environmental factors - is a full balanced feeding, ensuring optimal housing conditions and protection of animals from disease. In this aspect, the use of biologically active additives that increase immunological reactivity, stimulating growth, development and resistance deserve special attention [30, 37].

The use of probiotic preparations in young animals in the early stages of cultivation normalizes the microflora of the gastrointestinal tract, stimulates the synthesis of IgA immunoglobulin, increases its natural resistance, activates homeostasis [22, 23, 33].

Probiotics are prepared from microorganisms that represent the normal intestinal microflora, which grow well in it and synthesize inhibitors of pathogenic bacteria. A number of leading countries in the world have abandoned the use of antibiotics to stimulate growth and have begun to pay more attention to the development and implementation in animal husbandry of various immunomodulators to obtain environmentally friendly products.

The use of probiotic "Evitalia" in rabbits had a positive effect on hematological, biochemical and immunological parameters: blood, growth and development, which manifested itself in the following: , 2%, leukocytes - by 4.7 - 5.1%, hemoglobin concentration -

by 5.3 - 7.1%; - activation to the values: BASK - 46.07 ± 0.38 - 55.15 ± 0.40%, LASK - 36.14 ± 0.79 - 40.18 ± 0.83%, increasing FI - by 10.1 - 11.4%; - stimulation of growth and SDP, especially in rabbits from birth to 60 days of age, which reduces the time of their retention under rabbits. The drug is recommended for rabbits up to 30 days of age at a dose of 25 ml / head twice a day, older - 50 ml / head [32].

In rabbit breeding, the issue of preservation of young animals from the moment of weaning from rabbits needs special attention, it is during this period that the most active asymptomatic death is observed, which sometimes reaches 50%. And the main reason for this, experts believe the insufficiently formed immunity of the young organism, deprived of colossal support. During this period, rabbits are most vulnerable to pathogenic and opportunistic microorganisms [36].

In animals of the experimental group, which in the preparatory period received about the biotic drug, abnormalities in the gastrointestinal tract were not detected. Instead, without the drug, 7 to 53% of the rabbit population suffered from indigestion at various times. In addition, the rabbits of the experimental group had a significant advantage over their peers from the control group in terms of average daily growth for the entire growing period by 9%. Slaughter weight of rabbits treated with the biotic drug was higher compared to the control of 175 g. In addition, rabbits in the experimental group improved resistance and survival during weaning by 20% [31, 34].

Feeding rabbits with the inclusion in the diet of probiotic supplement "Biohumitel" also had a positive effect on the content of hemoglobin, erythrocytes, leukocytes, total protein. The authors explain this by the intensification of metabolic processes in rabbits. The most optimal dose of the drug was 0.2 g per 1 kg of live weight. Also, the authors investigated the effect of the probiotic "Biohumitel" on the quality, chemical composition and biological value of meat. Carcasses of the experimental groups exceeded the control group in terms of meat content of 5.09-10.59%, and in terms of protein content in the meat sample by 0.30-0.64%, fat - by 0.20-0.40% . In terms of tryptophan content, the rabbits of the experimental groups were superior to the animals of the control group [25].

In his research Scriabin SO [28] determined the effect of two probiotic supplements on the performance of rabbits. Clinical and biochemical blood tests were performed. The author came to the conclusion that the addition of probiotics Enterocin and Vetom to the feed for young rabbits had a positive effect on the general condition of the rabbits, as well as on the increase in live weight gain. The results of blood tests showed that when feeding rabbits with the addition to their diet of probiotic drugs increased the level of liver enzymes (ALT and AST) and bilirubin fractions, but the overall clinical picture of peripheral blood did not change.

The use of the biotic drug "Bacell" in young rabbits increased the average daily gain by 12-16% and increased the body's resistance. Feeding the drug to working males and females helped to stimulate sexual activity and increase the milk yield of females, as well as increase by 7-11% the yield of weaned rabbits.

The use of probiotic drug STF-1/56 TIM increased the safety of rabbits by 21.7%, as well as the average daily increase in live weight by 2.0%. Also, the authors noted a decrease in feed costs per unit of growth and cost of live weight gain.

A.S. Klimenko [21] conducted a scientific and economic experiment on rabbits, which studied the effect of the probiotic drug "Subtilis" on their productive qualities and health, as well as the effect of probiotics on the productivity of rabbits before weaning and subsequent fattening and their health. I. The use of the probiotic drug "Subtilis" allowed to increase the yield of weaned rabbits, live weight gain by 10% and reduce feed consumption per unit live weight gain.

