

## SUMMARIES

### **Optimization of carp species breeding in polyculture technology for fattening pond farms**

**V. Bekh, O. Oleshko**

The purpose of the research is to optimize the technology of marketable fish breeding on pond farms having fattening areas of water surface.

Hydrogen value of fattening ponds water pH during the season were within 6.5-8.1. The value of oxygen dissolved in the water ranged from 3.7 to 6.1 mg/l, which meets the requirements for carp species breeding in ponds. In general, the temperature in fattening ponds met the requirements on carp fish breeding in ponds and matched the average long-term values of the area.

Zooplankton in fattening ponds was represented with the following taxonomic groups: rotifers, copepods and crustaceans cladocera as well as with certain types of invertebrates that spend some period of their life cycle in the water. The ponds benthos consisted of the representatives of Chironomidae family larvae.

Fish cultivation control was carried out in the course of test fishing, carried out twice a month. The caught fish (various species) was counted, weighed and its average weight was measured.

Pasture technology without carp feeding was used under growing fish in farms fattening ponds. Intensification measures such as ponds fertilizing and melioration were applied which influenced the increase in natural fodder base indicators.

Ponds of "Rybovod" farm are profitable but their profit is low and amounted to 13.4 % in 2014.

Calculation of fish farms fattening ponds demand for lime, nitrogen, phosphorus and organic fertilizers was carried using biological fish breeding standards.

The amount of lime required to neutralize the acidity for the farm economy will be 2.75 tons per year under soil pH 5.5.

General demand for fertilizers for fattening ponds will be as follows: organic – 27.5, mineral – 82 tons.

Transferring from two years to one year fish breeding technology in fattening ponds under compacted landings to the mass of commodities is only possible when using feed or fodder Forage mixture. The total quantity of food to the growing season for carp reach 402 tons (at the value feed ratio of 3.5). While determining the the economy's needs of feed one should take into account the fact that, according to existing fish-breeding biological standards, in case the fish is bred in polyculture cultivation, additional feed cost are expected for herbivorous fish. Thus, up to 20 % more is expected for grass carp are expected as compared to that for carp. General requirements of animal feed will be 482 tons.

The following amount of fry should be purchased under the planned composition of fish for breeding in the polyculture – carp, hybrid of silver carp and grass carp: a year long bred carp – 3000 units/ha; silver carp hybrids – 1800 units/ha and grass carp – 50 units/ha. With the farm fattening ponds total area of 55 hectares 165 thousand units of a year long bred carp (4125 kg); 99 thousand units of year long bred silver carp hybrids (2970 kg) and 2,750 units of year long bred grass carp (82.5 kg) are to be purchased.

The breeding in fattening ponds will result in yielding over 60 t of marketable carp with the average weight of 500 grams and nearly 90 tons of silver carp with the average weight of 1200 g in a season. Also, additional 40 kg / ha of fish products can be obtained due to the grass carp.

Thus, the proposed recommendations will enable to obtaine 1,555 thousand of marketable fish in fattening ponds of "Rybovod" farm annually, under 1,071 thousand of production costs. UAH, the net profit may reach 484 thousand UAH. Production profitability will amount to 45 %.

**Key words:** fattening ponds, farm, carp, silver carp hybrid, grass carp, natural forage, morphometric parameters, a year breeding cycle, two-year breeding cycle, economic efficiency.

### **Fattening, productive and reproductive functions of different lactations cows after loose-cell management**

**O. Borshch**

Overwhelming majority of scientists during organization of feeding pay considerable attention to live weight of cows. However animals with identical live weight, but different habitus can have different fattening and, due to this, different forage requirement. Therefore the study of fattening dynamics, productive and reproductive qualities of different age animals under modern conditions of intensive technologies is actual.

As it is known, for cows after calving the negative power balance is determined, at which the requirement in nutritives on the milk productivity is higher, than actual energy of feed consumption. In this period of milk producing by cow happened due to the body nutritives which results the decline of animal live weight and fattening level. The loss of body weight must be limited most to 1 kg per twenty-four hours, and decline of fattening no more than 1point during the lactation. It is necessary to provide the positive balance of energy not later, than in 60 days after the calving or even before. One kilogram of the fat mobilized from a body power provides the receiving 7 kg of milk yield.

Providing the animals with energy has the most influence on the reproductive function. The negative influence appears both for lack and at its surplus. The insufficient providing of high-yeielding cow with energy takes place usually after the calving: the greatest at this time milk yield results the excessive loading on metabolism. Under such conditions such diseases, as inflammation of uterus, absence of heat, change in ovaries, decline of animals immunity and productivity are not eliminated.

The purpose of work was the study of different lactations fattening cows dynamics and its influence on productive and reproductive functions under the conditions of loose management and free full ration mix feeding feed.

In SVK "Ostriyky" among all farm milch population (500 cows) most part is presented by cows fattened to 3 points – 233 cows (60,2 %), part of cows fattened from 3–4 points was – 117 cows (30,25 %), and cows fattened 4 and more points – 32 (8,26 %), the least were cows fattened to 2 points – 5 cows (1,29 %).

The results of researches, conducted in two groups of cows, showed an insignificant difference in the dynamics of their fattening. So, in a first-calf cow the fattening at the beginning of lactation presented 3,0 points with a further slump to 2,75 points on the second month of lactation and a gradual increase on 0,25 points on fifth, seventh, ninth and tenth months. For the cows of 2 lactation the fattening at the beginning presented 2,75 points with a further decline on 0,25 points on the second, and increase on 0,25 points on fourth, seventh, eighth and ninth months.

Under conditions of loose-cell technology of management and milking on "Merry-go-around" bail in the group of first-calf cow middle milk yield during the lactation was on 584,3 kg higher, than in the cows of 2 lactation. The constancy of lactational curves is certain after the Yoganson-Hanson index was higher in the cows of 2 lactation, and after the Turner index – some more lower.

Forms of lactational curves in the cows of both groups were practically identical during the lactation. A peak of the productivity was on the second month of lactation whereupon gradually monthly went down with the sharp falling after the 9th month.

The lactational curves of cows of both groups are characterized by the high index of yield falling. Thus the terms of management, feeding and exploitation at this technology provide the high yield of cows. However the cows of 2 lactation under such conditions have the less productivity for something more intensive slump of lactation and its lower peak.

Our researches showed that the cows of both groups had middle fecundity. Thus the cows of 2 lactation are characterized by greater age of first calving (on 10 days), and an index of fecundity was almost at identical level in both groups. The duration of service period was 12 days longer, and between calving – on 11 days for the cows of 2 lactation, comparatively with the cows of 1 lactation. The coefficient of the reproductive ability is 1,3 % higher for cows of the first lactation.

It is set that due to result of the prolonged duration between calving period greater losses of milk for a lactation of the first-calf cow – 1702,36 kg comparatively with 1617,6 kg for the cows of 2 lactation, however in the percentage ratio losses were almost at one level.

Thus the index of adaptation had a minus value and was some higher for the cows of 1 lactation.

The technology of the loose-cell management with the selection of the first-calf cows in a separate group provides the higher level of fattening of the first-calf cows comparatively with the cows of 2 lactation. Thus the lactational curves of the first-calf cows at the high level of lactation constancy indexes are characterized by a higher peak and less index of yield falling. The indexes of their reproductive ability have a tendency to the improvement comparatively with the cows of 2 lactation.

**Key words:** cows, fattening, lactation, productivity, reproduction.

### **The frequency of visiting the milking robot cows in lactation of all ages and levels of performance provided for voluntary milking**

**I. Bryuhachova, V. Kostenko**

Given the voluntary milking we investigated the frequency of visiting the milking robot cows of Holstein breed of all ages and levels of lactation milk production.

Today the most promising area of milking equipment improving is believed to be the process of providing of the most comfortable animal state during milking. The intensity of milk production technology is based on the introduction of mechanic, automatic and computer processes. This causes the changes in technology of maintenance, feeding, milking and care of dairy cattle.

To date a robotic milking attracts many farms in Ukraine. One of the drawbacks of milking technology is its constructive imperfections of milking equipment, that has no any of elements of process control, milk obtaining and counting of volume of milk. Currently, the agricultural machinery market offers the most modern foreign machinery of leading foreign companies, as «Delaval» and Companies. Effective measures to improve productivity in dairy farming is a complex mechanization and cows milking, that are equipped with automated devices that control and regulate the process of milking according to the physiological state of animals, the quantity and quality of milk. With the development of automatic animals milking the means of mechanization of this process have undergone significant changes, both in principle of the release of milk obtaining, and in improvement of mechanization, and automation of certain operations, and organizations of milking process. New mechanized milking technologies are based on the stimulation of animals milk efficiency by creating and maintaining of a positive impact of external stimuli on conditioned and unconditioned reflexes of animals during the milking process.

Indicators of productive qualities of cows were fully defined by physiological activity of lactating body. Peculiarities of lactation give a clear specification to the changes in milk efficiency. It is proved that the young cows of

the I and II lactation period give milk in a lower volume than older cows. Cows of the III and IV-th lactation period and older are considered to be productive. It is found that the frequency of milking changes according to the physiological condition of the animal.

Thus, throughout the whole productive use the nature of physical yield of milk considering lactation period and is variable in nature. Physiological activity of the body is gradually increased to the fourth lactation period and then remains almost constant. Therefore, with age physiological activity of the organism of cows on synthesis and secretion of milk, increases.

Given the age of voluntary milking cows in lactation has a significant impact on the frequency of visits to the milking robot.

Therefore, evaluation of frequency of visits to the milking robot for voluntary milking conditions shows that the age of the cows in lactation has a significant impact on its value.

**Key words:** holstein breed, frequency of visits, milking robot, productivity, voluntary milking system.

**Young rabbits productive indicators under intensive growing technology****L. Darmohray, M. Shevchenko**

One of the most important production processes in livestock is feeding that provides animals need with energy and nutrients. The need for these substances depends on body weight, age, performance, physiological status, nutritional status and temperature of the surrounding. Complete animals feeding ensures all nutrients provided the optimal value of them. Under conditions of intensive technology of growing attention is paid to balancing rations for both females and calves, with the exchange energy and protein. This technology of rabbits growing bases on dividing the period of growing into suckling and to-raise one. For this technology, rabbits are weaned at 30–40 days of age when they reach the live weight of 850–950 g. To raise continues to 90–100 days of age. During this period the rabbits body weight reaches 2.8–3 kg. According to domestic and foreign scholars in the 21st. century an urgent problem is providing animals with complete proteins because the lack of them negatively impact on animal performance. Protein nutritional value is determined by the quantity and quality of protein in feed. Today's market has different feed ingredients high in protein. These feeds include yeast. However, there are very few publications on yeast biomass in the rabbits diet. Relevance of the research is to study the influence of feed yeast LLC "Polissya production – pilot plant" on the productive performance of rabbits.

The aim of research was to determine the optimal number of studied yeast as part of complete granular animal feed and study their impact on the productive performance of rabbits of White Termonska breed. To achieve this goal scientific, economic and physiological experiments have been conducted. The object of study is use fodder yeast (TU 15. 733336034–001:2005) in the feed for young rabbits. Subject of the research is productive quality, carcass yield, nutrient digestibility of feed. To achieve this goal 75 rabbits of white termonska breed 40 days old (the method groups) were selected. Young rabbits contained indoors under the same conditions (cell batteries). To feed young rabbits full-granulated feed were used in, the structure of which was different content of fodder yeast: 1 control group – 3 % of fodder yeast research 2–5 %, 3–7 %, 4–9 and 5 % – 11 %. The period of the experiment was 50 days.

Feed for rabbits includes the following feed ingredients: middlings com, middlings oats, middlings flour, middlings barley, wheat bran, soybean meal (35 % joint venture), sunflower meal (28 % joint venture), straw winter wheat, yeast, salt, premix (4 %). Nutritional feed for all experimental groups of rabbits was similar. With increasing amounts of fodder yeast reduced the number of soybean meal. Feed with different content of fodder yeast incorporates a positive impact on the productive performance of rabbits and digestibility of nutrients of feed under the intensive cultivation technology. Research has found that the optimal dose of fodder in the fodder yeast of young rabbits white Termonska breed is 9 %. Rabbits of this group are characterized by better indicators of growth. The average increase for the entire period of the experiment in rabbits of this group was the highest and was by 41.1 g, 7.2 % ( $P<0.05$ ) higher than in the control one. At the end of the experiment, namely at 90 days age, rabbits live weight was 2957 grams, 4.5 % ( $P<0.001$ ) more than weight of peers. The mass of slaughter and carcass yield was higher than the control group by 6.81 % ( $P<0.001$ ) and by 1.23 % ( $P<0.001$ ). In this group of animal figures diet digestibility of nutrients were higher than in the control group peers, but significant difference was noted with crude protein – 2.2 % ( $P<0.05$ ). Physiological research confirmed the results of scientific and economic experiment on the feasibility of using 9 % of fodder yeast feeds consisting of granulated feed for young rabbits under intensive cultivation technology. Prospects for future research is to study the effects of different quantities of yeast strains feeding on reproductive performance of doe rabbits.

**Key words:** young rabbits, feed yeast, feed, productive performance, digestibility of nutrients.

**Evaluation of meat productivity of the offsprings of ukrainian black spotted dairy breed of different live weight by EUROP and JMGA systems****O. Kruk**

Meat productivity is an attribute the studying of which has a significant scientific and practical meaning. It is evaluated according to live weight and fatness. Nevertheless they do not give precise and objective data considering meat productivity. That is why the most precise evaluation can be achieved only after slaughtering of animals. Qualitative evaluation of beef should be carried out from two standpoints, as food stuff and as materials for processing.

An example of leading countries tells us that they concentrated all their efforts on creation of modern management systems in animal science field. In Ukraine, even now, meat-packing factories use methods given in old state standards. This particular problem does not give a possibility for national manufacturers to become equal players on the world market, even though conditions for this were established. That is why studying qualitative characteristics of meat productivity of animals with different live weight before slaughtering according to EUROP and JMGA systems are essential.

Conformation of carcasses has a direct impact on the yield of cutoffs during deboning. With refinement of conformation of carcasses the yield of technologically valuable cutoffs increases. With increase of factual live weight of stirks before slaughtering the points for conformation are increased nonuniformly. The highest value of that point 9,7 ( $R^+$ ) is observed at the mass from 401 to 450 kilograms, the lowest 7,6 ( $R^-$ ) – from 350 to 400 kilograms.

Carcasses of investigated animals were characterized by “inconspicuous” subcutaneous fat regardless of live weight before slaughtering. Intramuscular fat improves sensory qualities of beef (taste, aroma, softness). The low content of intramuscular fat impairs sensory quality but optimal content gives beef desired marbling and softness. The softness of meat depends on quantity of connective tissue diameter of muscle fibers, accumulation and distribution of fat.

In the groups of animals with different factual live weight point for marbling of the longest spine muscle (*m. longissimus dorsi*) fluctuates from 2,7 to 4,0. The highest value of that point can be observed at live weight of 500 kilograms before slaughtering. The color of muscular and fat tissues with the increase of factual live weight before slaughtering intensifies and enlarges according to color strip from 5,0 to 5,8 points and from 4,7 to 5,3 points.

The longest back muscle (*m. longissimus dorsi*) – the biggest muscle in the musculature of the spine and constitutes the basic mass of the meat of two valuable junctures – sirloin and back parts. With increase of live weight of stirks before slaugh-

tering its area was increasing but at the mass of over 500 kilograms we observed decline down to 72,0 cm<sup>2</sup>. The thickness of subcutaneous fat on carcass is an important index and influences technological indexes of beef quality. The increase of its thickness on carcass is undesirable so as the quantity of fat cutoffs increases and the yield of eatable parts of carcass declines.

The thin layer of subcutaneous fat in the carcasses is also undesired so as it causes fast cooling which may become the reason for stiffening of beef, drydown, discoloration of muscle tissue. The thickness of subcutaneous fat on the carcass increases depending on factual live weight of animals before slaughtering from 0,7 (from 350 to 400 kilograms) to 1,3 cm (over 500 kilograms).

Coefficient of correlation between marbling and thickness of subcutaneous fat on carcass at live weight from 350 to 400 kilograms estimates 0,46 (moderate), at live weight from 401 to 450 kilograms – 0,42 (moderate), from 451 to 500 kilograms – 0,10 (low) over 500 kilograms – 0,65 (moderate). Marbling increases with the enlargement of subcutaneous fat on carcass. Received data approve the correlation between marbling and the thickness of subcutaneous fat on carcass which would allow manufacturers to forecast marbling depending on the thickness of subcutaneous fat on the carcass of slaughtered animals.

**Key words:** factual live weight, conformation of carcasses, the longest back muscle (*m. longissimus dorsi*) marbling.

### **The latest volumetrically planned and technological solutions of premises for beef production**

**I. Lastovska, M. Lutsenko**

The latest volumetrically planned and technological solutions of premises for feeding cattle are developed and their efficiency defined.

The most acute today problem is to provide population needs for meat, especially for beef. This is because the number of cows in comparison to 1990 is decreased almost three times, beef sales for the past 15 years have decreased by 5 times. Already low daily gains of calves decreased by 20 %, and on average for Ukraine they are 250–400 g per day, which is three times less than in EU.

Low efficiency in this field is caused by old technology use for production, and therefore the labor costs of production is 20 times higher than the cost in European countries. The productivity of cattle to a large degree depends on the way of its keeping.

Tethered cattle is the most spread way of nowadays keeping in Ukraine, used both by specialized enterprises and small farms. Reconstruction of farm for advanced technologies of feeding and growing cattle, new organization of work that takes into account the physiological state and productivity of livestock at this stage will allow to increase production of beef in Ukraine. Reconstruction of premises compared to new construction allows at a relatively small cost and with short-term period to increase productivity of work, reduce energy and resources in production, increase live weight gain of calves, return of fixed assets and profitability of production.

For the renovation of existing buildings of 21 m wide and 36 m long with tethered cattle we proposed loose method with zone placement of cattle, which suggests a zone for feeding and a zone for rest. Straw bedding is proposed for rest zone to make a comfortable bed, which is delivered periodically by technical means. To ensure high-quality indoor environment the light-aeration range and side curtains are proposed.

Under traditional beef production technology and a high concentration of livestock, there sharply arises the question of feeding process management, especially fodder preparation and dispensation. The existing at farms fodder workshops cause additional expenditures for fodder transportation and preparation. Therefore the reconstructed premises will use multifunction machines, providing loading and weighing of each ration component, its dosing, mixing, delivering and distributing of ready mixture, the so called “fodder combine”.

The proposed new volumetrically planned and technological solutions of premises for growing and feeding calves, rational area planning, providing each unit with feeding and resting areas, make comfortable conditions of keeping different age groups of calves.

Thus the live weight gain of calves at different periods of growing is increased by 10–15 %, and cost for food is decreased by 12–18 %.