The use of biotic drugs in feeding has a positive effect on the quality of muscle tissue in rabbits [38, 39].

Therefore, biotic supplements are prophylactics because they improve the physiological state of animals and increase their productivity [8, 24, 29].

The purpose of the thesis is to study the effect of biotic enzyme additives "Celozyme-Probiol" on the productivity and slaughter quality of rabbits.

Research methodology. Individual weighing of animals was performed in the morning before feeding at 30, 45, 60, 90 and 120 days of age. Access to feed and water was free.

Livestock survival was taken into account by daily examination of experimental rabbits.

The meat productivity of rabbits was studied by the results of a control slaughter at the age of 120 days. The calculations took into account the weight of fresh carcass without head, skin, lower parts of the fore and hind limbs, cut at the wrists and hocks, without heart, lungs, kidneys and liver. The ratio of the total weight of the carcass and liver, as well as the carcass without liver to the live weight of the rabbit after pre-slaughter exposure was set to slaughter yield in percentage.

Feed costs per unit of live weight gain were calculated based on the results of actual feed consumption, the obtained absolute live weight gain and storage during the period of rabbit fattening.

The material for the study were blood samples from rabbits taken two days before slaughter. Blood for the study was collected in serological tubes by puncturing the marginal ear vein of rabbits with an injection needle. When taking blood, the rules of asepsis and antiseptics were followed. The blood collection site was treated with 70% ethyl alcohol.

The digital data obtained in the experiments were processed biometrically according to the method of M. Plokhinsky [27] using computer programs. The results of the mean values were considered statistically significant at * - P <0,05; ** - P <0,01; *** - P <0.001.

Research results. Feed and feeding are an important part of modern technology for the production of livestock products, in particular the rabbit industry. These factors most significantly affect the productivity and reproductive properties of rabbits.

Feeds used in rabbit breeding are divided into the following groups: concentrated, green, coarse, juicy, animal origin, mineral and vitamin supplements.

Concentrated feed is the main type of feed for rabbits. The share in the total feed consumption is up to 70% of the total nutritional value of all feeds.

The main concentrated feeds are cereals and products of their processing. Wheat bran is a good food, which is given moistened with potatoes to avoid irritation by dust particles of the upper respiratory tract of rabbits.

Of cereals, it is recommended to use wheat, barley, oats, corn, rich in carbohydrates. It is advisable to soak, ferment, steam, germinate or cook the grain before feeding to avoid losses and increase its nutritional value.

Soaking or germination of grain helps to increase vitamins, enzymatic activity and digestibility of nutrients. Yeasting improves the digestion of fiber.

From protein feeds of plant origin, which contain a sufficient amount of protein and minerals, used legumes (vetch, peas, soybeans, lupines, rank and lentils), cakes, meal, as well as feed yeast - part of the feed. Sunflower, flax, soybean, rapeseed and hemp are most often used from cake and meal.

It is not recommended to use cotton meal and cake, which contain a poisonous substance - gossypol.

Despite the high nutritional value of cereals, feeding rabbits a single grain of cereals is considered defective, as it contains few vital amino acids, fiber and vitamins. These shortcomings can be eliminated by adding legumes (which contain a lot of protein, minerals), grass meal or hay, as well as vitamin and mineral feeds.

Modern compound feed plants produce full-fledged prescription compound feed and concentrate compound feed for rabbits. Compound feeds-concentrates are fed to rabbits together with green grass, hay or succulent feeds. They are produced both in granular and in bulk form. The use of complete granular feed allows a more complete balance of rations for all necessary nutrients and include a different set of drugs, supplements and biologically active substances.

In the scientific and economic experiment for feeding experimental animals used complete feed TM "Gross-Krol" (table 1).

The compound feed includes: cereals (corn, wheat, bran, barley, corn gluten), protein (soy and sunflower products, yeast), grass meal, salt, limestone, vitamins and trace elements, amino acids and enzymes.

1 kg of compound feed PK-90/1 and PK-90/2 contains respectively: metabolic energy 280 and 250 Kcal; crude protein 16.5 and 16; crude fiber 5 and 10%; calcium 0.9 and 0.8%; phosphorus 0.7 and 0.6%; lysine 0.85 and 0.7%; methionine + cystine 0.7 and 0.61%; vitamin A 11000 MO.