Keeping calves in small groups of 20–40 heads decreases the labor cost for handling, in particular for feeding by 44.3 %. Under such technology the maintenance of one premise for 500 calves is provided by one farm worker. With food tables use, the cost for construction is decreased by 14%, labor cost for food residues removal is decreased by 4–5 times, and fodder losses are decreased by 18 %. Along with specified advantages, the food tables use allows not only to reduce cost, but to implement the new up-to-date technic for preparation and distribution of fodder.

Reconstruction of animal premises for growing and feeding cattle of 21 m wide and 36 m long, according to the designed newest volumetrically planned and technological solutions, ensures comfortable conditions for keeping different age groups of calves, increases their productivity and reduces labor cost for keeping and feeding calves.

**Key words:** reconstruction, volumetrically planned solutions, technology, feeding, beef, loose technology, efficiency.

### **The composition of the boilers intestinal microflora after using polyfunctional probiotics**

**Yu. Melnychenko**

This article gives results of research of the impact of probiotic preparations Laktobas and Probidid on microflora of the digestive tract of a boiler chickens. The correction of microflora of poultry was installed to upward a normal flora and to reduce pathogenic microflora. Strains that been used in biotechnology of probiotics characterized by an unique combination of a high antagonistic action to pathogens, high immunomodulatory, metabolic activity, harmlessness for macroorganism and automicroflora, high resistance to the external environment. A health of poultry depends of a balance between normal and potentially pathogenic microflora. Any changes in this balance will be accompanied with functional disorders which, in turn, lead to lower productivity. Disbalance of intestine and death of chickens can be avoided by using probiotics. Receiving

groups of new biotech drugs – immunobiotics – based on a pre-selected and characterized representatives of normal microflora of poultry, including strains of lacto- and bifidobacteria – this is an important problem of modern biotechnology because of wide-using of this prebiotics, and prebiotic therapy is getting more popular than antimicrobial. That's why development of probiotics and their using to prevent and cure diseases of livestock and poultry is an urgent task today. Dysfunction of the immune system resulting from a changes in the environment, wide application of new chemotherapeutic agents of different nature, disruption of normal microflora is one of the major causes of increasing aggressiveness of opportunistic commensal microorganisms with subsequent development of infectious and inflammatory disease. The results of experimental studies, that have been obtained in recent years, show that under influence of the probiotics was observed a normal flora of alimentary canal, immune status – was restored; increased phagocytic activity of monocytes, neutrophils and macrophages.

Strains that been used in biotechnology of a probiotics are characterized by an unique stats: combination of high antagonistic action to pathogens, high immunomodulatory, metabolic activity, non-harming to the microorganism and automicroflora, high resistance to environmental conditions.

Modern requirements of the European regulatory law in the field of probiotics include the need for comprehensive studies of the biological activity of individual probiotic cultures, and combinations of them, when creating products based on probiotic monocultures lacto- and bifidobacteria or their different combinations. The aim was to study the influence of probiotic preparations Laktokas and Probifid on the composition of intestinal microflora of a broiler-chickens.

Experimental studies were performed in a vivarium conditions of the BNAU. The experiment was carried out on the groups-analogues of broiler-chickens of a cross: «Cobb-500», that was formed in the 2 groups. Preparations used with food, throughout all of the growing period: the second group received probiotic «Laktokas» and «Probifid» in a dose of 0,5 g/kg and the first group of a poultry served as controls and received a standard diet. For the researches were used: a drugs Laktokas (dry form) and Probifid – probiotic supplements for poultry, composed of a lyophilized strains *Lactobacillus casei* IMB B-7280 and *Bifidobacterium animalis* VKB. Chickens of all groups were kept indoors with floor maintenance system in compliance of all zoohygienic requirements. Microflora of the intestinal tract of birds were tested, by seeding bacterial trials on the selective medium. Isolation and identification of microorganisms was performed by using a multistage system, which included the allocation of a pure culture, learning their cultural, morphological, tintorial and biochemical properties of these cultures. For the microbiological studies there were used: selected samples of the containance in different parts of the intestine tract of a chickens. In 1 g of the containance of the guts was determined number of *E. coli*, lactobacteria and bifidobacteria. There were conducted a calculations of the quantitative composition of the studied bacteria samples, the results were transferred into a logarithms to define a ratio of a different groups of microorganisms of the microbiocenosis in the intestines of a chickens in a different age groups. With using studied drugs, was found, that correction of the intestinal microflora of the poultry was holding upwards beneficial microorganisms and reducing the pathogenic microflora. This studies tell us that, it is advisable to use drugs: Laktokas and Probifid to normalize microflora of the animals, especially in industrial poultry-keeping. Those are an ecologically pure drugs that are physiological and safety for poultry. Further researches should be aimed at the studying of the action of probiotics on the resulting quality of poultry's products.

**Key words:** probiotic preparations, immunomodulated properties, probiotic strains, gut, lactobacteriae, bifidobacteria, broiler chickens, microorganism.

### **An innovative approach for the identification tension teat cup liners**

**A. Palič**

One of the conditions for the proper organization milking machine is monitoring the work of milking machines and equipment. The dynamics removing milk and cost of manual labor during machine milking exercise significant influence properties teat cup liner rubber milking cups length, elasticity, integrity and product design – shape, size and head hole sucker. Teat cup liner needs to keep milking cups on the teats of the udder, preventing their decay and creeping.

When milking stretched teat cup liner under periodic vacuum arises in the milking cup, stretched and compressed 50–80 times per minute for 5–6 hours per day and, as shown by recent studies the dynamics of change in the elastic properties and structural parameters teat cup liner after 10 days work, it is extended to 2–3 mm, changing its thickness and form elastic properties deteriorating, pressure vacuum closure is changed to 0,5–0,7 kPa of the original, and this affects the speed and duration milking. In addition, because of the very poor quality and heterogeneity the material from which made rubber, these changes occur irregularly in the milking cups a single machine. Therefore, the process of milking occurred normally necessary to conduct re equipment milking cups on vacuum compression teat cup liner and monitor its status over the life of.

Scientific and economic research (testing of the developed method and apparatus) conducted on the basis DPDH "Kutuzivka" Institute of Animal Academy of Agrarian Sciences of Ukraine Kharkiv region on the national milking installation.

For daily use of a long and busy milking equipment on dairy farm an important factor for its success and profitability is a clear adherence milking and to avoid breakdowns or failures in milking machines.

For rapid and reliable determination of teat cup tension liner milking cups in a production environment prompted designed device.

The device consists of a reading device (watch type indicator) with a limit measuring up to 25 mm, case, fixation screw stop, the movable sleeve, the turning lever and fixed insert.

The device operates as follows: the device is ready for use (indicator reading clock type are in the home) is introduced in the middle teat cup liner rubber and placed in an upright position, with emphasis limits the depth input device. Swivel lever and fixed insert in contact with the inner surface of the rubber, thus determining its tension. Size is determined by the clock tension rubber scale indicator.

An example of the proposed method for determining the tension teat cup liner milking cups are the results of measurements of tension set new sets teat cup liner milking machine ADU-1 and after a certain period of operation.

It was proved that with increasing lifetime teat cup liner milking machine ADU-1 from 0 to 4 months decreases the tension of 56–60 to 43–45 N. Maximum speed of milk is reduced from 2,0–2,1 to 1,3–1,4 l/min., and the average rate of milk from 1,7–1,8 to 0,9–1,0 l/min.

The proposed device and method proved their effectiveness in terms of production. They provide high precision and efficiency in obtaining suitable information need not to determine the material costs for rubber tension milking cups, provide information on tension teat cup liner, which is made with milk as compatible handset, and separately, after installing it in the milking cup and the operation of milking machines.

Implemented research and development will allow broader studies that focus on the technological process of machine milking cattle. The data will create the conditions to enable controlled interaction teat cup liner milking cups with the udder of animals.

**Key words:** machine milking, teat rubber, lactation performance, device, method.

### **Behavior and productivity of sows during year and different keeping conditions**

#### **M. Povod**

It was conducted the research of studying of sows behaviour and productivity with different keeping conditions during four seasons of the year. It was determined that during all seasons the sows spent time for activity and standing 14,2-25,2 % of researching time. For feeding piglets they spent 11,6-13,4 % of the time during day. The most of the time during day sows had rest (lying) – 59,1-74,2 %. The most actively sows behaved in winter and spring (17,5-25,2 %). At the same time during hotter seasons of the year their activity was lower. In summer it was 14,2-18,4 %, in autumn – 15,6-19,9 %. And on the contrary the part of the rest time was higher during summer 69,5-74,2 % and during autumn – 66,7- 72,5 %. Time for the rest in winter was 61,9 % in brick pen of old design and 70,9 % in modern pen with polymeric grated floor. The sows which were kept in pen without fixation spent less time by 4,7-12,2 % for the rest (lying) in comparison with sows kept in modern pen with fixation. The difference in duration of resting time was the highest in spring – 12,2 % and the lowest in summer – 4,7 %.

The duration of active phase of sows behavior in pen of old design was 1,4-25,2 %, at the same time in advanced pen of modern design it was 14,2-17,9 %. Within activity time the most part was the feed intake – 40,4-77,5 %. In pen without fixation the activity time for feed intake was in winter – 40,4 % in summer – 70,1 %, in pen with fixation – 72,0 % in winter and 83,8 % in summer. For feeding piglets swine spent 10,8-13,4 % of the time during the day. It was observed the tendency for reducing the time for feeding piglets in pen with modern design in comparison with traditional pen. Time of the year didn't have the influence on the time for feeding the piglets.

During all time of the year there was not essential difference between polycarpous, heavy litter and nest weight in different pen type.

The number of piglet, their safety, individual mass and nest weight at weaning were essentially different in different type of pen during year. The sows kept in modern premises during winter had safety index higher for 5,2 % ( $p < 0,001$ ) in comparison with sows kept in traditional premises. At that time of the year the nest weight at weaning was heavier for 13,2 kg ( $p < 0,001$ ) in comparison with sows kept in traditional premises.

At spring the average number of piglets at weaning in modern premises was higher by 8,7 % ( $p < 0,05$ ) in comparison with traditional premises which determined by higher safety by 6,1 %. The individual piglet weight at weaning in spring also was in average by 0,6 kg ( $p < 0,05$ ) or by 8,2 % higher in comparison with average piglet weight which was kept in traditional premises during the same season.

During summer piglet safety before weaning was higher by 2,9-3,2 % in comparison with winter and spring. Also the difference of this index was lower in premises of different design and was 3,62 % in comparison with winter 5,2 % and spring – 6,1 %. The piglet safety at summer was higher by 3,9 % in comparison with winter and by 7,0 % in comparison with spring.

It was determined that in autumn the prolificacy was essentially lower than in summer by 4,8 %. In traditional premises the tendency of reducing prolificacy was higher in comparison with modern premise. In modern premises the number of piglets at weaning was higher by 7,6 % ( $p < 0,05$ ) in comparison with traditional one. At this time of the year the piglet nests in modern premises were heavier by 9,3 % ( $p < 0,05$ ) in comparison with traditional one.

The piglet safety before weaning was a little bit worse in comparison with summer and was almost at the level of winter and spring. Like at other time of the year it was better in modern premises by 5,9 %.

Thereby it was determined that the sows behavior depends on time of the year and constructive features of premises and farrow pens. In modern pens the sows had more rest by 6,8-19,0 % and were less active by 27,5-32,4 %

The new design features of the premises and equipment had no significant impact on the multiple pregnancy and large fetus of sows, but provided significantly higher by 3,4-7,0 kg ( $p < 0,05$ ) and weight of the nest of pigs at weaning and safety of piglets by 3,6-6,1 %. The time of the year also affects the safety of piglets.

**Key words:** sow, pig, prolificacy, safety, weight of nest, design features, pens for farrowing, behavior.

### **Correction of free radical oxidation of proteins in the boar's bodies**

#### **S. Polishchuk**

Course of various physiological and pathological processes is caused by the individual characteristics of the organism. Free radical oxidation of lipids and proteins in the cells of various organs are occurring with varying intensity. Reactive oxygen can modify the structure of proteins and lipids of biological membranes, which in turn leads to disruption of metabolic processes in cells. Male's sex cells are extremely sensitive to the active forms of O<sub>2</sub> (AFO) because of grate content of polyunsaturated fatty acids and proteins.

Due to the peculiarities of the chemical structure and the structural organization of proteins, the process of oxidative modification of proteins (OMP) is complex and specific. It is accompanied by violation of skeletal structure of the polypeptide chain or of individual amino acid residues.

The accumulation of protein oxidation is one of the factors which regulate the synthesis and breakdown of proteins, activation of multykatalyzing proteases which are selectively destroying oxidized molecule. In fact, the destruction of oxidized proteins is evaluated as a manifestation of secondary antioxidant in tissues.

OMP is one of the earliest and most reliable indicator of lesions in free radical pathology, as well as one of the markers of oxidative stress. In this regard, the use of drugs with antioxidant and metabolic properties is promising direction in biology. These includes biologically active drug with vitamins and minerals "Multybakterin."

For research there were used boar-sires of Large White breeds and synthetic lines SS23. The material for the study is semen. The intensity of OMP was evaluated by content aldehydnitrophenilhydrazones and ketonitrophenilhydrazones (ADNPH and KDNPH). The content of middle mass molecules (MMM) was determined by screening of autoimmune processes assessed by the content of circulating immune complexes (CIC). Experimental datas were processed by conventional methods of statistics.

Using of "Multybakterine" for feeding increases the total protein in semen of boars. So, on the 15th day of the experiment the protein contents of sperm plasma of purebred boars increased by 23.6 %, in synthetic line animals - by 24.8 % as compared with the control. A similar trend is evident in sperm cell's plazma. Boar-sires ejaculate of both breeds consisted with oxidation products of proteins which reacted with 2,4-dynitrophenilhidrazynе. The basic amount formed dynitrophenilhidrazones belongs to aldehydogenic and ketogenic neutral.

Against the background of compound feeding semen plasma of boars of both breeds had a tendency to decrease in the concentration of KDNPH neutral. The number of these OMP products in semen plasma of sires Large White breed decreased by 23.2 % and in animals of synthetic line by 10.1 % compared to rates in control. This marked the likely reduction ADNPH neutral in purebred boars 2.0 x animals synthetic line SS23 - 1.6 times compared with the control. On the 15th day of the experiment the concentration of aldehydogenic and ketogenic by main character boar sperm plasma studied species was actually 2 times lower in comparison with the original neutral. By the end of the experiment the number of OMP products main character continued to decline relative to carbonyl compounds neutral.

Number of ADNPH by main character in sperm cell plazma of Large White breed animals for two weeks using "Multybakterine" did not change. However, the significant reduction of all factions oxidized proteins compared with controls were shown by the end of the experiment revealed. Fluctuating contents of various products OMP have their own characteristics, which are probably due to the conditions of their formation. For example, some OMP products are formed by direct interaction with protein molecules AFO, while others are formed by the interaction of the products of lipid peroxidation and glikooksydation.

The degree of endogenous intoxication in animals by the use of "Multybakterine" was studied based on the content of MMM for 254 nm and 280 nm. The results showed that feeding multicomponent drug for boar-sires help to reduce MMM in their semen. So, on the 15th day of the experiment the number of sperm plasma MMM280 of purebred animals is reduced by 11.8 % and in animals synthetic line by 18.8 % compared with the control. On the 30th day the level of middle molekular peptides in boars research groups continued to decline to 41.2 % and 37.5 % respectively. The concentration of MMM in sperm sires slightly higher compared to plasma sperm.

Functionality of humoral immunity in the boars bodies by using of "Multybakterine" was assessed by circulating immune complexes (CIC). Under physiological conditions, the formation and presence of CIC in biological fluids is one of the manifestations of the immune response to antigens and it is an important factor that provides immunity. CIC concentration in plasma and semen plazma of boar-sires of large white breed slightly higher compared with animals synthetic line. Against the background of feeding the drug "Multybakterine" is shown the tends to decrease circulating immune complexes in the ejaculate studied groups of animals.

Feeding "Multybakterine" for boar-sires improves the adaptation of the organism in industrial pig. In particular, it is shown the decrease of concentration of products of oxidative modification of proteins in semen of studied animals.

**Key words:** boars, semen, oxidative modification of proteins, molecules mass medium, circulating immune complexes.

### **Melliferous lands soil acidity effect on Pb and Cd concentration in drone larvae homogenate**

**S. Razanov, V. Shvets**

Drone larvae homogenate is used in bee- farming as feed additive. Free amino acids, minerals and other microelements contribute to bee-families vital functions stimulation, as well as to 15-20 days increase in bees life expectancy, up to 50 percent increase in females fertility. Also, the family power grows quickly which results in 15-18 percent increase of the family honey yield.

Application of these products for therapeutic purposes requires monitoring its quality and safety.

It has been proved that the intensity of heavy metals inclusion into the soil-plant-products circulation depends to some extent on the melliferous lands soil pH. However, the impact of this factor on the quality of drone larvae homogenate has not been sufficiently studied. Therefore, the aim of our research was to study the influence of melliferous lands soil pH on the concentration of heavy metals in drone larvae homogenate.

The research was conducted under conditions of the Right bank steppes in Vinnytsa region. The research material was drone larvae homogenate produced by bees from buckwheat pollen. The research material was harvested from the bee-families, located on two melliferous land grounds (№ 1 and № 2), the pH of the soil of these was within 4.7-4.9. Buckwheat was grown on these grounds, and its nectar and pollen was the raw material for the drone larvae growing. Lime had been introduced to № 2 land soil at the rate of 6 t / ha and the pH wash brought to 7.4 for the previous three years.

Drone larvae were sampled from bee families from each experimental field during the buckwheat flowering. Soil sampling was performed by the cover method. Formation of families was carried out according to the analog groups method. Drone larvae homogenate was obtained in the manner described V.P. Polishchuk, which included frames with the nine-day

old drone larvae removal from the bee alveary and shredding the larvae and infiltrating the obtained mass obtained. The mass was further poured into special vessels, numerated and then heavy metals content determination was carried out in the laboratory. Determination of heavy metals movable forms in bee pollen was carried out by atomic absorption method on AAS-200 device in the agrochemical laboratory of Vinnitsia NAU.

Heavy metals migration of in the soil → plants system results in accumulation of these substances in the pollen and nectar, which is the raw material for the production of drone larvae homogenate. Therefore, we can assume some of Pb and Cd accumulation in this product.

The obtained results showed some accumulation of Pb and Cd in drone larvae homogenate. However, it should be noted that exceeding the maximum permissible concentration of Cd and Pb in drone larvae homogenate was not found under both 4.9 and 7.4 soil pH of the melliferous lands. Thus, the concentration of Pb and Cd in drone larvae homogenate of the control group bee families was lower than that of maximum permissible concentration by 3.08 and 3.75 times respectively whereas the difference between the MPC experimental group and the actual concentration of was even bigger and amounted to 56.3 in Pb and to 10.7 in Cd in the similar products obtained from the control group bee families.

At the same time, it should be noted that Pb and Cd concentration in drone larvae homogenate obtained from the experimental group bees was lower than that in the similar products obtained from the control group bee families by 18.3 and 2.86 times respectively.

Research results are reflected in the figure, also show some influence of liming acid soils bee lands on factor accumulation Pb and Cd in drone larvae Homogenate.

Specifically, Pb accumulation rate in drone larvae homogenate under conditions of 7.4 soil pH was 1.5 times lower in comparison with the similar products of the lands with the soil pH of 4.9. A similar pattern was observed in Cd. Thus, Cd accumulation ratio was 3.1 times lower in drone larvae homogenate under soil pH of 7.4 as compared with the same raw material obtained from the lands with the soil pH of 4.9.

Therefore, liming acid soils in melliferous lands changed Pb and Cd accumulation rate and concentration in drone larvae homogenate which, in turn, promoted pH decrease from 4.9 to 7.4 and can find its further development in the high quality apiculture products under anthropogenic impact on the environment.

**Key words:** lead, cadmium, drone larvae homogenate, soil, accumulation factor, lime fertilizers.

### Indicators of glutathione dependent enzymes activity in the brain tissue of rabbits

**N. Rol, S. Tsehmistrenko**

The rabbit breeding is perspective industry of agriculture, that provides a population with dietary meat. In terms of highly-intensity industrial technology of the industry it is almost impossible to avoid the influence of stress factors such as weaning, changing the type of feeding. In the pathogenesis of stress is hyper production of reactive oxygen species (ROS) bioenergetic and neurochemical systems of the brain. Brain ranks first among the tissues by the number of oxygen consumed per unit of weight; this level is so great that superoxide radical transformation is only 0.1% of metabolized neurons of oxygen may be toxic to it. Thus, the antioxidant system of the brain has a relatively small margin and deficiency of its components is very dangerous for the functional activity of neurons.

Of particular importance in antioxidant protection belongs to glutathione antioxidant system. The components of this system are glutathione metabolic and enzymatic link, namely, glutathione peroxidase (GPO), glutathione transferase (GT) and glutathione reductase (GR). The reduced form of glutathione (SH) with NADP · H influenced GPO reacts with free radicals and inactivates the toxic effects of free radicals due to oxidation of glutathione. Restored oxidized glutathione under the influence of GH, which is induced by conditions of oxidative stress.

Correction enzymatic activity glutathione dependent system opens up new perspectives in solving problems of increasing adaptive and compensatory capacity of the organism, restore homeostasis in vital biochemical systems in terms of pathology, expanding the boundaries of the adequacy of the perception of a factor adverse effects on the body. The objective of the work - to study changes in the activity of glutathione peroxidase, glutathione reductase, glutathione-S-transferase and glutathione levels in brain tissues of rabbits of New Zealand breed in different age periods. The study found that the highest glutathione content in brain tissues of rabbits was 75 days age –  $1,99 \pm 0,01$  mmol/g. Glutathione is the main component parts of glutathione antioxidant system, which quickly mobilized with increasing content of peroxides and restores them in response, accompanied by the formation of oxidized glutathione (GSSG), which is toxic to cells. The content of GSH in the middle of the cell depends on the speed of balancing opposing processes such as *de novo* synthesis involving  $\gamma$ -glutamyl-cysteine synthetase and output in the extracellular space and regeneration through restoration and use of GSSG in neutralizing  $H_2O_2$ . Glutathione restores  $H_2O_2$  to water and organic hydroperoxides - to hydrocompounds and interrupts the chain of intracellular reoxidation reactions. The high level of activity GPO is possible only on condition of maintaining a sufficiently high level of intracellular GSH, which not only serves as a substrate reactions, but also a factor necessary for the permanent restoration placed in the catalytic center of the enzyme selenium groups in the oxidized glutathione peroxidase reaction. GPO activity in brain tissues of rabbits decreased in 15- and 30-day age. It is possible that a gradual decrease glutathione peroxidase activity in this period is due to the exhaustion of the available pool of GSH and the accumulation of lipid peroxidation products. Starting from the 45th day GPO increased activity in the 90-day age was almost reached baseline.

Decreasing the activity of glutathione reductase in the 90 days age almost 5 times compared with those one days old rabbits. The most likely cause of reduced activity of the enzyme with age is the lack of regeneration of NADP pentose phosphate pathway in glucose oxidation. Normal functioning of the cell NADP · H -dependent glutathione reductase is essential to prevent oxidative damage to mitochondria that are unable to synthesize glutathione *de novo* and therefore depend on the intensity of oxidized glutathione glutathione reductase recovery and its income from the cytosol through the outer mitochondrial membrane.

Glutathione transferase activities marked increase throughout the study period. The 45-day age GT activity increased 1.6 times, and the 90-day at almost 2.4 times. Increase of enzymatic activity of GT can testify activation processes of neutral-



ization products of lipid peroxidation and is a compensatory process aimed at inactivation of endogenous metabolites nature. Glutathionetransferase using GSN that prevents toxic action of radical oxygen species and electrophilic metabolites provides a significant portion of conjugation reactions. According to the research data were obtained from the dynamic changes of basic components of glutathione links antioxidant in the body of the New Zealand breed rabbits of all ages. It is noted increased activity of glutathione-S-transferase 2.4 times, while glutathione reductase activity decreased. The results demonstrate that the enzymatic link of glutathione system is directly involved in shaping the adaptive response of the body to the action of various stress factors. Correction of enzymatic activity dependent glutathione system opens up new perspectives in solving problems of increasing adaptive and compensatory capacity of the organism, restore homeostasis in vital biochemical systems under stress, expanding the boundaries of the adequacy of the perception of a factor adverse effects on the body. Investigation of the role of glutathione in the biochemical mechanisms of pathology will identify areas of search for new means of regulating levels of glutathione and on this basis to increase the effectiveness of industrial growing rabbits.

**Key words:** antioxidant system, glutathione, glutathione peroxidase, glutathione reductase, glutathione-S-transferase, brain, rabbits.

### **Characteristics of beef and carcasses of bullocks of Ukrainian meat breed of different classes**

#### **A. Uhnivenko**

An assessment of beef and carcasses of Ukrainian meat breed bullocks belonging to different classes was carried out according to TS 46.14.09-96, that provide beef cattle division into two categories. The category "A" includes big sized animal breeds. The category "B" includes precocious ones. Young animals are divided into three classes based on body weight and/or weight of carcasses: prime, first, second. The standards for carcasses according to their quality are determined.

A slaughter performance of Ukrainian meat breed bullocks, which belong to category «A», depending on their age, is studied comprehensively. It was found, that with the age a content of adipose tissue in the fat depot tends to increase. Net increase and percentage of bones tend to reduce. But still, quantitative and qualitative characteristics of carcasses according to their weight are not full. Thereby, the purpose and objectives of the research was to develop the characteristics of the meat performance of bullocks of different classes according to their carcasses weight by TS 46.14.09-96.

Data about meat performance of Ukrainian meat breed bullocks, which are breeding at the plant "Volva" (Cherkasy region) served as a study material. From the very birth to a weaning date an offspring was kept with mothers. At the age of 8 months animals were put to the test on their own performance; it lasted until they reach the age of 20 months. After a slaughter (according to TS 46.14.09-96) animals, whose carcasses weight was more than 270 kg were classified as a prime; those of weight from 250 to 269 as the first class; from 220 to 249 kg – the second. The area of "eye muscle" of the longest back muscle (m. Longissimus dorsi) was determined in accordance with the requirements of ICAR.

Because of the high slaughter performance of young animals an evident contradiction in classifying them on live and slaughter weight is observed. There is a significant difference between slaughter performance of bullocks of different classes. The highest performances (56.9 %) show animals of the prime class. According to this characteristic they are preferential if to compare with their peers of the first and the second classes by 2.8 and 3.9 times. The length of the half-carcasses of animals of the first class is by 2.5 and 4.6 % bigger, and hip circumference by 3.7 and 9.2 % bigger than of their peers of the prime and the second classes. Bullocks of the prime class have better characteristics of hip length, but the difference between groups is insignificant.

The increase in young animals carcasses weight improves their muscling development. The highest (103.8) muscling development coefficient (excellent) K1 have animals of the prime class and it is higher than of peers of the first and the second class by 10.8 and 16.3 %. Good muscling development coefficients K2 have young animals of the first class. Bullocks of the second class have much lower basic characteristics comparing to their peers of other classes.

With the increase of the weight of animals' carcasses the area of "eye muscle" increases, so that indicates the longest back muscle and forecasts the performance of a muscle tissue of the highest grade. The width and the depth of "eye muscle" is different for all classes, but the animals of the prime class show the highest characteristics.

The best (82.3 %) water retain ability of a meat have bullocks of the first class. The juiciness of meat depends on its ability to retain water and hold it in intramuscular fat. This is determined by area of beef and water stain. Bullocks belonging to the prime class have an area of stain bigger than animals of the first and the second class by 21.1 and 2.4 %.

A tendency of decrease of the moisture content and the increase of dry matter in the longest back muscle is traced as the class of bullocks gets lower. Water retain ability and meat boiling characteristic of animals do not differ significantly.

Thus, the data on meat performance peculiarities suggest, that the highest carcasses performance, an "eye muscle", hip length and muscling development coefficient K1 have bullocks with the weight above 270 kg. Characteristics of water retain ability and meat boiling characteristics do not diverge significantly among bullocks of different classes. The worst quantitative and qualitative characteristics have bullocks of the second class. So, it is expedient to choose bullocks of Ukrainian meat breed of the prime and the first classes for better meat performance indicators.

**Key words:** Ukrainian meat breed, carcasses characteristic, area of "eye muscle", technological properties of beef.

### **Improving the quality of feed due to the introduction anisorb in the pigs diet**

#### **N. Begma**

There was developed a new and improved feed additive – anisorb that protects health of animals deactivating mycotoxins, found in contaminated feed. Also it is multicomponent preparation, which includes various of mineral compounds and has high specificity in binding and neutralization toxins in the GI tract, the main binder of which is a hydrous aluminum of complex shape.

The mechanism of anicorb's actions is adsorption – neutralization of toxins in process of bonding with adsorbed additive components by elektrostatischen of attraction. Due to the high level of electrostatic connections are stable to changes in pH in

the gastro-intestinal tract and keep the mycotoxins so much that they become unable to participate in the process of digestion. The cations of magnesium and potassium contained in Gtat sodium aluminosilicate, do not lead to an imbalance of sodium, which is believed, reduces the usefulness of phosphates. Anicorb has acidic properties and therefore effectively acts on the intestines. The area of coverage of 1 g anicorb is 12 sq m the stomach.

Due to the synergistic action of the components of the drug anicorb links active chemical groups, leading to the formation of new molecular structures. By increasing their size, these new structural formations are not adsorbed onto the inner walls of the intestine. Adsorption of mycotoxins occurs in the small intestine and they do not have time to penetrate into the organism. Also has the polarity that gives the ability to link both positively and negatively charged mycotoxins. Anarb is not toxic and not irritating to respiratory ducts, skin and mucous membrane, non-corrosive hardware, so it can add simple tools or even by hands. It mixes easily with food, does not separate during storage and transportation, does not alter the shelf life of feed. Products from farm animals after consumption anderbo can be used for food purposes without restrictions. Does not contain dioxin and GMO.

For ration formulation was determined the actual nutritional value of forage resources used in the experiment, by carrying out chemical analysis. About half rations conforms to the norms of feeding.

In the main period of the experiment, the diet of pigs was fully supplied with energy and protein. In the beginning of the experiment the total nutritional value of the diet was 2,65 feed units and 285 g of digestible protein. Animals received daily: 0,9 kg dirty barley, 0,7 kg dirty wheat, 0,3 kg of maize, 0,3 kg BPD "Grower" per head per day. For the period of the experiment, which lasted 105 days, as the pigs of the control and experimental group differed good indicators of fattening.

In the beginning of the experiment the animals of the three groups in the average live weight did not differ. At the end of the experiment the animals of the I – th control group had a live weight 106,56 kg, II experimental 112,22 kg and the difference with the I-th control 5,66 kg, III – 115,67 kg is the difference significant and reliable, is of 9,11 (8,55 % when  $P \geq 0,999$ ). Average daily live weight gain in animals of the experimental group were higher in comparison with analogues in the control group. Best indicators daily gain during the period of experiment were obtained on diets with feed additive – abcorb, which was added to 3 kg per 1 ton of feed – 747,82 g, 13,05 % higher than the experimental group.

A characteristic feature length of fattening pigs is the precocity of animals. More precocious animals fattened faster, increasing the production of pork and faster vacate the premises for fattening animals. As a result of scientific and economic experiment that the growth vigor qualities and higher energy growth differed gilts third experimental group. They significantly outperformed their peers from other research groups by age reaching a live weight of 100 kg for 12 days.

Abcorb supports the immune system, reducing the risk of inflammation and contributing to the preservation of the health and safety of the respiratory and urinary system, liver; improves the safety of livestock; promotes the formation of granules, not bind vitamins and other nutrients.

**Key words:** young growth of pigs, feed additive, anisorb, mycotoxins, metabolism, mineral food, productivity.

### The preparation of yeast origin NuPro in broiler's diets

V. Bilkevych, L. Dyachenko

The efficacy of different doses and periods of feeding preparation of yeast origin NuPro (nucleoprotein) were studied in two scientific experiments on broiler chickens cross "Ross-308" in a production environment of Starosil'ska station LLC "Cherkassy Poultry Plant" (p. Staroselie, Gorodishche county, Cherkasy region, Ukraine). For both experiments (directly in the poultry house with a total capacity of 16 ths. birds) 500 broiler chickens were selected, and divided into 5 groups of 100 birds each. In the first experiment, starting from the first day, chicks of the first (control) group were fed with standard fully balanced feed. The poultry of 2, 3, 4 and 5th experimental groups were fed with the same feed, but during the first 7 days the feed was supplemented with 1, 2, 3, and 4 % of mass fraction of the preparation NuPro. In the second experiment, control broilers group received feed without preparation of NuPro. During respectively – 7, 14, 21 and 42 days the poultry of 2, 3, 4 and 5th experimental groups were fed with the same fodder, but with adding to it the optimal dose NuPro.

During the experiments feed intake, body weight dynamics and safety of livestock broiler chickens, feed conversion, microbiological, and hematological parameters slaughter were studied. The results were subjected to biometric processing.

Results of the 1st experiment showed that the introduction of NuPro into a feed in 1–4 % of mass fraction improved growth rate of experimental chickens. The average daily weight gain for the 1st week in control chickens was 21.7 g., at the same time their analogues in 2, 3, 4 and 5th research groups gained by 6.8; 8.7; 7.3 and 4.2% more. Body weight of broilers of 2-4th research groups at 42-day of age was also higher and amounted to 2622,8-2764,1 against 2534.8 g in control, with a simultaneous reduction in feed costs by 1,1–2,2 %. The overall evaluation of the results of the 1st experiment established that the optimal dose of NuPro in the fodder is 20 kg/t. In the second experiment the supplementation of the feedstuff with the optimal dose NuPro during 7 days improved feed intake of broilers of experimental groups compared to the control, and increased average daily gain respectively: during the first week – by 12,0–12,9 %, during the second week – 10,8–13,6 % and 3rd week – by 9,8–14,5 % ( $P < 0,05$ ). For the growing period from 21 to 42 th day, when feedstuff with NuPro supplementation was fed only to birds of 5th experimental group, an average daily gain of chickens in all research groups prevailed control by 8,7–14,2 %. Overall, throughout the whole experiment an average daily gain of broilers in 2-5th experimental groups were higher than control by 9,2–13,7 %. Survival rate of chickens was the highest in 3 and 4 experimental groups – 99 %, and the cost of feed for poultry in the 2-5-th research groups decreased by 3,5–9,6 %.

Supplementation of NuPro to the fodder was accompanied by a decrease in broiler's droppings of escherichia enterococci with a simultaneous increase of the desired flora – bifidobacteria and lactobacilli. The difference compared to the control, was, respectively – 7,9–17,0 and 6,6–15,5 % with NuPro feeding within 14 days, and 7,0–24,2 and 6,2–22,6 % with NuPro feeding for 21-day and 6,1–28,6 % and 4,9–27,0 % with NuPro feeding for 42-days (5th experimental group).

The results of blood tests revealed that the blood of birds in experimental groups had more red blood cells, higher hemoglobin, total protein, nucleic acids, and observed increased enzymatic activity.

Controlled slaughter demonstrated that the weight of broilers in the 2–5 th research groups exceeded control analogs by 187,6–265,6 g, slaughter body yield – by 0,87–1,42 %, processed chicken weight – by 141,9–206,4 g, or 10,4–15,1 %. The greatest difference between the indexes of processed broilers in the experimental and control groups took place when NuPro was fed during 14 th and 21 days (3rd and 4th experimental group) and continuously (fifth experimental group).

Meat quality of broiler from research groups dominated over control group. In particular: the total weight of the edible body parts of the broilers in the 2 nd experimental group was higher than the control by 6,1 % and by 18,3–19,5 % ( $P < 0,001$ ) in the 3-5th research groups, thoracic mass m' muscles of broiler carcass 2-5 th experimental group was higher than in control, to 15,0–24,2 %, muscle mass of the thighs and legs – 10,9–17,4 and body, wings and neck – on 17,3–24,3 %. Utilization of NuPro supplement in feedstuff helped reduce amount of inedible body parts in experimental broilers compared to control by 4,2–5,8 %, which, in turn, improved their meat index (5,46–5,84 against 4,62 in control).

The overall evaluation of the data suggests that 42-, 21- and 14-days NuPro feeding periods provides the best impact on the growth of broiler chickens. Additionally, according to economic estimates, the optimal supplementation dose of feedstuff with NuPro (20 kg / t) over 7, 14 and 21 th day provides additional profits from each broiler at 2,26; 3,21 2,83 GRN in the corresponding groups, and the continuous feeding brings loss at 0.31 GRN per broiler.

**Key words:** broiler chickens, productivity, feeding period dozes.

### Using probiotic feed additive "PROPIHplv" in the diet of sows

**I. Bogdan**

The basis of the research is tasked with optimizing gestation sow feeding normalized by use in the diet of fodder additive "PROPIHplv" production International Probiotic Company, Slovakia, which obtained the technical specifications and permission to use in Ukraine.

Studies have shown that the optimal dose feed additive "PROPIHplv" in gestation diets of sows, which positively affected the exchange rates of nutrients in animals, as well as the dynamics of live weight for the gestating period is 4–5 g per.

Probiotic feed additives – is important naturally occurring microorganisms that have the ability to positively influence when administered in the diet on the physiological, biochemical and immune response of the host organism through stabilization and optimization functions microflora of the gastrointestinal tract.

In recent years, a huge number of probiotic feed additives, so the main objective of our research was to investigate the effect of productive probiotic feed additive "PROPIHplv" as part of the diet of gestation sows.