Table 1

Nutrition of compound feed of TM "Gross - Krol"

Indicator	Units of measurement	Contents	
		PC-90/1 (28-60 days)	PC-90/2 (60-120 days)
Exchange energy	Kcal	280	250
Crude protein	%	16,5	16
Crude fiber	%	5	10
Calcium	%	0,9	0,8
Phosphorus	%	0,7	0,6
Lysine	%	0,85	0,7
Methionine + cystine	%	0,7	0,61
Vitamin A	M.O.	11000	11000

Experimental rabbits of the 2nd experimental group in addition to the main diet received a probiotic enzyme supplement "Probiol-Celozyme" at a dose of 0.040% by weight of feed, which is produced in SE "Enzyme" according to the recipe of "VitaeBiotech" (UK)

The supplement contains active live cells of lactic acid bacteria (Streptococcus faecium, Lactobacillus plantarum, Lactobacillus salivarius) - 10 billion in 1 g, as well as amylase, protease, cellulose, xylanase and galactosidase.

In terms of feed costs per head, on average per experiment, no significant difference was found between the control and experimental groups, although feed consumption by rabbits in the experimental group was slightly lower (Table 2).

Table 2

Feed costs

Indicator	1-control	2-experimental
Spent feed per 1 head, kg	8,6	8,8
Obtained gain, kg	1,836	2,076
Feed costs per 1 kg of gain, kg	4,68	4,24
As a percentage of the control group,%	100	91

Calculations of feed costs per 1 kg of growth showed that the feeding of the additive "Probiol-cell" allowed to reduce them in the 2nd experimental group according to 9% compared to control.

Preservation and dynamics of growth of young rabbits. The percentage of storage and intensity of growth of rabbits are important indicators that characterize the level of feeding. The percentage of preservation is influenced by the following factors: the airspace of livestock premises, the number, composition and quality of feed and water, methods, feeding mode and animal feeding, maintenance technology and placement

density, groups size and more. The percentage of animal preservation affects the level of production costs and the efficiency of the industry as a whole.

Live weight of animals is an important indicator that characterizes their growth and development. Depending on the increments during a certain period, judge the rate of development of animals, the results of their cultivation and fattening.

During a scientific and economic experiment, experimental animals had excellent appetite. The positive effect of a probiotic enzyme additive "Probiol-cell" indicates the preservation of experimental rabbits (Table 3).

Table 3

Indicators of preservation of experimental rabbits, (M ± m, n = 15)

Indicator	Groups	
	1-control	2-experimental
Number of experimental rabbits, goal	15	15
Padizh, ch	2	0
Saving percentage,%	87	100

The percentage of preservation of animals in the control group for the whole period was at 87%, and in the second experimental group, whose experimental animals received in addition to complete feed 0.040% by weight of feed probiotic enzyme supplement "Probiol-Celosim" 100%, which is higher by 3% .

Indicators of growth and development of rabbits depend on feeding conditions and hereditary qualities. The precocity of rabbits is judged by the indicators of the average daily growth of their live weight and the terms of the end of intensive growth. In rabbits, due to their biological characteristics, the indicators of growth and development are strongly influenced by the stress factor. This is especially pronounced in the first 3 months, when weaning, labeling, grading, selection of repair young and other operations.

The use of rabbits in the fattening of probiotic enzyme supplements had a positive effect on their live weight dynamics (table 4).

According to Table 4, the growth rate of fattening young rabbits of both groups at the beginning of the study was almost the same. However, with the addition of probiotic enzyme complex to the main diet, the live weight of animals of the 2nd experimental group was higher by 5.4% (60-90 days), by 8.3% (91-120 days).

The level of average daily gains in the period of 61-120 days was higher in animals of the second experimental group by 13.1%, which provided a live weight of rabbits of the 2nd experimental group at the level of 3270.0 ± 18.27 *** against 2042.5 ± 21.82 control group.