The main trend of breeding sows in many countries is to reduce rations composed of inorganic additives replacing them with organic dietary supplements natural substance which without prejudice to animal health has a positive effect on the digestive processes in the gastrointestinal tract. Do of probiotic feed additives, which appeared to market of our country, include: "PROHALplv", "PROPIHplv", "PROPUOLplv" Slovak production. These biological feed additives contain probiotic strains microorganisms and components of natural origin with antibacterial action on pathogenic and opportunistic pathogenic microorganisms and destination for both animals and poultry.

The basis of the research is linked with the task of feeding process optimization through use in the diet of gestation sows of large white breed feed additive "PROPIHplv" against the background of the concentrate type of feeding animals.

Analysis of the total feed cost estimates showed that the need for energy and nutrients in gestating sows first period did not significantly differ from the needs of blank sows. It should be noted that the experimental animals gestating during the first period (84 days) consumed the same amount of feed. Some differences were observed in the second period, which can be attributed to the positive impact of feed additives. The whole period of gestating sows in the study groups was stable.

Thus, as a result of the introduction of the feed additive "PROPIHplv" in the diet of sows research groups within 84 days of the first period gestating average daily live weight control group comprised 442.8 g and 2, 3 and 4 experimental groups, respectively – 501.1; 529,7 and 540.4 g, which is 58.3; 86.9 and 97.6 g or 13.1; 19.6 and 22.0 % more, thus emphasizes the positive effect of feed additives on digestion in the gastrointestinal tract of sows. Along with the digestibility of nutrients and dynamics of the live weight of test animals is important efficiency of feed protein in the body, as this mainly depends on the intensity of their growth and development.

Studies have shown that the experimental feed additive dose showed a positive effect, not only on nitrogen digestibility and assimilation and performance of sows it in the body of experimental animals.

Thus, according to the average daily nitrogen exchange we can state that the optimal dose feed additive "PROPIHplv" in gestation diets of sows is 4–5 grams per head/day.

We will conduct diverse research, to study the use of probiotic feed additive "PROPIHplv" in the diets of sows received from young after birth and at weaning and fattening.

**Key words:** farrowing sows, feed additive "PROPIHplv", ration, nutrition, nutritional value, digestibility, live weight, balance.

### Influence of mixed ligade complex of Copper on the balance of Nitrogen in the organism of piglets

**V. Bomko, S. Dolid**

Attaining the high level of the productivity of animals on condition of maintenance of their health and receipt ecologically clean products is impossible without providing them with biologically-active substances. In this connection in recent years much attention is paid to research of influence of different vitamin-mineral additives of organic origin on animals productivity.

In the system of the procedures led to the increase of production of goods of the pig breeding, next to the improvement of terms of feeding and maintenance and improvement of pedigree qualities of animals a large role is taken to the study of metabolism in early periods of post natal ontogenesis.

In zootechnical experiments the study of balance of substances that enter in the organism of animal is widely applied, and on this index we come to the conclusion about sufficiency of feed in the conditions of the tested feeding.

Balance of Nitrogen gives an opportunity to set the level of the use of protein of feed in the organism and estimate the influence of assimilated nitrogen of feed on formation of muscular tissue of the body.

The aim of the work was a study of economic action of mixed ligade of Copper in the composition pre-starter mixed fodder on balance of Nitrogen in the organism of piglets taking into account their breeds.

Full value of the mixed fodder, fed to the piglets during experience and protein that was contained in it may be estimated on the balance of Nitrogen.

On the amount of assimilated Nitrogen, in the first experience, pigs of large white breed of the 2nd, 3d, 4th and 5th tested groups exceeded control respectively on 2,1; 2,9; 5,2 and 6,3 %. Different levels of Copper in the ration stipulated a difference between the groups of pigs on the amount of Nitrogen released with an excrement. So, on the indicated index animals of the 2nd, 3d, 4th and 5th tested

On the amount of Nitrogen released with urine, animals of the 2<sup>nd</sup> and the 3d tested groups were the same. Advantage of pigs from the 4<sup>th</sup> and the 5<sup>th</sup> tested groups over the control group was respectively – 4,7 and 5,1%.

Ratio between the amount of assimilated and used nitrogen the pigs of the 2<sup>nd</sup> tested group prevailed control on 1,0 %; the 3d – on 1,4; the 4th – on 2,7; the 5<sup>th</sup> – on 3,1 %. Administration of chelates of Copper to the mixed fodder of pigs of Landrass breed did not influence substantially on balance of Nitrogen in their organism, certain differences took place though. So, animals of the 2d, the 3d, the 4th and the 5th tested groups Nitrogen was assimilated more on 2,1; 4,3; 6,3 and 4,6 % respectively with the analogues of control group.

Pigs from control and tested groups differed between each other by the amount of released nitrogen with an excrement. So, for piglets of the 2d and the 3d tested groups nitrogen with an excrement was even, and the animals of the 4th and the 5th tested groups released it with an excrement on 8,2 and 6,6 % less in compare with control group.

On the amount of Nitrogen released with urine, animals of the 2d, 3d, 4th and 5th tested groups were lag behind from the control group on 0,9; 6,1; 4,3 and 3,7 %.

An important economic index is ratio of assimilated Nitrogen to fed with a fodder. On this criterion animals of the of the 4th tested group exceeded the control group on 3,1 %. Pigs of the 2d, the 3d and the 5th tested groups also prevailed the animals of control group on 1,3, 2,6 and 2,5 % respectively.

Thus, at feeding to the pigs of Large White and Landrass breeds the full ration mixed fodder with the different doses of organic mineral compound of Copper the balance of Nitrogen in the organism of the tested animals was positive. However, Nitrogen was best assimilated in an organism of those animals, content of mixed ligade complex of Copper in the mixed fodder presented for the Large White breed – 2,72 g/t and Landrass – 5,45 g/t of mixed fodder. On the indicated index these animals prevailed pigs that consumed a ration with the sulfate of Copper (15,1 g/t) on 6,3 and 6,4 %.

In the second conducted experiment on the three- and four breed hybrids the balance of Nitrogen the animals of experience groups had positive and clearly differed from the analogues of control groups. Using of different doses of mixed ligade complex of Copper in rations stipulated a difference between the groups of pigs on the amount of nitrogen released with an excrement. So, on the indicated index three breeds hybrids of the 2d, the 3d and the 4th tested groups were lag behind to the pigs of control group on 1,1, 5,1 and 2,0 % respectively, and for the animals of the 5th tested group an amount of Nitrogen in excrement was less on 0,3 % in compare with control. On the amount of Nitrogen released with urine, advantage of pigs of the 2d, 3d, 4th and 5th tested groups presented 1,7; 7,8; 2,4 and 2,6 % respectively.

Using chelates of Copper in the mixed fodder led to the increase of amount of assimilated Nitrogen in pigs of all tested groups I compare with the control group. This increasing was 2,5; 7,3; 2,8 and 2,5 % for the animals of the 2d, 3d, 4th, 5th tested groups.

Purebred hybrids of the control and tested groups were fed by equal amount of Nitrogen there was no difference in the excrements and digestion among the groups. Animals of the 2d, 3d, 4th and 5th tested groups released nitrogen with excrement on 2,6; 5,5; 1,7 and 1,2% less than analogues of the 1st group. It testifies that animals from the 3d tested group used Nitrogen better then animals from the 2d, 4th and 5th groups. So, animals from the 2 d group assimilated Nitrogen – 11,46 g; 3d – 11,98g; 4th – 11,51 g; 5th – 11,53 g. Animals from the 3d group assimilated Nitrogen on 7,1% less then animals from the 1st group.

The use of digested Nitrogen on sustentation and increase of body weight was high for the animals of all groups and presented in the 1st group 59,75 %, 2 – 60,65 %, 3 – 62,88, 4 – 60,62 and 5 – 60,73 %.

Thus, the most subzero index of the use of Nitrogen was shown in the piglets of control group, in feeding of that used the inorganic forms of Copper. Introduction in the composition of the mixed fodder for piglets on fattening of chelates of Copper in an amount of 10,9 g/t of mixed fodder assists the increase of amount of assimilated Nitrogen that testifies more intensive growth of muscular tissue in the organism of piglets of tested groups.

**Key words:** young pigs, rations, productivity, mixed fodler, live weight, Nitrogen balance.

### Efficiency of the use of enzyme preparation in feeding of chickens-broilers

#### L. Bomko

Noticeable reserves for the increase of production of goods of stock-raising are based on the increase of coefficient of transformation of nutrients of fodder due to application of enzyme additives.

Enzymes are biologically active substances, that are not accumulated in an organism, they do not pollute an environment, positively influence on transformation of energy and nutrients of fodder in stock-raising products. Enzyme preparations are the obligatory constituent of the mixed fodders for poultry. Forage enzymes do not operate directly on microbes to the intestine, but influence on their food base.

Increase of digestibility of cellulose in the rations of chickens-broilers as a result of application of the microbial cellulase with an increase hydrolysis activity, obtained due to improvement of biotechnology, has an important scientific and practical value. So, optimization of nourishing environment for the strain *Aspergillus terreus* of Copper in organic-mineral compound allows to get ultimate product –forage additives of cellulase enzyme.

Application of the experimentally set optimal concentration of complex Copper in composition of nourishing environment for the strain of *Aspergillus terreus* allows to obtain domestic cellulolytic enzyme additives with an increase hydrolysis activity and resistance to drying. It in turn is one of ways of improvement of domestic biotechnology of cellulase production.

The objective of the research – studying efficiency of the use of enzyme of cellulase, obtained due to the improvement of biotechnology in the feeding of chickens broilers.

On the basis of model, biochemical and scientific results of investigation it was proved the necessity of correction of mineral compound of nutrient environment for the strain *Aspergillus terreus* of Copper with the help of it's chelate form, efficiency of feeding it in the combination of mixed fodder of this enzyme to chickens broilers was set. Using cellulase in the mixed fodder for chickens broilers, obtained due to the improvement of biotechnology leads to the increasing of their productivity by 9,5 % ( $p \leq 0,001$ ).

To prove the results of scientific experiments in the condition of “Poultry Farm Bershadskiy” production monitoring of efficiency use of enzyme of cellulase obtained due to improvement of biotechnology was conducted. With this aim among of one-day age chickens broilers control and tested groups were formed containing 320 heads each. Control group received a standard ration which contained cellulolytic enzyme from the strain *Aspergillus terreus* which was cultivated on the nutritive environment without introduction of Copper. Tested group was given cellulase in the amount of 1 ton of mixed fodder – 68,0 g. Cellulase, obtained from mushrooms grown up on cultural fluid with content 0,5mg/l of organic complex of Copper. Indices of micro climate, care of chickens and their keeping were the same for all groups and met to the set requirements.

Results of conducted production examination proved positive influence of introduction cellulolytic enzymes to the combination of mixed fodder on the average daily gain of chickens broilers. Thus, replacement cellulose of mushroom origin obtained without introduction of Copper on the enzyme obtained from the strain *Aspergillus terreus* which was cultivated on the nutrient environment with content of metal 0,5 mg/l in the form of organic- mineral complex in the compound of mixed fodder for chickens broilers promotes increase of poultry productivity by 2,5 %.

With the increase of growth intensity of tested chickens fodder costs on 1 kg of live weight was marked, it was 4,8 % less than in the control. It should be noted that quantity and cost of used fodder additives were different.

In the result of calculation of economic efficiency of the use of cellulase of different origin during the period of chickens growing had impact to the profit from sale of chickens live weight.

So, feeding of the recommended mixed fodders during growing of chickens-broilers assisted the increase of population and gross production of meat, accordingly, by 0,9 and 3,5 % comparatively with control.

As a result of increase of gross production of goods expense of the mixed fodder volume from a calculation on 1 kg of increase of live weight in the tested group were by 4,81 % less comparatively with control. Additional introduction cellulase to the mixed fodder obtained with using organic complex of Copper decreased the cost of fodder, as a result general costs on the production of meat of chickens-broilers in the experiment diminished by 1,3 %. After conducted calculation, prime price of 1 kg of broilers increases in the tested group and was by 4,6 % less comparatively with this index of control group.

*Aspergillus terreus* that was cultivated on a nourishing environment with maintenance of metal 0,5 mg/l in the form of organic complex, for growing of chickens-broilers, that assisted the increase of level of profitability by 8,6 % comparatively with control. For the increase of the productivity, reduction of charges of forage on unit of increase of chickens-broilers and improvement of breaking up of cellulose that is an antinourishing factor, it is necessary to add to one ton of the mixed fodder 68,0 g of the cellulase obtained from the strain *Aspergillus terreus* that was cultivated on a nourishing environment with compound 0,5 mg/l of organic complex of Copper.

**Key words:** chickens-broilers, enzyme cellulase, organic complex of Copper, economic efficiency, net profit, profitability.

### **Amino acid composition of muscle tissue of young pigs at feeding PVMS Minaktyvit**

**V. Bondarenko**

In livestock production, the importance of not only the number of received products, but also its quality, which is associated mainly with feeding.

Among the studied parameters amino acid composition of proteins in muscle tissue more fully reflect its biological value. In addition, the amino acid composition provides guidance on the capability of pork as one of the full-value nourish source. Amino acids are scarcely lay in stocks in animals, for that matter the balance ratio in nitrogen metabolism is determined by exogenous revenues.

We must pay constant attention to the problems of valuable protein animal nutrition and especially the young, because the body, which grows, is extremely sensitive to the lack of certain amino acids in the diet.

Feeding and meat quality of pigs – are basic and most valuable properties, from which essentially depends on the efficiency of production of meat. However, with the problem of meat and meat products is a problem of quality, including quality of carcasses.

In comprehensive definition of the quality of meat products the main attention must be focused at assessing the amino acid composition of the longest back muscle.

One of the important aspects of solving the problem of the quality of carcass is feeding animals with balanced rations based on protein feed. PVMS Minaktyvit goes with the feed factors that significantly affects on the quality of meat. This is new additive and in animal nutrition it hasn't been used. Therefore, the study of amino acid composition of meat is extremely important.

Experiment consisted of comparative and base periods. Comparative lasted 15 days. During this period, the animals received balanced complete feed compound. In the base period of the experiment animals from control group received diet with PVMS, ani-

imals from research group – as part of the grain ration PVMS starter Minaktyvit in an amount of 250 kg/t. Duration of feeding additives in such amount lasted 33 days. When reaching a live weight of 30 kg, the animals received PVMS hrouer Minaktyvit in the amount of 150 kg / t. Feeding duration lasted 50 days. From 60kg of live weight the research group has already received PVMS finisher Minaktyvit in the amount of 100 kg / t. The base period of the experiment lasted 145 days, after which a controlling slaughter was held and were taken away samples of the muscle tissue for the determination of amino acids in it.

Fortification the diets of young pigs with PVMS Minaktyvit has no negative effects on feed intake and positively effects on the number of studied parameters.

Productive performance of feeding PVMS Minaktyvit manifested in increasing the average daily weight gain at 95 g, or 15,68 %.

The positive effect of feeding supplements appears on swine growth intensity from research group. The indicators of live weight proves this. The animals of experimental group increased absolute growth to 13,55 kg compared to control.

In the study of amino acid composition of muscle tissue of experimental animals is observed the probable increase in almost all fungible and some essential amino acids.

Overall in the muscle tissue of young animals, which eat PVMS Minaktyvit amino acid, content of amino acids increased by 6,12 mg per 100 mL compared to their counterparts in the control group.

**Key words:** PVMS, starter, hrouer, finisher, feeding, muscle tissue, amino acids.

### Use of mixed legade complex of Zinc in the feeding of cows in dry period

**V. Danylenko, V. Bomko**

To organize rationed biologically valuable feeding of cows it is possible by the selection of such correlation of high-quality forage in rations, what would meet the physiology of animals feeding, gave an opportunity to the organism maximally to use nutrient substances on formation of products, maintenance of good state of health during life. It is necessary to take into account that organic and mineral substances of forage, that are in the rations must take the deep chemical converting in the organism of animals with obligatory participation of substances that stimulate and regulate these processes.

Such substances are proteins-enzymes, that accelerate chemical reactions in the organism in millions times and in the complement of that microelements and vitamins that enter with forage or with premixes. Absence of some microelements or vitamins leads to decrease of enzymes activity and resulted in metabolic disturbance in the organism of animal, worsening the state of animals health, decline of the productivity and reproductive ability. Zinc deficiency in rations reduces fecundity of dams, and protracted deficiency can result in their sterility.

The objective of the research was determining of optimum levels of mixed legade complex of Zinc in the combination of Copper, Cobalt, potassium iodide and sodium selenite in the feeding of highly productive cows in the first half of dry period.

To conduct investigation five groups of cows of Black-and-White dairy breed were chosen from "Agrosvit" Mironiv district, Kyiv Region. Difference in feeding of highly productive dry tested cows consisted only in that to the mixed fodder concentrate to the cows of the 1-st control group was entered sulfate of Zinc 795 g/t, that provided recommended norm in this element, and the cows of the 2-d tested group were provided with mixed legade complex of Zinc 895 g/t.

The mixed legade complex of Zinc, g/t was entered the cows of the tested groups: the 2-nd – 895, that provided a deficit on 100 %, the 3-d – 671, that provided a deficit only on 75 %, the 4 – th – 448, that provided a deficit on – 50 %, the 5-th – 224, that provided a deficit on 25 %. The cows of the 5-th tested group received only 25 % deficit of Copper, Cobalt, Iodine and Selenium. During 30 days of dry period, and in the first 100 days of lactation all tested cows received the same set of fodder. In the first 100 days of lactation the rations of tested cows differed in different amount of mixed fodder that was entered in rations calculating on 1 kg of milk yield.

After finishing of comparative period of the experiment the difference in feeding of the tested cows was absent but in the main period of experiment using different levels of mixed legade complex of Zinc affected different on eating forage.

So, from set 4 kg of hay tested cows consumed 3,8–3,9 kg, or 95,0–97,5 %; from 18 kg of corn silage – 15,8–17,7 kg, or 87,8–98,3 %; from 8 kg of clover – 7,2–7,7 kg, or 90,0–96,3 %.

Consuming dry substances of fodder in the calculation 100 kg of live weight of cows resulted 2,1 kg in the 1-st control group and 2,15–2,23 kg in the tested groups. The cows from the 5-th tested group consumed dry substance the best due to best consuming of hay – by 2,6 %; silage – on 12,03 %; clover – on 6,94 % in compare with the control group. Consumed fodder supplied cows with raw protein on the level 14,2–14,33 % from dry substance of heavy soluble fraction on the level of 61 % of raw protein.

Zinc supply was as follows: the 1-st control group 96,1 %, the 2-nd tested group 97,51 %, the 3-d tested group 86,0 %, the 4-th tested group 75 % and the 5-th tested group 64 % to the norm. Supplying of different levels and sources of Zinc in the organisms of tested cows during the first 30 days of dry period directly depends on their live weight.

Weighing of tested cows at the end of the first stage of dry period showed that their live weight was increased. This increasing in the cows of the control group was 24,8 kg and in the tested cows it was more by 1,2–16,5 % or 0,3–4,1 kg more. Difference was reliable for the cows of the 4-th and the 5-th tested groups ( $P < 0,01$ – $P < 0,001$ ).