Table 4

Dynamics of live weight of experimental rabbits, (M ± m, n = 15)

Indicator	Age, days	1-control	2-experimental
Live table, g	45	779,0±3,21	778±3,86
Live table, g	60	1184,2±6,30	119,2±6,81
Live table, g	90	2042,5±21,82	2152,5±19,09**
As a percentage of control		100	105,4
Live table	120	3020,0±20,81	3270,0±18,27***
As a percentage of control		100	108,3
Average daily gain, g	61-120	30,6±0,31	34,6±0,27***
As a percentage of control		100	113,1

*Probability of difference:**P<0,01; ***P<0,001.*

Thus, the use of probiotic enzyme complex in the amount of 0.040% by weight of compound feed during fattening of young rabbits increases the average daily gain by 13.1%, the preservation of rabbits by 3% and live weight at the end of fattening by 8.3%.

Meat productivity and weight of internal organs of experimental rabbits. Meat productivity of rabbits is assessed by slaughter weight (carcass weight without skin, head, legs, internal organs, except kidneys) and by slaughter yield (percentage of slaughter weight to weight before slaughter). Productivity is also assessed by other indicators, such as the ratio of morphological components of the carcass, the quality of rabbit, chemical and technological indicators of meat.

Slaughter weight and carcass yield depend on many factors: feeding conditions, age, live weight, breed of rabbits, and meat productivity - on their precocity, which means achieving optimal live weight and slaughter qualities at an earlier date.

In order to determine the specifics of the action of the probiotic enzyme complex on the meat productivity of rabbits at the end of the experiment at 120 days of age, a control slaughter was performed. The positive effect of probiotic enzyme supplement "Probiol-Celozyme" at a dose of 0.040% by weight of feed (table 5).

Table 5

Meat productivity of experimental rabbits (M ± m, n = 4)

Indicators	1-control	2-experimental
Pre-slaughter mass, g	3020,0±20,81	3270,0±18,27***
Carcass weight with kidneys, g	1673,0±18,3	1870,0±17,9***
In% to the control group,%	100	111,7
Slaughter yield,%	55,4	57,2
As a percentage of control	100	103,2

*Probability of difference:***P<0,001.*

Feeding rabbits with a diet with the addition of probiotic enzyme complex contributed to an increase in carcass weight in the experimental group relative to the control. Thus, the weight of the carcass with kidneys in the second experimental group was 1870.0 ± 17.9 against 1673.0 ± 18.3 g, which is 11.7% higher than the control. Slaughter yield was again higher by 3.2% in the 2nd group receiving the above-mentioned additive.

After slaughter, the mass of internal organs and their percentage to the slaughter mass of rabbits were also determined (table 6). The results of the research showed that the mass of edible parts in the carcasses of rabbits treated with Probiol-Celozyme increased by 5.8%. In rabbits of the 2nd experimental group, a significant increase in lung and heart mass was observed (* P <0.05). The mass of other internal organs such as the liver, kidneys were at the level of the control group.

Table 6

Mass of internal organs of experimental rabbits, g (M ± m, n = 4)

Indicators	1-control	2-experimental
Lungs	33,4±0,4	36,7±0,9*
Heart	16,7±0,18	17,7±0,22*
Liver	134,0±2,34	139,4±2,04
Kidney	20,1±0,63	22,4±0,94
Edible parts of everything	204,2	216,2
Edible parts of total,%	6,76	6,61
Lungs	1,10	1,12
Heart	0,55	0,54
Liver	4,43	4,26
Kidneys	0,63	0,68

*Probability of difference: *P<0,05.*

Thus, the introduction of the supplement "Probiol - Celozyme" helps to increase meat productivity and slaughter performance of fattening young rabbits.

Indicators of blood of rabbits under the influence of additives. Violation of the technology of keeping and feeding reduces the natural resistance and resistance to adverse environmental factors. In order to prevent these disorders in the body in recent years have become widely used in the practice of animal husbandry and veterinary medicine on biotic and enzyme preparations.

Therefore, the study of the effect of these drugs on the physiological state of the animal body is of both theoretical and practical importance. There is much evidence in the literature that the use of biotic and enzymatic drugs helps to optimize metabolic processes in animals, effective action on protein-amino acid status and morphological and biochemical parameters.

It is known that the blood together with lymph and tissue fluid forms the internal environment of the body, which washes all cells and tissues. The composition of the blood can be judged on many processes occurring in the body. The composition of the blood not only determines the condition of the animal, but also gives a general idea of adaptation to environmental conditions. The picture of blood allows to observe various changes which occur in an organism of animals under the influence of feeding and the maintenance that gives the chance to estimate their physiological condition.