This difference in gaining of live weight of cows from the control and tested groups may be explained by less requirements of Zinc in this period.

In the second stage of dry period a tendency of live weight gaining was marked in the tested cows in spite of that the levels were the same.

Tested cows differed from control cows on data of live weight on the 3-d day after calving: animals from the tested groups exceeded the control one by 1,4–6,8 kg.

Live weight of calves at birth increased by 2,7–8,7 % in the tested groups in compare with the control one.

Thus, obtained results show that supplying the organism of dry cows with different quantity of Zinc influenced as on live weight of cows as on live weight of calves at birth.

Perspective of further investigations is studying the influence of mixed legade complex of Zinc in the rations of highly productive cows on the quality of colostrums, milk productivity and reproductive ability of cows.

**Key words:** highly productive cows, premix, microelements, acid salts of microelements of Copper, Zinc and Cobalt, potassium iodine, sodium selenite, mixed legade complex of Zinc live weight.

### Slaughter indicators of young pigs with feeding premixes

**I. Datsyukt, M. Mazurenko**

The efficiency of pork production and its quality is largely dependent on rations enrichment necessary quantity of nutrients and bioactive substances. Recently introduced in pig rations consisting of premixes and other feed additives.

Among the new premixes there is Intermiks that is produce by Ukrainian company LLC "Interahroteh" (m. Vinnytsya) for virtually all technological groups of pigs.

The aim of research was to study the performance of slaughtered young pigs grown for meat when fed with Intermiks premixes.

Studies were conducted on three groups-analogues young pigs of large white breed, with initial body weight of 14.5 kg. In groups were 12 heads of animals taken from sows after weaning at 45 days age.

After a 15-day period equalized in the diets of animal groups for the second phase feeding 20–35 kg administered premix Intermiks Visitor Messages in an amount of 1.25 %. And in phase 35–65 kg and 65–110 kg – premix Intermiks BC 1 % by weight of feed.

Young pigs in the third group phase of the main feeding period of the experiment received premix according Intermiks PV-4 %, Intermiks BC-3 % and Intermiks BC-2.5 %.

Animals first (control) group in the different phases of the experiment period, the main diet eat mostly premix PIP Euromixcompany "Eurokorm modern feeding", designed according to the requirements of each phase feeding.

Studies have shown that the use in feeding young pigs premix Intermiks has a positive effect on slaughter performance, but the results in both experimental groups compared to control mixed. Much better were the third group of animals that are in the phase of feeding 65 to 110 kg obtained in the diet premix Intermiks AC-3 and 2.5 %. Under these conditions, in animal experiments ante live weight increased by 16.52 kg, or 15.95 % ( $P < 0,01$ ), weight at slaughter 16.6 kg, or 19.65 % ( $P < 0,01$ ). Quite significant was the increase in carcass weight 14,67 kg, or 21.16 % ( $P < 0,01$ ). However, carcass yield increased by only 2.43 %. The animals of the second group phase in the feeding of 65–110 kg eat premix Intermiks VS-1 %, the likely increase compared to the control value received only three indicators, namely: ante live weight (on 5.19 kg or 5.0 %), slaughter weight (in 2.48 kg or 2.9 %) and weight of the head (on 0.52 kg or 10.2 %).

Absolute data mass of internal organs of pigs indicate that liver, spleen and stomach in experimental groups had no significant alteration in comparison with control. While other organs reacted according to the study factor increasing mass feeding. This refers to the weight of the heart, kidneys ( $P < 0,05$ ) and lung ( $P < 0,01$ ).

Endocrine glands also increased their weight in animals of experimental groups, especially in the third group, where the weight of the thyroid prevailed reference value at 16.84 %, adrenal gland – by 22.54 % and pancreas – to 25.58 %. While in the second group, these figures were much lower – within 4.6–11,5 %.

The increase in mass of internal organs of pigs has a direct correlation with their body weight before slaughter and may indicate a better development of these tissues and improving functional activity in the growth created conditions in supply.

Feeding studied premixes impact on increasing the thickness of bacon pigs. Naytovschym speck was in the third group of animals. Especially in the neck and back – respectively 29.1 and 35.4 % ( $P < 0,05$ ). And at the withers and loins of bacon thickening was 16.6 and 18.6 % ( $P < 0,05$ ).

Indicators of bacon thickness and weight of internal fat of all three groups suggest that the premix Intermiks sun that consumed the animals of the third group, causes intensified fat metabolism. And therefore the absolute increase in body weight during the experiment for the fat content in most of these animals.

Slaughter figures were obtained under the following performance parameters: average daily two and three animal groups dominated their importance in the control respectively by 37 and 141 g or by 5.5 and 21.0 % ( $P < 0,01$ ), at their level and 709 813 g per day.

The daily feed consisted of a set of Dirty barley (44 %), wheat (38 %) and soybean meal (18 %) and premix enriched by the circuit experiment. Total nutrient intake in all phases of feeding a power feed units corresponded to normal. The diet balanced 30 indicators of supply. In addition, as part of premix animal received no vitamin K<sub>3</sub>, B<sub>6</sub>, C, choline, niacin, pantothenic and folic acid. All this contributed to a relatively high growth of animals.

Consequently, the use in feeding young pigs Intermiks new premixes increases downhole parameters.

**Key words:** piglets, premixes, feeding, slaughter indexes, fat thickness, internal organs, glands.

### Scientific bases formation and challenges in farm animal nutrition

**L. Dyachenko, V. Bomko, T. Syvyk**

Based on the analysis of the leading global research and development, the following article traces a step by step shaping of the scientific norms and bases of the livestock nutrition over the course of the last 200 years. Among the proposed methods are: evaluation of the nutrition value in comparable units, which had existed since 1809 over a course of fifty years, and has been known as the «Thaer's hay equivalents»; the evaluation based on the gross value of the nutritious elements (Justus von Liebig); the evaluation based not only on the values of the raw nutrition input, but also based on the nutritious value of the digested feed (E. Volf); the evaluation based on Kelner's starch equivalents; evaluation based on Armsbi terms (whereas 1 term = 1000 kkal of pure energy diverted directly to the product); and finally, the general Scandinavian evaluation of the feed, in which one feed unit is expressed as 1 kg of barley (0,7 of the starch equivalent).

Regarding the national experience in the development of the foundation of standardized livestock nutrition, in the former USSR, and by proxy in Ukraine, in 1922-23 yrs. the oat nutrition unit was developed, based on the productive action of one kilogram of oat (whereas 0,6 of oat equivalent would equal one kilogram of oat) for domestic animals of all kinds. The first practical textbook about livestock nutrition based on the oat nutrition units was «Food norms and food tables», developed by I.S. Popov in 1933. This textbook included four parameters: nutrition units, protein, calcium, and phosphorus. In 1958, an updated version of the textbook was published by M.F. Tomme, and in this new edition, the protein nutrition was replaced by the digestible protein, calcium, phosphorus, and carotene.

In 1985, a group of USSR scientist have developed the reference guide «Standards and ration feeding of farm animals» edited by A.P. Kalashnikov. The main feature of this reference guide was that it had predicted balancing of the rations based on 20–30 factors, and the animal's nutrition needs is developed as the summary of the needs to sustain the animal, needs to get a proper level of production, and the needs for reproduction function. These standards, at the time, demonstrated a major step up in the scientific foundation of the system of normalized feeding of domestic animals.

This article also discusses the issues pertaining to the livestock nutrition. For example, as of right now, the feeding of livestock in Ukraine is based on the norms that were developed 30 years ago, although since those norms had been developed, there have been a lot of progress made, pertaining to the subject, including an accumulation of experimental data related to the influence of different nutrition factors onto the animal's digestion and productivity. With that said, the in-depth research in this field is limited and fragmented, and thus does not fully covers the changes that have been taking place in the gene pool structure of the livestock, the nutrition base, and agroecology. That is why under highly sophisticated technology of production and processing of livestock products it is crucial to re-evaluate current standards based on the analysis of energy, protein, amino acid, fatty acid, carbohydrate, mineral, and vitamin nutrition of the livestock. This is especially important in regards to the high performing animals, focusing on feed standards, methodology of the feed certification, biological accessibility of nutrients and minerals from various types of feed and nutrient supplements, bio-ecological safety, digestion issues, and alimentary diseases.

The article emphasizes that without an adequate supply of full-valued forage to the livestock, achievement of productivity increase up to the genetically inherited potential is out of the question, especially in the bird and pork production. The current state of production in Ukraine is way below it's potential – instead of the potential 20 million, only 7.5 million tons of compound feed is being produced. It is caused by the general decrease of the number of livestock, as well as a wide range of other factors. For example, the state and structure of the crop production are below Ukraine's capability, and thus the task of rebuilding and intensifying the production of compound feed, feeding supplements, and premixes, just like the entire crop production in general, is steadily leaning towards the need for export oriented farming.

It is very much unreasonable to import supplements and premixes into Ukraine, because every single administrative territory within Ukraine has the resources to build an either government or privately-owned plant for the production of the necessary premixes, with each plant having a various output between 1–3 % of the gross output of compound feed. Same relates to the protein, vitamin, and mineral supplements – local production of which could be launched in every state within Ukraine, with an output potential of 20–25 % of the gross compound feed production. There is a solid supply base to make this happen.

**Key words:** animal nutrition standards, feeds, nutrition, mixed folder.

### **Somatometric evaluation of calves' growth when fed with protein-vitamin mineral supplement Intermix**

**S. Yefimchuk, M. Mazurenko**

Somatometric evaluation involves the study of changes in the parameters of mass and linear body measurements of animals in the process of their growth. It is nothing like getting information about the productive qualities of the animal in the specific conditions of its life. This is especially important when raising calves from birth to two months of age under limited milk supply. Milk saving needs demand that from this time calves' feeding is replaced by non milk type of breeding with the need to use different supplements. To do this, protein-vitamin mineral supplements and premixes are developed. Their use in animal feeding can replenish the shortage of certain nutrients in specific diet to normal; introduce additional individual nutrients and biologically active substances, including enzymes, probiotics, antioxidants, etc.

The new protein-vitamin mineral supplement Intermix Calf is designed to prepare a concentrate mixture for calves directly in the farm. This mixture consists of two grain components (barley and wheat) and 30 % of protein-vitamin mineral supplement Intermix Calf, has all necessary feed elements for the growth and development and can be fed from the very beginning of calves' raising. However, it has never been used in animal feeding.

The aim of this study was to investigate the growth and development of calves in the first two months of life (the period of limited milk supply) when fed with protein-vitamin mineral supplement Intermix Calf.

Studies were conducted on calves (heifers) of Ukrainian black-spotted dairy breed by the method of similar groups. To do this, the calves were collected during the first month after calving and were divided into two groups – control and experimental, with 12 calves each.

During a 15-day comparative period, colostrum and whole milk were the main food. For 60 days from the day of birth, the calves of the second (experimental) group received a new protein-vitamin mineral supplement Intermix Calf in the amount of 30 % by weight of feed in the composition of the grain portion of the diet.

In the first (control) group the animals consumed protein-vitamin mineral supplement Europrotcalf in the amount of 25 % of the grain mixture. This rate is recommended by the firm "Euro modern feeding", and the supplement is widely used at the market of feed and feed supplements of the country. In this experiment, it is defined as an alternative (or control) for comparison with the newly created protein-vitamin mineral supplement Intermix Calf, produced by the Ukrainian company Ltd "Interagrotech" (Vinnytsia).

For a two-month rearing period each calf consumed 400 kg of whole milk, hay and silage grasses and legumes – according to the rates, and in fact, plenty.



Studies have shown that the use of a new protein-vitamin mineral supplement Intermix Calf in the amount of 30 % by weight of the concentrate feed in calves' feeding increases average daily weight gains on 75 g, or 11.7 % more than the control, where the animals consumed protein-vitamin mineral supplement Europrotcalf – 25 %.

For a two-month rearing period the live weight of calves of the experimental group increased by 4.2 kg and was 90.7 kg in the experimental and 86.5 kg in the control groups ( $P < 0.05$ ), while the level of average daily gains is 715 and 640 g respectively in groups.

From the monthly absolute and average daily weight gains of calves it turns out that animals of the experimental group are dominated. Second month indicators were relatively higher, reaching the level of average daily gains of 702 and 777 g respectively in the first and second groups ( $P < 0.05$ ).

The linear growth of the experimental animals indicate that feeding with the studied protein-vitamin mineral supplement Intermix has no significant influence on the spatial parameters of the animal's body.

None of the 11 measurements of the body has no reliable difference between the groups.

Obtained weight and linear growth parameters of experimental animals occurred at the optimum level of feeding. For a two-month rearing period each animal consumed 16.5 kg of barley bran, 21.9 kg of wheat bran, 16.5 kg of protein-vitamin mineral supplement, 45 kg of hay and silage grasses and legumes. In total, it is 150.9 of feed units and 20 kg of digestible protein that is 2.56 of feed units and 333g of digestible protein per calf per day along with milk.

Thus, consumption of protein-vitamin mineral supplement has no significant influence on the change of parameters of calves' linear growth in the first two months of life.

**Key words:** calves, protein-vitamin mineral supplement, feeding, growth, development, body weight, measurements.

### **Correction of amino acid feed of broiler chicks during the brooding period**

**P. Karkach, Y. Sas'ko, M. Torba**

The achievement of target live weight during the first 10–14 days of brooding period is one of the key phases of broiler meat production. Of particular relevance is the solution of the problem of delay in the live weight gain in broiler chicks hatched from small-size eggs.

The conducted researches revealed comparatively lower rates of both absolute and average daily weight gain in the batch of chicks with live weight lower in the 1<sup>st</sup> day of age than the target live weight. In this regard, the cost of feed per 1 kg of live weight gain in those batches were higher by 6.2–8.4 percent and accounted for 1.89–1.93 kg of feed per 1 kg of live weight.

It was revealed that one of the reasons for reduction of weight gain in brooding period was insufficient amino acids rate in the chicks' diet, particularly the methionine amino acid, which is a decisive factor. The effectiveness of use of synthetic DL-methionine, when it is additionally introduced into the diet during the first 1–10 days of brooding period, allows for compensating the gain of target live weight by the 21<sup>st</sup> day of age with no side effects. For the purpose of compensatory weight gain during the brooding period, in experimental batches of broiler chicks hatched from small-size eggs the normal dosage of synthetic DL-methionine in the chicks' diet was increased by 0.18 percent, which in total accounted for 0.69 percent of synthetic DL-methionine per gross weight of the feed.

The additive effect of the use of supplementary synthetic DL-methionine is characterized by an increase in average daily and absolute live weight gain, as well as in the target live weight in general, which gave an opportunity to get additional 5 260 kg of chicken meat for the amount of 105 147 UAH from experimental poultry houses with advanced technology.

The achievement of greater live body weight and chicken meat production from the experimental poultry houses with the advanced technology allowed for obtaining a net profit higher by 99444 UAH than usual, and an increase in profitability by 7.3 percent compared to that of the basic technology.

**Key words:** broiler chicks, amino acid feed, brooding period, live weight.

### **Addition the glutamic acid additives to the ration and its impact on the digestibility and the productivity of the pigs**

**O. Karunskyy, Y. Gorokhova**

In this article we provide the research of the important field of agriculture – the pig-breeding, that is the pig-breeding and the receiving the biggest productivity from them. Recently, the problem of receiving the biggest productivity in a short period of time becomes very important, as the world population increases and requires a large number of foods, including meat products, which are an important source of protein.

The aim is to study the influence of the glutamic acid additives to the pig rations, their productivity and feed costs for the production of 1c. of the production.

While doing the research, the following tasks were set:

- to set the optimal dose of glutamic acid in the ration of growing pigs;
- to examine the effect of glutamic acid on the indicators of growth and the development of young pigs, the feed costs on the production of per product;
- to identify the economic efficiency of glutamic acid in the rations of growing pigs.

For a comprehensive study of digestibility and nutrient absorption of the rations, our physiological research was based on young pigs of four months of age. It was based on two groups of animals: the control group and the research group, with the number of 12 animals in each. The ration of animal's feed was twice a month according to the existing rules, taking into account the age and the live weight of the examined animals. On the basis of the analysis of the structure and the nutritional value of the rations, we have regularly performed their balance based on all of the 28 indicators. According to the scheme of the research the animals in the control group were given a ration without added glutamine acid and other animals of the experimental group received a ration in which glutamic acid was added in an amount of 2 g per day for 1 each pig. The glutamic

acid (Glu, E) was added to the basic ration - found in all organisms in the free form (in plasma with the glutamine it is about 1/3 of all free amino acids) and the consistence of proteins. For the first time it was found in wheat gluten, because of which it has got its name. The metabolic processes which takes place in animal's and human's organisms at stresses and diseases lead to large numbers of using the glutamic acid.

The research of the glutamic acid's metabolism is important for understanding its role in metabolic processes and is of great interest to solve many fundamental and practical problems associated with the protein metabolism.

The adding to the ration the experimental glutamic acid made some impact on the tendencies of digestibility and absorption of nutrients. In research group there is the increasing of digestibility by all indicators of nutrition. In comparison with the control group of animals, the digestibility of dry and organic matter increased by an average of 2.4; the protein – by 3; the fat – by 9.9; the crude fiber – by 3.6 and MAR – by 1.5 %.

The received data makes it possible to affirm that the adding of the glutamic acid into the ration of pigs in an amount of 2 g is maximum. The further increase of the glutamic acid in the rations, according to received tendencies, would lead to a decrease of nutrients digestibility coefficients, which in turn negatively affects the productivity of young pigs. It is known that the live weight and the intensity of growth of the animals are the main indicators that characterize the influence of a particular factor on the metabolism and the functional state of any organism.

Our research provides a basis for the economic feasibility (the increase of the live weight gain and the decrease of the feed costs per unit) of the use of the glutamic acid in pigs rations and allows getting the additional production and profits.

**Key words:** pigs, glutamic acid, diet, full feeding, balanced feeding, digestibility substances.

### **Efficiency of the use of feed additive of steady-state Iodine in feeding of cows**

**I. Lykhoshva, V. Bomko**

Dairy cattle breeding in Ukraine requires organization of such level of feeding of animals, that would provide their productivity at the level of 7500–10000 kg of milk. In the complex of measures on the production of competitive goods of animal husbandry an important link is an increase of efficiency of the use of nutritive substances of forage. To achieve this aim additives of biologically active compounds are used in feeding of agricultural animals. Mineral substances and Iodine take an important place.

Iodine deficiency is the leading factor of caw disease and hyper function of thyroid. It is especially observed in young animals. At the deficit of Iodine in forage traditionally to the rations iodine potassium or sodium are added. Such compounds of Iodine are not stable, oxidize easily, as a result of what this element appears in an environment, as a result of what animals do not get necessary amount of element that negatively influences on realization of their genetic potential. Radical decision of this problem in creation and use of forage additives with steady-state Iodine that promotes the coefficient of assimilation of element.

The objective of the research was studying the efficiency of use of aluminium silicate iodine preparation in feeding of highly productive cows during the first 100 days of lactation on the basis of obtained average daily milk yield and conducted qualitative examinations of milk.

To conduct experiment three groups of cows of the Black-and-White dairy breed of the first lactation were chosen from Scientific Investigation center of Bila Tserkva National Agrarian University of Bila Tserkva Region, Kyiv District. In a preparatory period, during the first 20 days of lactation, experimental cows were fed with identical rations.

A difference in feeding of highly productive experimental cows consisted only in that in premix of cows of tested groups iodine Potassium was substituted by steady-state aluminium silicate iodine to the 2-nd tested group 25 g/ t of mixed fodder and to the cows of the 3-d tested group 12,5 g/t of mixed fodder. Amount of clean Iodine in rations, as for the cows of the 1-st control group so for the cows of the 2-nd tested group was identical, and for the cows of the 3-d tested group was 50 % less.

Different forms and doses of feeding of Iodine were caused by not identical consumption of rough and juicy forage for tested cows in an experiment period.

So, from set 4 kg of alfalfa hay tested cows consumed 3,6–3,8 kg, from 20 kg of corn silage – 18,1–18,9 kg, from 10 kg of alfalfa haylage – 8,4–9,6 kg, and cows of the 1-st control group, accordingly 3,4 kg, 17,3 kg and 87,2 kg.

Average daily 4-% milk yields were the most for the cows of the 3-d tested group, aluminium silicate iodine was added to the rations – 12,5 g/t of mixed fodder. From the cows of the 3-d tested group during 80 days of the experiment 3584 kg of milk was received, from the cows of the 2-nd tested group – 3424 kg and from the cows of the 1-st control group – 3224 kg. Yields of 4-% milk prevailed control by 7,5 % in the 2-nd tested group and by 13,3 % – in the 3-d tested group ( $P < 0,001$ ).

In the milk of tested cows increasing of fat content by 0,05–0,07 % was observed due to better supply rations with Iodine at simultaneously increasing of protein in the milk (3,21–3,22 % versus 3,2 % in the control group).

Costs of fodders on one kg of milk were minimum for the cows of the 3-d tested group and resulted 0,68 to one kg of milk. In the 2-nd tested group – 0,69 and in the control group 0,72 per one kg of milk.

Thus, the best data of milk productivity of cows and less costs of fodders to the unit of products were obtained from the tested cows which received aluminium silicate iodine in account 25 and 12,5 gr/t of mixed fodder.

**Key words:** highly productive cows, aluminium silicate iodine preparation, fodder additive, steady-state Iodine, potassium Iodine, microelements, average daily milk yields, protein, fat, fodder costs.

### **Hematological parameters pregnant sows at feeding PVMA Intermiks**

**N. Lyubasyuk, A. Hutsol**

The program of feeding livestock Ukrainian company LLC «Interagrotekh» the newest advances in livestock, resulting in its products provide fast growth and efficient feed use due to optimal balance of required batteries. One of the new developments for feeding sows are PVMA Intermiks PS-7,5 % and the Intermiks LS-20 % and lactation piglets Intermiks «Bambino»-25 % and Intermiks SP-20 %. However, they require scientific substantiation for the next practical use.

The aim of research was to obtain scientific information on the state of morphological and biochemical parameters of blood at feeding pregnant sows new PVMA Intermix PS-7,5 %.

Blood samples were taken from pregnant sows during scientific experiment on the study of economic efficiency in the diets of new PVMA Intermix PS-7,5 %. In conducting this study on two groups of pregnant sows analogues – large white breed, average live weight 161 kg, after the age of second farrowing.

Sows first (control) group received a diet of complete feed. And the second (researched) – 7,5 % of the mass of feed was replaced with a new PVMA Intermix PS, made on capacities Ukrainian company «Interagrotekh».

Blood samples were taken 85 days gestating sows from four from each group and examined by conventional methods. Researches have shown that feeding pregnant sows PVMA Intermix PS – 7,5 % ensures optimum condition of the structural elements of blood that can be seen from the morphological parameters. All of them are within the physiological norm. There are only a few changes within the same rules. Thus, in the blood of sows that consumed PVMA Intermix PS – 7,5 %, there is a tendency to reduce lymphocytes (7 %), platelets (8,9 %), leukocytes (11,3 %) and monocytes (2,5 %). At the same time, incredibly increases the number of red blood cells (2 %).

Consumption of pregnant sows PVMA Intermix – 7,5 % causes an increase in blood calcium ( $P<0,05$ ), and iron ( $P<0,01$ ). Also within two percent increases the amount of phosphorus and protein, 7,3 % colored indicator. Indicators albumin and alkaline reserve are at like animals in the control group.

Thus, the positive impact study PVMA Intermix PS-7,5 % on hematological indicators confirming the working hypothesis that the variant in the developed part of PVMA was provided optimal level of protein, amino acids, vitamins, macro- and micronutrients, adequate to the state of pregnant sows. In this regard, the composition of the new PVMA included over thirty nutrition, including ten energy, mineral and vitamin nature. This is to some extent consistent with the new regulations for swine.

Unlike previous standards, nutritious diet is determined metabolic (exchange) energy (EE) in MJ/kg and power feed units (PFU), where 1 PFU = 10,45 MJ OE. In addition, the valuation put on threonine and tryptophan amino acids and trace mineral selenium. A study composition PVMA Intermix PS-7,5 % is introduced and vitamins K3, H, B6, BC, PP, choline.

Up to 85 days gestation sows received a diet with three a mixture of corn (20 %), wheat and barley (36 %), accounting for 2,5 kg of feed per head per day (3,26 PFU). Feeding the mixture of PVMA Intermix PS-7,5 % contributed to an increase in body weight during gestation sows by 9,3%, had a positive effect on pregnancy and subsequent farrowing.

Thus, feeding pregnant sows SS provides a level of 7,5 % hematological parameters within physiological norm.

**Key words:** pregnant sows, PVMA Intermix, feeding, blood, morphological parameters, biochemical parameters, physiological worm.

### **Slaughter rates in young pigs when fed with protein-vitamin mineral supplement Intermix**

**M. Mazurenko, A. Honcharuk**

Pork is produced on little component grain diets with dry type of feeding on the farms of different organizational forms. So, under such conditions, it is quite difficult to balance diets with recommended feed elements without the use of concentrate supplements of different composition.

The use of modern feed supplements in pig diet provides high growth rate and average daily weight gain of 700–800 g and more, which reduces the time to reach slaughter condition – live weight 110–120 kg.

The new developments include protein-vitamin mineral supplement Intermix, produced by Ukrainian company Ltd "Interagrotech" to the pig's diets of all technological groups under the brand Intermix. Modern criteria regarding the composition of protein-vitamin mineral supplements for feeding phase during growth of pigs are taking into consideration. This requires scientific justification.

The aim of the study was to investigate the slaughter rates in young pigs that are raised for meat, while feeding with protein-vitamin mineral supplement Intermix. The research was conducted on three groups of young pigs of large white breed, with 12 pigs each. The initial live weight was 18,3 kg.

The main period of the experiment was divided into three feeding phases according to the increase of live weight during growth. Experimental young pigs were fed with the same amount of two options of new protein-vitamin mineral supplements in the phases.

Thus, during the feeding phase 20–35 kg the animals of the second group received protein-vitamin mineral supplement Intermix PV-20 % (starter) with the main diet, at 35–65 kg – Intermix VS-15 % (grower-finisher) and at 65–110 kg – Intermix VS-10 % (grower-finisher).

In the third group young pigs received protein-vitamin mineral supplement Intermix VS-20 % (super starter) at 20–35 kg, then Intermix VS-15 % (grower) at 35–65 kg and Intermix VS-10 % (finisher) at 65–110 kg.

When reaching a live weight of 100–110 kg, the control slaughter of three pigs from each group was carried out and slaughter products were accounted.

Studies have shown that feeding of young pigs with protein-vitamin mineral supplement Intermix has positive effect on slaughter rates of pigs. Thus, pre slaughter live weight of the animals in both experimental groups, compared to control, increased by 11,0 and 7,63 % ( $P<0,05$ , respectively 2nd and 3d groups), slaughter weight by 14,0 and 12,7 % ( $P<0,05$ ), carcass weight by 11,0 and 7,65 % ( $P<0,05$ ).

These rates were slightly better in the second group of pigs who received protein-vitamin mineral supplement Intermix 15 % (grower) in the diet during the feeding phase from 65 to 110 kg. Pre slaughter live weight increased by 11,3 kg, slaughter weight by 10,68 kg, carcass weight by 7,1 kg. The carcass yield of pigs in all three groups was practically similar.

In accordance with the increase of pre slaughter live weight in animals of the experimental groups, the weight of by products was also greater – head with ears in 1,3 times, legs – in 1,2 times, skins with tail in 1,3 times and the internal fat in 1,4 to 1,8 times respectively in the second and third groups.

The feeding of studied young pigs with protein-vitamin mineral supplement Intermix has no significant effect on the change in mass of internal organs. It is observed only a tendency to its increase in both experimental groups.

The consumption of protein-vitamin mineral supplement Intermix leads to thickening of the subcutaneous fat of pigs in both experimental groups.

During the main period of the experiment, the productivity of animals is characterized by the following indicators: average daily gains are exceeded the control rate in the second group in 70 g, or 9,9 %, in the third in 36 g, or 5,1 %. Their level is 778 and 744 g, compared to control 708 g. The highest rates were in the phase of feeding 35-65 kg, namely: 803 g (II group), 838 g (III group), compared to 771 g (control).

**Key words:** young pigs, protein-vitamin mineral supplement, feeding, slaughter weight, carcass weight, by products, fat thickness.

### **Indices of slaughter of landrace breed pigs while fattening with mixed legade Zinc complex**

#### **V. Marshalok**

Zinc plays an important role in the organism of animals and human. It's biological role is connected with activity of ductless glands, where it is mainly concentrated. For today the necessity of Zinc for the function of endocrine glands and it's participating in the mechanism of cellular division is proved. So, Zinc effect operating on the organism of animals is multifaceted and optimization of rations with this microelement influences on normalization of progress of different metabolic processes.

The aim is to establish the optimal dose of mixed legade Zinc complex consisting of fodder for young pigs Landrace breeds for fattening that would provide maximum meat productivity.

Scientific and economic research was conducted in conditions of "Elite" Kyiv Region fattening young pigs Landrace breed. Pigs kept for meat production were fed by mixed fodders of own production with the addition of mineral mixture Landmix designed for the manufacture of animal mixed fodder in terms of the economy according to the needs of animals in minerals.

Pigs had free access to food and water, thus ensuring optimum feed intake. Nutritiousness of mixed fodders was the same for animals of all experimental groups and met detailed standards of feeding, but mixed fodders differed on the content of Zinc. Animals eat food with appetite and any changes in the behavior of experimental pigs were not observed.

The nature and feeding and balance of feed and feed additives in the diet depends not only animal productivity and product quality, but also the health and functional activity of internal organs of pigs. Enrichment of rations fattening pigs of Landrace breeds Zinc chelate showed positive impact on slaughter figures.

These data show that pigs mass before slaughter from the 2-nd experimental group exceeded controls by 1.8 %; the 3-d - 2.2; the 4-th - by 3.3 and the 5-th - by 2.1 %. Slaughter mass of animals from the 2-nd experimental group exceeded analogues of control by 2.3 %; the 3-rd - 3.2; the 4-th - 5.0 ( $r \leq 0,01$ ); the 5-th - 3.4 % ( $r \leq 0,05$ ).

Pigs of experimental groups dominated analogues of control also by slaughter yield. This indicator of animals from the 2-nd experimental group was higher than in the control by 0.4 %; the 3-rd - 0.9; the 4-th - 1.4; 5th - by 1.0 %.

Internal fat weighing results showed that Landrace breed pigs have less fat than young pigs of Great White breed. Most of it's weight was found in pigs of the 4-th experimental group - 3.9 % more compared to the control, but significant difference in this indicator was not observed. It should be noted that the head mass of Landrace breed pigs was less than the head mass of Great White breed, and this figure was the highest in animals of the 4-th experimental group and it prevailed by 3.1% of control. According to the mass of head of the 2nd, the 3-rd and the 5-th experimental groups dominated the control animals, by 0.6 %; 1.0 and 2.1 % respectively.

Weighing indicators of feet and pig skin in the 2-nd experimental group did not differ from that of control animals and the 4-th experimental group - dominated control, by 4.5 % and 1.4 % respectively. Pigs of the 3-rd and the 5-th experimental groups dominated control data by mass the feet - 2.3 % by weight of skins - by 0.5 % and 1.0 %, but the difference was statistically improbable.

The thickness of the bacon over 6-7 thoracic vertebrae was similar in all experimental pigs. Area of "muscle cells" in the animals of the 2-nd - the 5-th experimental groups compared with control was higher and amounted to 30.3-30.8 sq.cm that exceeded the date of control by 0,3-2,0 %.

Research of morphological composition of carcasses showed that the yield of meat from animals of experimental groups was high. It should be noted no significant intergroup differences in content of meat, fat and bones in the carcasses. The largest amount of meat in the carcasses of animals was in the 4-th and the 5-th experimental groups respectively by 7.4 % ( $r \leq 0,01$ ) and 5.4% ( $r \leq 0,05$ ) higher than in control.

In the half carcasses of pigs from the 2-nd and the 3-rd experimental groups weight of meat was higher, respectively, by 1.9 % and 3.9 % compared with the control.

Data of fat content in the half carcasses of pigs from the 2-nd experimental group exceeded the control by 4.0 %; the 3-rd and the 5-th - 5.1 % ( $r \leq 0,05$ ) and the 4-th groups - by 6.0 % ( $r \leq 0,05$ ).

The least bones were in the half carcasses of pigs from the 4-th and the 5-th experimental groups - by 6.4 % ( $r \leq 0,05$ ) and 4.3 % ( $r \leq 0,05$ ) less than in the control, and pigs from the 3-d group - 2.2 % less. The content of bones in the half carcasses of pigs from the 2-nd experimental group was at control.

Thus, the enrichment of mixed fodder for young pigs of Landrace breed of experimental groups with chelates of Zinc improves the morphological structure of animals slaughtered and improve performance. Thus the highest rates found in the animals of the 4-th experimental group, mixed legade Zinc Complex was added to the mixed fodder in the amount of 166,4 g/t.

Analysis of the chemical composition of the meat showed that the moisture content in it ranged from 1 %. The difference was statistically improbable. The same mechanism was also set for dry matter content.

The highest protein content was determined in meat of pigs from the 4-th experimental group, this figure is 1 % higher than the control. Protein in the meat of pigs from the 2-nd and the 3-rd experimental groups was higher by 0.3 % and 0.5 % respectively.

Fat content in the longest back muscle was the largest in the animals from the control group - 4.18 %. This indicator in the animals from the 2- nd, the 3- rd, the 4- th and the 5th experimental group was slightly lower - respectively, 0.26 %; 0.48; 2.13 ( $r \leq 0,05$ ) and 1.70 % ( $r \leq 0,05$ ). The highest ash content in meat of pigs was in the animals from the 4-th experimental group - 2.65% ( $r \leq 0,05$ ). In the animals from the 2-nd, the 3-rd and the 5-th groups ash content was higher than control, respectively, 0.04 %; 0.08; 0.1 % ( $r \leq 0,05$ ).

Fat of animals from the control and experimental groups in chemical composition did not differ significantly from controls. The protein content was the highest in the fat of animals from the 4-th experimental group and was 1.95 %, which is 0.30 % ( $r \leq 0,05$ ) more compared with analogues of the 1-st control group.

The analysis of mass indicators of liver, heart, lungs, kidneys and spleen testify positive effect of mixed legade zinc complex on the mass of internal organs of Landrace breed pigs, but significant difference between the control and experimental groups were not established.

As for the digestive system, it should be noted that the pigs who consumed different levels of Zinc chelate had a greater mass of the stomach, small and large intestines. Pigs from the 4-th experimental group that consumed mixed fodder with content of mixed legade Zinc Complex in the amount of 166.4 g/t exceeded control data. Thus, by the mass of the stomach, animals from the 4-th experimental group prevailed control by 10.4 %; by mass of small intestine - 8.7 % and large intestine - 13.5 %.

Feeding young pigs with different levels of Zinc in the form of organic mixed legade Zinc complex in the mixed foddors causes increase of slaughter indices, meat yield and its chemical composition. It should be noted that Landrace breed pigs remarkably exceeded control data at dose of mixed legade of Zinc complex 166.4 g/t.

Prospects for further research is to study the effect of mixed legade Zinc complex in the combination of mixed foddors for young pigs of various breeds and hybrids on productivity, metabolism and accumulation of zinc in products of slaughter.

**Key words:** pigs, mixed legade Zinc complex, mixed fodder, slaughter weight, slaughter yield, morphological composition of carcass, chemical composition of meat, fat, internal organs.

#### **Fatty acid composition of bacon pigs fed with enzyme preparation MEK-BTU-7**

**A. Matvienko, A. Hutsol**

Lard - a highly nutritional product that contains essential fatty acids such as linoleic, linolenic and arachidonic that make up the cell nucleus and affect fertility. In fat essential fatty acids than in butter. Linoleic acid is quite common among plant origin, but linolenic and arachidonic in plants lacking. Linoleic acid enters the body with food plant, forming part of fats of vegetable origin; linolenic and arachidonic same, obviously, are synthesized from the latter. These acids and are considered the most biologically active and fats to which they belong, biologically valuable. Experiments found that fats composed of polyunsaturated fatty acids, exhibit exceptional biological effect on animals.

Therefore, the purpose of these studies was to determine the effect of the new composition multyenzymnoi MEC-BTU-7 "Viradin" the content of fatty acids in the spinal Speck young pigs.

Studies conducted in the "Artemis" (Kalinowski district, Vinnitsa region) in the three groups-analogues young pigs of large white breed, on 10 goals each. The first group was the control. During the 138 days period, the main diet of the animals of the second group was injected enzyme preparation MEK- BTU -7 "Viradin" in the amount of 0.15 kg/tonne feed, the third 0.35 kg/tonne of feed. At the end of the experiment was conducted three control slaughter of animals typical of each group and research adipose tissue samples were taken bacon weighing 200 g at 9-11 thoracic vertebrae.

Productive feeding action of the enzyme preparation MEK- BTU -7 " Viradin " manifested in the increase of average increases of 7.3 and 17.1 % in their levels within 665-726 g for doses of 0.15 and 0.35 kg/tonne of feed.

The results determine the content of fatty acids in the spinal Speck young pigs indicate that enrich the diet of pigs enzyme preparation MEK- BTU -7 "Viradin " has no significant effect on change in the amount of saturated and unsaturated fatty acids in the spinal bacon. However, there are significant changes on the content of individual fatty acids.

Among the group of saturated fatty acids in bacon pig spinal research group increases the amount of palmitic ( $P < 0.001$ ), margarine ( $P < 0.001$ ), stearic ( $P < 0.01$ ) and arahinovoyi acids. At the same time, the number of capric, lauric, myrystynovoyi, pentadetsylovoyi fatty acids virtually unchanged. In general, the amount of saturated fatty acids in the spinal bacon pigs in the control group is 37.51 % of the total acid research and in 38.90 % and 37.49 %.