Blood includes two parts of the liquid medium - plasma and shaped elements (platelets, erythrocytes and leukocytes). The content of shaped elements can change dramatically in pathological conditions of the body. In the first month of life, the number of erythrocytes in the blood is much lower than normal, but with age increases and up to 4 months of age comes into line with the norm.

The main part of erythrocytes is hemoglobin, which provides the respiratory function of the blood, being a respiratory enzyme. It is part of the hemoglobin buffer system of the blood, which is involved in the regulation of acid-base balance. Hemoglobin belongs to the group of chromoproteins, consists of a prosthetic group - heme, which includes ferrous iron, and a protein component - globin. Hemoglobin is synthesized in the red bone marrow, and is destroyed after 110–130 days of erythrocyte life in cells of the phagocytic mononuclear system. In circulating blood erythrocytes, hemoglobin is in a state of continuous feedback: attaching an oxygen molecule in the pulmonary capillaries (oxyhemoglobin), gives it in the tissue capillaries (reduced hemoglobin). The latter binds carbon dioxide (carbohemoglobin) in the tissues and transfers it to the lungs.

The direct executors of immune reactions are leukocytes. Their purpose is to recognize foreign substances and microorganisms, to fight them, as well as to record information about them.

Lymphocytes are responsible for the formation of specific immunity and carry out immune surveillance in the body, maintaining the genetic stability of the internal environment. In the central organs of the immune system is the primary differentiation of the so-called

zero lymphocytes with their transformation into T-lymphocytes (in the thymus), B-lymphocytes (in the bone marrow of mammals and in the fabric bag (bursa Fabricius) in birds). In the peripheral organs of immunity, T-lymphocytes acquire the ability to carry out an immune response of the cellular type, and B-lymphocytes - a humoral response by producing antibodies.

Of the total number of lymphocytes circulating in the blood and lymph, approximately 75% is accounted for by T-lymphocytes, 15% by B-lymphocytes and 10% by cells belonging to neither the first nor the second group (zero). -cells, or K-cells).

The level of natural resistance determines the degree of resistance of animals to disease and is directly dependent on age, season, feeding and housing conditions.

The results of laboratory analysis of morphological and biochemical parameters of the blood of rabbits are presented in table 7.

In the blood of adult rabbits, the variation of leukocytes is considered normal in the range of 5.5-10 thousand in 1 mm3, erythrocytes - 4.7-7.5 million in 1 mm3, leukocytes - 5-11 G / l, total protein - 30- 82 g / l and ESR 1.5 mm / h.

Table 7

The results of laboratory studies of mophological and biochemical parameters of blood (M ± m, n = 4)

Indicators	1-control	2-experimental	Norm
Hemoglobin, g / l	33,4±0,7	36,7±0,9	80-150
Erythrocytes, T / l	6,7±0,18	7,7±0,22	5-8
Leukocytes, G / l	9,8±0,34	9,4±0,54	5-11
Total protein, g / l	48,1±3,6	42,4±9,4	30-82
ESR, mm / min	1,71	1,67	1-2

The average hemoglobin and erythrocytes in the blood of rabbits of the 2nd experimental group were within the physiological norm and were higher than the control by 3.3 g / l and 1 T / l, respectively.

The tendency to increase the number of erythrocytes has a positive effect on the development of immune status and also on the safety of animals.

Of all the dry matter, serum contains the most protein, which consists of albumins and globulins. Plasma proteins perform a variety of functions. At intensive growth, and also at diseases of animals the ratio of protein fractions changes. With the age of animals, serum is enriched with globulins and at the same time the content of albumin decreases. The change in the protein spectrum can be triggered by a change in animal feeding.

In the serum of rabbits of the 2nd experimental group there is a tendency to increase the content of total protein compared to analogues of the control group by 2.3 g / l.

ESR is a non-specific indicator of blood status in animals. The value of ESR depends on many factors and primarily on the content in the blood plasma of macromolecular proteins - globulins. In experimental rabbits of the 2nd experimental group, the value of ESR was within the physiological norm.

The complex of researches included definition of biochemical indicators of blood of rabbits and the analysis of the received data.

Therefore, the addition of probiotic enzyme supplementation to the main diet of experimental rabbits has a positive effect on the morphological and biochemical composition of the blood, which is confirmed by their more intensive growth and development.

Economic efficiency of the conducted researches. At present, the economic indicators of livestock production are becoming increasingly important, as it is necessary to reduce costs and production costs.

The main indicators of economic evaluation of the studies are presented in Table 8. As a result of studying the effectiveness of probiotic enzyme complex, it was found that the safety of the experimental group increased by 3%, feed consumption per 1 kg of live weight gain decreased by 9%.

Due to the increase in the preservation of the rabbit population and gross growth in the 2nd experimental group, additional profit from sales was received by UAH 1,176 more compared to the control group. As a result, the level of profitability under the action of probiotic enzyme complex increased by 25.6% compared with the control group.

Table 8

Economic evaluation of the conducted research (M ± m, n = 15)

Indicator	1-control	2- experimental
Number of goals in the group	15	15
Preservation,%	87	100
Gross live weight gain, kg	107,3	133
Carcass weight, kg	39,3	49,1
The cost of 1 kg of feed, UAH	28	28
Additional costs for the drug, UAH	-	70
Feed costs for the whole period, kg	111,8	132
Sales price 1 kg, UAH	120	120
Complete cost, UAH	4210	4280
Sales revenue, UAH	4716	5892
Profit from sales, UAH	506	1612
Profitability,%	12,0	37,6

Thus, the use of enzyme-based biotic additives in the diets of fattening young rabbits helps to increase safety by 3%, increase gross growth by 23.9% and carcass weight by 24.9%, as well as reduce feed consumption per 1 kg of growth by 9%.

CONCLUSIONS

1. Feeding the complex supplement "Probiol-Celozyme" to young rabbits for fattening allowed to reduce feed costs during the fattening period and including 1 kg increase by 9% compared to the control.

2. The use of probiotic enzyme complex in the amount of 0.040% by weight of compound feed during fattening of young rabbits increases the average daily gain by 13.1%, the safety of animals by 3%.

3. The introduction of the additive "Probiol - Celozyme" to the main diet of rabbits for fattening contributes to an increase in live weight in rabbits of the experimental group by 8.3% against control.

4. The addition of probiotic enzyme complex to the diet of rabbits for fattening contributed to an increase in carcass weight in the experimental group by 11.7%, edible parts in rabbit carcasses by 5.8% compared to the control.

5. With the use of probiotic-enzyme supplementation in rabbits of the 2nd experimental group there was a significant increase in lung and heart weight (* P <0.05).

6. Feeding the supplement "Probiol - Celozyme" in addition to the main diet of experimental rabbits has a positive effect on the morphological and biochemical composition of the blood, which is confirmed by their more intensive growth and development.

7. Economic evaluation of the research confirms the need to add a complex additive to a complete feed for rabbit fattening. At the same time, sales revenue and profit increased by UAH 1,176 and UAH 1,106, respectively. In general, the level of profitability due to feed additives increased by 25.6%.

OFFERS. In order to increase the intensity of growth and the level of preservation of young rabbits for fattening should be introduced into the main diet of a complex supplement "Probiol - Celozyme" at a dose of 0.040% by weight of feed.

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INFLUENCE OF THE SYSTEMATIC APPLICATION OF FERTILIZERS ON THE INTENSITY OF ACCUMULATION OF NITRATES IN AGRICULTURAL CROPS

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Abstract

The article considers the influence of mineral and organic fertilizers on the productivity and quality of winter wheat. During the investigation it was found that the average yield of winter wheat by means of potential soil fertility in 3-year was 2,3±0,1 t/ha.

Systematic application of the fertilizers in crop rotation helped to increase the yield of winter wheat. After the treatment $N_{60}P_{60}K_{60}$ the additions in 1,1 t/ha (47,8%) to the control have been received. On the plots where winter wheat was tested the aftereffect of manure 30 t/ha in combination with $N_{60}P_{60}K_{60}$ increases the yield on 1,1 and 1,2 t/ha (47,8 and 52,2%) respectively. The highest yield of winter wheat obtained by application of mineral fertilizers in quantity $N_{120}P_{120}K_{120}$ was 3,8±0,3 t/ha (addition 64,0% to the control). In addition to the investigations of the different fertilizer type's influence and their dosage on the winter wheat productivity their impact on the quality of the following indicators: crude protein content and gluten has been evaluated.

On the control option the average protein content was 12,45±0,45. The record amount of protein observed after $N_{120}P_{120}K_{120}$ application was 13,25±0,45%. It should be noted that the quality of the gluten protein content and the winter wheat grain in all these tests is significantly higher compared with controls.

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