Among the monounsaturated fatty acids in the spinal bacon pig research groups marharynoleyinovoyi content, oleic acid and hondoyinovoyi increases to the reference level. The difference between the groups by the amount of monounsaturated fatty acids insignificant. Of the group of polyunsaturated fatty acids in the spinal bacon pigs increased the content of linoleic,  $\gamma$ -linolenic,  $\alpha$ -linolenic, and arachidonic acids dyhomolinolevoyi ( $P < 0.05$ ).

A total amount of fatty acids in the spinal bacon pigs three groups is practically at the same level (12.34, 11.46 and 12.41).

Summarizing the ratio of unsaturated to saturated fatty acids, is a factor of saturation. In this experiment it is 1.67 in the control, 1.57 and 1.67 - in the experimental groups.

**Key words:** young pigs, enzyme preparation, feeding, performance, fatty acid composition, fat.

#### **Wormycultivation as an alternative method for producing mineral-protein feed additive**

**Yu. Mashkin, S. Merzlov**

The development of modern competitive market for feed requires constantly finding new ways to improve their quality and reduce production costs. One of the ways to reduce the additives production cost is to use other unconventional technologies of obtaining biologically active protein-containing substances and wormycultivation is among these technologies.

Wormyculture can be a source of protein for livestock and poultry. Growing worms on both industrial basis and in the farms is a rather topical issue.

Californian worms are used in wormycultivation most widely. California red worms hybrid belong to oligochaetae (Oligocheta). Their body length is 60–130 mm, thickness – 3.5–5.0 mm.

The optimum temperature for worm growing is 20–22 °C, and the critical one is below 0 °C and over 42 °C. Under the temperature of +7 °C worms fall into a state of suspended animation. The optimal substrate humidity is – 75–88 %, and the critical one is below 40 % and above 95 %.

The perspective of wormycultivation biotechnology implementing on an industrial basis and in the private sector consists in the fact that Red Californian worm hybrids increase their biomass under organic residues non-waste recycling. The chemical composition of the wormyculture biomass depends on the composition of the substrate the worms are grown. Thus, the aim of the study was to establish the content of protein, amino acids and microelements in the biomass of wormyculture grown on the substrate of cattle manure and cereals straw.

Wormyculture grown in the Bila Tserkva national agrarian university vivarium conditions was used for the research. Worms were grown on the substrate consisting of fermented cattle manure and cereals straw. Worm samples were selected using a probe (10x10x60 cm) in chess order. Protein, lysine, methionine, glycine, cysteine, copper, lead and zinc content were determined in the wormyculture biomass.

The biochemical analysis proved that protein content was 62.0 % in the dry matter of Red Californian worms hybrid grown on the substrate with fermented cattle manure and cereals straw biomass as the basic component.

It was also found that the lysine content in the wormyculture biomass was at the level of 6.4 %. Of sulfur amino acids methionine and cystine were investigated. Methionine content as compared to that of lysine was 2.7 times lower and amounted to 23.2 g/kg or 2.3 % while cystine concentration in the worms dry matter was the lowest and varied at 1.7 % level.

Of essential amino-acids glycine contents was examined. This amino acid concentration was 2.5 and 3.3 times higher than that of methionine and cystine, respectively, and amounted to 58.5 g/kg or 5.85 %. However, lysine content was than 9.0 % lower as compared to glycine content.

Thus, analysis of protein and some amino acids content shows that wormyculture bioma is a valuable protein additive to farm animals, poultry and fish diets.

Minerals content in the Red Californian worm biomass depends on the substrate it is grown on. Thus we set a goal to investigate concentration of some biotyc metals like zinc and copper and toxicant metal of lead in worms dry matter along with determining protein and some amino acids content.

It has been found out that the zinc concentration in the wormyculture biomass was 68.1 mg/kg, which is 15–17 % higher than that in meat flour. Copper concentration was significantly lower – this metal content was 12.8 times lower as compared to zinc and made 5.3 mg/kg. Havinh compared copper content in the worms biomass and meat-and-bone flour we found that the metal concentration in wormyculture biomass was 3.5 times higher.

It has been experimentally found out that lead content in the wormyculture biomass does not exceed the maximum permissible level and is 0.06 mg/kg of worm biomass dry matter.

Thus, wormyculture biomass is a better source of microelements for zinc and copper content than that of meat and meat-and-bone flour.

**Key words:** wormyculture biomass, Red Californian worm, substrate, Copper, Zinc, Lead, protein, aminoacids.

### Status and application prospects of filtration sediment in the diets of laying hens

#### O. Musich

Sugar beet processing for sugar manufacture has many by-products with a significant amount of wastes: filtration sediment, transport and washing sediment, limestone screenings. A composition of filtration sediment (% weight of dry matter) is: calcium carbonate – 74.2; nitrogen-free organic compounds – 9.5; nitrogenous organic compounds – 5.9; sugar – 2.0; pectin substances – 1.7; lime in the form of various acids salts – 2.8; other minerals – 3.9.

The aim of the work was to identify the effectiveness of use the filtration sediment in the feeding of laying hens.

Scientific and economic experiment to study the filtration sediment application was conducted with Lohmann Brown breed laying hens at a poultry farm "Agrocenter" of Dnipropetrovsk region. The basic feed mixture (BFM) was made of feeds, specific to the conditions of Ukraine steppe: corn and barley grain, sunflower meal, wheat bran, millet, meat-and-bone meal, mineral supplements and Lohmann Brown company premix (Table 1).

Table 1 – The scheme of scientific and economic experiment

Group	The number of hens in the group	Variant of hens feeding
1 (control)	100	The basic feed mixture (BFM)
2 (experimental)	100	BFM + 2 % filtration sediment instead of calcium in chalk
3 (experimental)	100	BFM + 4 % instead of calcium in chalk

BFM was balanced on the basic nutrients as recommended by the Lohmann Brown company. We used both the actual nutritional value of feed and general information about the nutritional value of forage from steppe of Ukraine.

The largest number of eggs was obtained from hens of experimental groups, which had filtration sediment as a part of the diet. Egg production of experimental groups was, respectively – 64.61 and 64.77 % against 63.32 % in control.

The average weight of egg in experimental poultry was higher than in control – 62.01–62.88 against 61.93 g. Morphological and vitamin content of eggs was related with weight. The addition of filtration sediment to the hens` feed mixture had

no essential effect on cholesterol, vitamins A<sub>2</sub> B<sub>2</sub> and carotenoids in the yolk of eggs, which were sufficient and met the standards.

At the end of the scientific and economic experiment there was made a control slaughter in order to assess the impact of filtration sediment on the development of hens' individual body parts. Addition of filtration sediment to the hens diet contributed to yield increase of eviscerated and semi-eviscerated carcasses in relation to before slaughter live weight. The yield of semi-eviscerated poultry carcasses in the control group was 79.8 %, in the second and third experimental groups, respectively – 83.9 and 82.77 %. However, the found differences between the control and experimental poultry groups were not statistically significant.

Thus, results of our research show that hens, that were fed with filtration sediment added fodder, had stronger skeleton and higher yield of muscle tissue due to the more intense mineral metabolism.

The results of the scientific and economic experiment, indicators of control slaughter and biochemical studies suggest a positive effect of using filtration sediment in feeding laying hens. The addition of filtration sediment to hens diet increases egg productivity by 2.1–2.3 %.

It was noted a significant decrease of feed intake in the laying hens experimental groups. This trend is typical for the feed conversion into products. If feed consumption being calculated per 10 eggs in the control group was 1.70 kg, in poultry from the second and third experimental groups this rate was correspondingly lower – 1.57 and 1.47 kg. The results of research confirm that optimal mass fraction of filtration sediment in the hens' fodder is 2 %.

**Key words:** laying hens, filtration sediment, feed mixture.

### **The influence of polyfunctional sorbent on the chemical composition of the muscle of ducklings-broilers**

**N. Nedashkivska, V. Nedashkivsky**

It is established that the use in feeding ducklings, broilers polyfunctional sorbent Ecosorb, as feed additives to the diet affected the chemical composition of breast muscles and leg muscles. In the case of feeding the ducks-broiler feed with the addition of a sorbent dose of 1.0 % of there was observed increase in the thoracic muscles of nutrients compared to counterparts in the control group. Add to feed the ducks-chickens of the experimental group of the sorbent in an amount of 2.0 g/kg of feed had no significant impact on the chemical composition of meat. The best indicators of the chemical composition of the muscle of ducklings, broilers was obtained for the dose of sorbent in an amount of 1.5 g/kg of feed. This contributed to the growth in the thoracic muscles of the organic matter content of 0.5 %, fat and MAR – 0.2 %, protein and ash by 0.1 % compared with the bird in the control group.

Today Ukrainian market offers a wide range of sorbents, in which composition as binder materials used activated carbon, zeolites, some clays (bentonite, saponite, kaolin), garate sodium, calcium-aluminium silicates, etc (Kotyk A.M., 2005; Polishchuk A.A., 2006; Tjamos S.E., 2006).

Therefore, to study the effect of sorbent capable of binding a variety of types of mycotoxins, and firmly hold them regardless of the medium acidity on the digestibility of feed, metabolism and productivity of ducklings, broilers is an important research direction. One of the high-performance adsorbents, capable of functioning in the lumen of the gastrointestinal tract – is Ecosorb-c.

The research was conducted in the conditions of the vivarium and interdepartmental laboratory of the Department of technology of animal feed, feed additives and animal feed of Bila Tserkva national agrarian University on catenata-broilers cross cherry valley.

For the experiment were formed 4 groups (one control and three experimental) to 100 animals each (50 males and 50 females) at day old, selected on the principle of analogues.

It is known that the chemical composition depends on the species, age, nutritional status and level of feeding birds.

As a result of researches it was found that feeding ducklings-broiler feed with the addition of different doses of polyfunctional sorbent Ecosorb with during their growing influence on the chemical composition of breast muscles and leg muscles.

It should be noted what to add in the feed to the source of information in an amount of 1.0 g/kg, 2-nd group duck-broiler, birds content increased in the thoracic muscles of organic matter 0.3 %; protein, fat and MAR – by 0.1 % compared with the control.

It was found that feeding 4th group birds of feed with the content of the source of information in an amount of 2.0 g/kg contributed to the growth in the thoracic muscles of the level of organic matter 0.3 %; fat – 0.1% MAR 0.2 %. Protein indicators were at the level of control, and ash content – inferior to the control counterparts by 0.2 %.

Adding 1.5 g/kg of the sorbent Ecosorb-meat to 3rd group chicken-broilers increased the organic matter content by 0.5 %; fat and MAR – 0.2 %; ash and protein (0.1 % compared with the control). A similar pattern is observed in chemical composition of leg muscles in poultry of experimental groups.

In particular, in the muscles of the legs 2nd group ducklings it was observed an increase in the quantity of organic matter – 0.2 %, protein – 0.1 %; fat – 0.4 per cent; ash content difference with their peers in the control group was not detected, the contents of MAR, on the contrary, was reduced by 0.3%.

Leg muscles of young animals of the 3rd group contained more protein by 0.3 %; organight substance – 0.2 per cent; fat – 0.1 per cent; ash – 0.6 %; however, the BER content was lower by 0.7 % than the control counterparts.

It should be noted that the bird of the 4th group of leg muscles was determined by reducing the amount of ash and REM, respectively, 0.2 and 0.1 %, while the increase of organic matter and grease – 0.2 % protein, 0.1 % compared with the control.

The best results of the chemical composition of muscles of broiler ducks produced for dose introduction of multifunctional sorbent Ekosorb-s in an amount of 1.5 g/kg feed. This boosted the pectoral muscle in the organic matter content of 0.5 % fat and MAP – 0.2 %, protein and ash – 0.1 % compared to the control group bird.

**Key words:** ducks broilers, polyfunctional sorbent Ecosorb, pectoral muscles, leg muscles, dry and organic matter, fat, protein, ash, BER.

**The influence of the soy milk hydrolysate on the intensity of bee brood cultivation****V. Nedashkovsky**

Practice shows that in the last few decades there have been attempts to use artificial substitutes as protein meal replacement for bees (pollen load). It is caused primarily by the fact that the melliferous base in some areas of Ukraine is not able to fully meet the needs of the bees in this feed. At the same time, we need to emphasize the unevenness of providing protein for bees during the active season. In particular, the shortage of bees protein feed was observed in early spring and autumn period and also during the active season in premises.

Lack of protein feed for bee colonies reduces their lifespan, reduces the number of grown brood, delays their development that adversely affects the profitability of apiaries. In this regard, a wide application in practice gets use in feeding bees such partial substitution of protein food as: baking and brewing yeast, skimmed and whole milk, soy flour and milk, homogenate of drone larvae, etc. which positively benefits the development and productivity of bee colonies.

In particular it is proved that the replacement of sugar syrup 10 % water milk contributed to the increase in the cultivation of bees brood up to 35 %. The feeding of soybean flour increased the egg production of queens by 7.6 %.

At the same time it is proved that these partial substitutes can replace the pollen by 50 %. There are current known attempts to improve efficiency by forming various feed mixtures, which include milk, baking yeast, soy flour, pollen and others. Good results were found to increase the efficiency of use of protein substitutes when bees were fed with baking and brewer's yeast.

In the recent time to increase effective use of both artificial and natural food the scholars and practitioners use enzymes to improve the efficiency of assimilation of proteins and carbohydrates. However, a preliminary hydrolysis of the protein substitutes are not studied enough, that in our opinion may be more effective when they are used.

The efficacy of the soy hydrolysate of milk was performed in the conditions of right-bank Forest-steppe zone on 10 bee families of the Ukrainian steppe breed located in the village Vasylivka of Buchach district, Vinnytsia region.

Protease activity (15350 u/t) was obtained in Ladyzhyn plant of bio – and enzymatic preparations (Vinnytsia region). Obtaining a hydrolysate of soybean milk was carried out according to the methodology (P.W. Degterenko, A.M. Duchak). Feed additive was fed in the form of a pasty mass at the rate of 300 g per 5 days within 2 months.

Evaluation of the factor under study, were carried out according to the amount of sealed brood comb, which was explored every 12 hours with the help of frame mesh.

The composition of the feed mixture control bee families included: powdered sugar, soy milk in an amount of 10 % and protease C. Experimental bee families were provided with food, which was composed of powdered sugar and hydrolyzed with 10 % soy milk. The obtained results are reflected, and indicate a positive effect of the hydrolysate of soybean milk in amount of grown brood. In particular, the number of open brood comb on the first date of the calculation, i.e. 26.07.2014 G., increased by 4.6%, on a second – by 16.3 %, the third – by 43.7 %, on the fourth – 45.8 %, the fifth – 41.4 %.

For the entire accounting period, the number open brood comb has increased on average by bee families in the experimental group at 23.2 %, compared to their counterparts in the control group. That is, when artificial fermentation of soy milk have higher efficiency in feeding bees, comparatively with the introduction of the protease enzyme with just in the feed.

However, it should be noted some decrease in the intensity of cultivation bee families as control and experimental groups of brood during the analyzed period compared with the first calculation date. This pattern is primarily associated with the season of active period in which there is a decrease in the intensity of the cultivation of the bee families of the brood.

However, the decrease in the intensity of bee brood rearing families of the experimental group was less compared to their counterparts in the control group. In particular, the first date of the calculation by 2.2 times, on the second – by 2.0 times, the third – by 2.5 times, the fourth one by 1.07 and fifth – by 1.37 times.

In general for the entire accounting period the decrease intensity of bee brood rearing families research group was lower by 1.83 times as compared with the control.

**Key words:** powdered sugar, soy milk, protease C, hydrolysed soy milk, brood, sunbed, bee colony, bee bread, honey, feed mixture.

**Efficiency of using combined feed along with acidifier of different levels in feeding of growing quail****N. Nechay, V. Otchenashko**

Nowadays there is an ample quantity of different additives which might be the alternatives to feed antibiotics when it comes to regulation of microbiological processes in the digestive tract and stimulation of animals' productivity: probiotics, prebiotics, acidifying agents, ferments, phytobiotics, essential oil etc. But recently one of the most widespread feed additives in poultry industry became acidifying agents, which contain different organic acids and their salts.

The higher acidity level in the stomach improves ooze of sap and ferments of pancreas which is the main factor of further optimal digestion and consumption of nutrients.

Experiments in creation of new preparations on the basis of organic acids continue so as there is some kind of synergism in their actions, when several acids in complex amplify capabilities of each other, working at different acidity levels in different parts of digestive tract. Also hydrolysis of nutrients of diets is closely tied to physiological condition of poultry (age, gender, direction and period of productivity).

Thus, the essential task is to determine balanced levels of acidifiers and their impact on postnatal ontogenetic regularity of digestive processes in the organism of quail at different periods of their growth and evolution in order to increase transformation of nutrient rich and biologically active solutions of the feed into production of quail farming.

Having carried out the research we established the changes in the live weight of quails under the impact of different levels of acidifier in the combined feed. The highest dynamics of growth was observed in quails of the third study group, which were fed by combined feed that contained 0,3 % of acidifier. Quails of this group probably ( $p < 0,01$ ) dominated quails of



other groups by live weight in the period of 14-19 days. The difference by this index in reference to the age mates of control group fluctuated from 6,1 to 9,4 %.

Also the highest daily average and relative increase of live weight during research were noticed in quails which consumed combined feed with moderate content of acidifier (0,3 %) and exceeded poultry of study group correspondingly by 9,0; 2,8 %.

Different intensity of quails' growth under the influence of the investigated factor had an impact on expenditure of feed by 1 kg of live weight increase. One should mention that according to the size of daily feed consumption per one unit any significant discrepancy was observed.

Quails, which were fed by combined feed supplemented with acidifier, consumed less feed over 1 kg of live weight increase than those quails which were fed by combined feed with acidifier. At that poultry which consumed combined feed supplemented by 0,3 % acidifier during the whole investigation period (1-49 days) were characterized by the lowest feed expenditures by 1 kg of live weight increase which is less by 3,3-9,3 % than in control group.

Safety of quails in all study groups was quite high and estimated 97-98 %.

In order to establish correlation between level of acidifier and productivity of quails we carried out graphic and correlational analysis. Among that we established nonlinear dependence between content of acidifier in combined feed and daily average live weight increases in of growing quails. Graphic analysis of indexes which characterize the correlation between given values states that the best way to describe it is to use polynomial curve with the value of approximation trustworthiness (R<sup>2</sup>) which equals 1.

According to the results of investigation we approved the practicability of using the acidifier during feeding of growing quails of pharaoh breed. In particular feeding combined food to the of growing quails supplemented by acidifier (0,3 %) in the period from 1<sup>st</sup> to 49<sup>th</sup> day of the research increases live weight by 6,1-9,4 %, improves daily average and relative increases approximately by 9,0; 2,8% and decreases the expenditures of feed by 1kg of live weight increase by 3,3-9,3 %.

**Key words:** quails, mixed fodder, live weight, feed costs, acidificator.

### **Influence of complex enzyme additive on digestibility of feed and broiler chickens performance**

**O. Osipenko, L. Dyachenko, T. Syvyk.**

Poultry farms are looking to reduce the price of complete feed recipes for poultry by replacing food grain for their products, leading to the use of feeds with high content of fiber, non-starch polysaccharides, phytase complexes and other substances. These substances are antinutritional factors and in recipes requiring the use of animal feed enzyme complexes.

The aim of research was to investigate the effect of complex enzyme Kingzyme on feed digestibility and performance of broiler chickens.

The material for the experiment was a complex enzyme Kingzyme which consist of: xylanase with the activity of at least 12000 U/g,  $\beta$ -glucanase with activity at least 3000 U/g, cellulase - not less than 300 U/g, protease - 1000 U/g, amylase - 350 U/g and other enzymes - pectinase, lipase. This enzyme complex is thermally stable and can withstand pelleting temperatures up to 90 °C, easily mixed with animal feed ingredients and premixes.

The trial was conducted on three groups of broiler chickens Ross 308 from 1-st to 42-th day on 320 heads in the group. All trial groups were fed broiler complete feed based on corn, soybean products and wheat calculated in accordance with the requirements of feeding norms. The difference in feeding between chickens research groups was that the bird first group received complete feed that meets the requirements of the manufacturer cross for all indicators nutrient, the second group - energy nutritional value of feed according to NRC reduced by 65 kcal/kg, all other indicators are identical to the first group; the third group - energy nutritional value of feed according to NRC reduced by 65 kcal/kg with the addition of enzyme complex Kingzyme in the amount of 100 grams per ton of feed.

The studies found positive effects of complex enzyme Kingzyme on the growth rate, feed conversion, digestibility and intestinal viscosity. It was found, that the introduction to 3-rd experimental group of the complete feed with a reduced number of metabolizable energy by 65 kcal/kg enzyme complex Kingzyme in an amount of 100 g/ton of feed increases the average daily gain on 1,4 % and 5,7 % and reduced feed conversion rate by 2,3 % and 3,5 % compared to the first and second groups. Feed consumption in all groups were at the same level: the first - 110,0 grams per head per day, in the second - 107,0 g; the third group - 109,7 g.

Digestibility of crude protein was higher in the 3-rd group for adding Kingzyme compared with a second group at 2,3 % (P<0.05), and the first group - by 2,01 %, and crude fat, respectively, - on 2,45 % and 1,96 %.

Adding a complete feed to the broiler chickens with complex enzyme Kingzyme helped to reduce the viscosity of the intestinal contents in the ileum. Thus, these studies indicate that broiler chickens 3-rd experimental group (with Kingzyme) intestinal viscosity was 2,25 cps, in first group - 2,54 cps, or on 12,9 % more; in second group - 2,85 cps, or on 26,7 % higher.

**Key words:** broiler chicken, feed consumption rate, average daily gain, complex enzymes, Kingzyme, digestibility, crude protein, intestinal viscosity

### **Dynamics of internal weight for feeding young rabbits high-protein feed**

**M. Slomchinskiy, O. Chernyavskiy**

With the use of modern industrial technologies rabbit sector will be effective only for the organization of full and balanced feeding. A special place in addressing the growth of meat rabbits belonging to increasing consumption and improving efficiency of feed nutrients, since the bulk of expenditures in rabbit production accounts for feed.

In Ukraine and abroad in feeding farm animals use various feed additives with a wide range of actions that differ in origin (plant, animal, mineral), a set of biologically active ingredients (vitamins, protein, fat, protein and vitamin, mineral, etc.) and production technology.

One of the feed additives containing a significant amount of lysine is Liprot (lysine-protein supplement).

Through the use of lysine microbiological origin was possible reduction of protein in the diet of rabbits without reducing their average daily live weight gain. But while the corresponding changes in diets and the use of different feed ingredients can affect the composition of the resulting product, so along with the study of animal performance indicators need to control its quality.

In this regard, the establishment of research and study of optimal levels of crude protein and lysine in the feed for young rabbits of all ages are important and have great scientific and practical importance.

Research on the effects of additives in meat Liprot performance young rabbits was conducted on rabbit farm part-time farm JSC "Feed" in Bila Tserkva town Kyiv region and rabbit farm village. Production test was carried out on an industrial rabbit farm AASO AK "Kalyta" village. Kalyta Kyiv region.

During the scientific and economic research and industrial inspection of rabbits kept in rooms with controlled microclimate parameters. Zoohygienic conditions met the requirements to the established standards.

Studies were conducted on rabbits of grey giant breed.

Taking into account that during the research animal from research groups received in addition to the basic diet Liprot that could cause specific effects on their bodies, during the control of slaughter involving specialist veterinary attention was paid to study the status and weight of internal organs of experimental animals.

During examination of internal organs of slaughter rabbits there was not found any significant deviations from the norm, although the tendency to increase the weight of internal organs in animals of experimental groups was observed. Thus, the average weight of the hearts ranged from 6.72 g to 8.13 g, and its development index (ratio of weight to internal organ ante live weight) was 0.22–0.25 %. A statistically significant difference between the increase in heart weight compared to control rabbits was only the 3rd and 4th experimental groups, and heart mass was greater, respectively, 1.41 grams, or 21.0 % and 1.37 g, or 20.4 % ( $P < 0.001$ ). The difference in increasing heart weight in rabbits 2nd and 5th experimental group compared with controls was not significant ( $P > 0.05$ ).

The mass of internal organs, the indices of development and the length of the gut in all experimental animals was within physiological norms for rabbits at 4 months of age, but in animals 3rd and 4th research groups, which are the main diet treated with the additive Liprot doses 1–1.5 % from protein diet, an increase in mass of the heart, lungs, kidneys, spleen and liver relative to the weight of these rabbits in the control group (heart, kidney, spleen difference was statistically significant), although their indexes of such trends was not observed.

So feeding Liprot SG-9 young rabbits for fattening has increased the average weight of internal organs and intestinal lengths, and their development was held in proportion to weight gain.

In the future it is necessary to investigate the effect of feeding Liprot to the taste of by-products of the 1st range.

**Key words:** young rabbits, Liprot, rations, internal organs, intestines, code development, ante slaughter weight.

### **Metabolism of Nitrogen in highly productive cows at first 100 days of lactation while feeding mixed legade complex of Cobalt**

**O. Smetanina, V. Bomko, O. Kuzmenko**

For today in the zone of Forest-steppe of Ukraine in forage of rations of highly productive cows feeding microelements are not enough that is why for their compensation a sulfate and chloride salts are used that through low absorption in the intestine form insoluble complexes, and that is why, digestion of microelements presents only 12–23,5 %, that assists the increase of their content in excrement, urine and results in environment pollution.

That is why studying of mixed legade complex of Cobalt which is a compound of vitamin B<sub>12</sub> and is an activator of many enzymes and hormones and determining it's optimal level for highly productive cows is topical especially at first 100 days of lactation.

The objective of the research was studying the influence of mixed legade complex of Cobalt in the combination of Zinc sulphate, Copper and sodium selenite on the metabolism of protein in the organism of highly productive cows, that will help to identify the level of this element at the first 100 days of lactation.

Scientific-economic experiment of studying different levels of mixed legade complex of Cobalt was conducted in "Terazino" Bila Tserkva district Kyiv region on milker cows of Ukrainian Black-and-White breed. To conduct investigation there was formed five groups of cows – 10 cows in each.

Tested cows during preparation and test periods were fed by the same ration. The difference in the feeding was that during test period which lasted 80 days the cows from the control group were fed premix which contained sulphate of Zinc, Copper, Cobalt and sodium selenite and the cows from the tested groups – instead of sulphate of Cobalt were fed mixed legade complex of Cobalt. Tested cows received the same amount of pure Cobalt as the cows from the 1-st control group and the cows from the 3-d, 4-th and 5-th tested group respectively 74, 50 and 25 % from the quantity of Cobalt from the 2-d rested group.

Control and tested cows consumed the same amount of Nitrogen – 291, 66 – 304, 58 g average daily. The amount of secreted Nitrogen in the cows of the 1-st group was 103,83 g, of the 2-d, 3-d, 4-th and 5-th tested groups this amount was less on 16,89; 39,56; 32,96; 12,17. In the result of this the amount of digested Nitrogen in the tested cows in compare with control groups increased respectively on 20,96; 52,48; 45,47 and 15,25 g.

The efficiency of digested Nitrogen depends on the nature of intermediate metabolism. In our research the amount of Nitrogen secreted with urine of cows from the tested groups was more than from the control group, in the 2-d tested group on 14,82 g or 17,09 %, in the 3-d tested group on 28,45 g or 32,81 %, in the 4-th tested group on 36,59 g or 42,20 % and in the 5-th tested group on 12,16 g or 14,03 %. This was stipulated by the larger quantity of digested nitrogen.

The best digestibility of Nitrogen in the tested groups assisted the increase of it's transformation to the protein of milk of cows of tested groups. Thus cows of the 2-nd, 3-d, 4-th and 5-th tested groups secreted Nitrogen with milk daily in compare with control on 5,49; 12,18; 8,17 and 2,55 g more, that, presumably, was one of basic factors of increase milk productivity.

In spite of more intensive using of fodder Nitrogen to produce milk, the cows from the 2-nd, 3- d, 4-th and 5-th tested groups differed from the control group by it's better accumulation in the body. Though the balance of Nitrogen was positive in the cows of all groups in the animals' body of the 2-nd, 3-d, 4-th and 5-th tested groups in compare with the control group daily depositions of Nitrogen were higher on 0,65; 11,85; 0,71; and 0,54 g. In general productive use of Nitrogen on the deposition in the body synthesis of milk in the cows of tested groups were higher in compare with control on 6,14; 24,03; 8,88 i 3,09 g. It is proved by the indices. For example, if the amount of Nitrogen secreted with milk and deposited in the body in according to generally consumed level of Nitrogen in the cows of the control group was 34,67 %, in the animals of the 2-nd, 3-d, 4-th and 5-th tested groups – 36,27; 41,09; 36,17 and 35,36 %. According to the general digested amount the part of Nitrogen deposited in the body and secreted with the milk in the animals of the control group was 53,84 % and in the tested groups – 47,15–52,08 %.

Thus, analyzing the obtained experimental data, we consider that substituting of Cobalt by mixed legade complex in the ration of lactating cows by 100 %; 75 %; 50 %; and 25 % from a scarce amount in forage to the existent norms promoted positive influence on the function of liver, pancreas and glands of gastrointestinal tract, and also improved synthetic activity of microorganisms of rumen. It positively proved on digestibility of nutrients of ration, metabolism of Nitrogen and productivity of animals.

**Key words:** highly productive cows, mixed legade complex, chelate, sulfate of copper, Zinc, Manganese, Cobalt, Iodine and Selenium, Nitrogen, exchange.

### **The slaughter and meat qualities of broiler chickens, depending on the level of selenium in the mixed fodders**

**O. Soboliev**

The analysis of literary sources testifies that the questions of selenium additions influence into the mixed fodder on the slaughter and meat qualities of broiler chickens (yield of the half eviscerated and eviscerated carcass, it's morphological composition and development of internal organs) are studied yet not enough.

Only in the separate scientific works there is data about positive influence of additions of certain doses of selenium in the mixed fodders for different types of agricultural bird on some indicators that characterize their meat qualities and development of internal organs.

At the same time, the results, obtained by different scientists are contradictory and, to our opinion, they should be estimated as orientation, which needs further verification and clarification.

In this connection, the study of selenium different doses additions influence of in the mixed fodders on the for slaughter and meat qualities of broiler chickens was the aim of researches.

Experimental researches are executed on the broiler chickens of cross-country race COBB 500. For carrying out scientific and economic experience there were formed, on the principle of analogue, four groups of one day old chickens (100 heads in each).

Feeding of broiler chickens during the period of growing (42 days) was made by the dry nutritions mixed fodders in accordance with existent norms. The experiement groups birds mixed fodders was additionally added with different amount of selenium, mg/kg: the second group – 0,2; the third – 0,3 and the fourth – 0,4. The first control group chickens did not get selenium addition. Sodium selente was used as a source of selenium. At the end of the experiment the 4 broiler chickens of each group were slaughtered according to the existing recommendations.

It is being established that feeding of experience groups bird during the period of growing with the mixed fodders enriched by selenium allowed to promote not only living mass of broiler chickens but also their half eviscerated carcasses mass. So, that average mass of the half eviscerated carcasses of chickens of the second experiement group was by 1,8 %, the third – by 7,0 % ( $P < 0,01$ ) and the fourth – by 3,3 % ( $P < 0,05$ ) higher, as compared with analogical index in a control group (1545,0 g).

The mass of the eviscerated carcass of all the young experience groups also advantageously differed from the control. However, statistically a difference appeared reliable only in the third experiment group the chickens of that exceeded on this index the persons of the same age from a control group by 67,0 g, or by 5,3 % ( $P < 0,01$ ).

Mass of edible parts rose in the experiment groups. Comparatively with a control, in the second experience group a difference presented 1,1 %, in the third – 6,3 % ( $P < 0,01$ ) and the fourth – 4,3 % ( $P < 0,01$ ).

The yield of edible parts is largely determined by specific gravity of muscles that present basis of carcass. On this index the chickens of experiment groups exceeded the persons of the same age from a control group (40,3–41,3 % against 40,0 %). The absolute mass of muscles difference between the bird of control and experiment groups was statistically reliable in favour of the last and presented in the second group – 5,1 % ( $P < 0,01$ ), in the third – 8,7 % ( $P < 0,001$ ) and fourth – 4,3 % ( $P < 0,05$ ).

Additions of selenium in the mixed fodder positively influenced on mass of liver, heart and muscular stomach of broilers. Yes, if for the of control group bird specific gravity of edible entrails presented 4,5 %, then in the experience groups she appeared higher, accordingly on 0,3 %, 0,2 and 0,9 %.

The special differences between groups after attitude of mass of uneatable parts it is not educed toward foods. This index in control and second experiment groups was identical and presented 1:1,36. For third and fourth experience groups bird on unit of mass of uneatable parts was, accordingly, 1,34 and 1,39 foods.

Correlation of mass of bones to mass of muscles was higher for the chickens of experiment groups, comparatively with control on 4,8–8,4 % and presented in the second and the third – 2,61, in the fourth – 2,70.

Thus, the introduction of the feed for broiler chickens of selenium from a calculation 0,3 mg/kg most notably affected the meat productivity, in particular, assisted the reliable increase of mass of the half eviscerated and eviscerated carcass, accordingly by 7,0 and by 5,3 %, and also the masses of edible parts of carcass by 8,7 %, in the consequence of the best development of muscular tissue and edible entrails.

**Key words:** selenium, dose, mixed fodders, broiler chickens, meat productivity.

### **Influence of complex feed additives with the palm fat on productivity and histological structure of broilers liver** **S. Tsap, O. Orischuk**

Broilers chickens have very sensitive reaction to the number of nutrients, minerals and biologically active substances because of the high rate of growth. That's why balanced diet is extremely important to them, especially at an early age (on the first and second weeks of life), when the chicken is not adapted to the environment and is influenced by various stressors. As it is known, the enzymatic system of broilers digestive tract is formed during the first ten days. So, in this period chickens diet should contain digestible nutrients. Later, the chickens change their needs in energy, nutrients and bioactive substances, so it is necessary to feed them according to growing period (starting, growing and finishing). Each of these periods should be accompanied with feed with appropriate chemical composition and nutritional value.

Records about nutrition of complex feed additives, which were given for chickens in experimental groups during the first 14 days of the starting period with the addition of vegetable fats instead of the equivalent amount of soybean meal and soybean oil were not significantly different from the records in control group. The content of metabolizable energy in the fodder of second experimental group increased only by 1.6 %. And the content of critical amino acids such as lysine, methionine + cystine, histidine was at the same level.

It is very important to safe the initial number of chickens as their unpredictable rate can influence the profitability of broiler meat production. Our experiment showed low death rate of chickens. Survival in the control and second experimental group was 99 %, in the III and IV groups it was 100 %. So, included dried vegetable fat had a positive impact on chickens survival.

Addition of dry vegetable fats to diet of experimental groups had a positive impact not only on feed intake, but on the rate of chickens growth.

The results showed that live weight of chickens, which were fed with vegetable oils in different growth periods, increased more in the chickens of II and III experimental groups. Thus, live weight of chickens in II experimental group, which were fed with 5 % VAMZHK, increased by 2.8 % ( $P < 0.95$ ) during 7-day period, by 3.3 % ( $P > 0.99$ ) during 14 days, by 5.1 % ( $P > 0.999$ ) during 21 days, by 4.3 % ( $P > 0.999$ ) at the end of growing period compared with control group. Chickens, which were fed with 7 % BZHK, had more intensive growing rate. During the first 7 days the difference in live weight of chickens in experimental and control was not significant, just 0.5 %, but in other periods it was 2.4 % ( $P > 0.95$ ), 1.7 % ( $P > 0.999$ ), 6.6 and 5.6 % ( $P > 0.999$ ). The analysis of the chicken live weight increase in experimental groups showed that the optimal period for feeding with dry vegetable fat is the last phase of growth.

The liver is one of the most important glands, which provides a full existence and functioning of the whole organism. The study of its histological structure under the influence of different feed additives, makes it possible to determine the structural and functional condition of the body.

During our research we studied the efficiency of complex feed additives with palm oil in the broilers diet in the amount of 3 %, 5 % and 10 % instead of similar quantities of soybean meal and soybean oil.

Liver of chickens in control and experimental groups, which were fed with 3 % vitamin-amino-mineral complex, did not have any deviations in its structure. Lobular structure of the body was preserved. Dystrophic and degenerative changes in the parenchyma of the body were absent. In some parts of the liver there were some circulatory disorders that were presented with venous hyperemia of acini.

In the liver of birds, which were fed with forage mixture of 5 % protein and lipid, there were some signs of fatty degeneration. Beam structure was flat, hepatocytes were enlarged, with circular shape, they had void, vacuoles, formed in place of fat droplets. The nucleus in the cytoplasm were shifted to the periphery of the cell.

The liver of broilers, fed with 10 % protein and vitamin supplements, had signs of protein malnutrition with disorders in hemodynamics. Hepatocytes increased in volume, the contours of the cells were not expressed, the cytoplasm was not clear, dull or with mild graininess. Some nucleus of hepatocytes had signs of pycnosis or rhexis.

**Key words:** broiler chickens, productivity, liver, morphology, histology.

### **The corn silage for dairy cows feeding with the inoculants usage**

**S. Chernyuk, A. Zahorodnii**

The important things for the further animal husbandry branch intensification are the food production growth, the food quality increasing and their cost reducing at the same time. We should pay attention to the vital point of the normalized and balanced feeding for cows with the own production site.

The feed quality due to the slow implementation of progressive forage technologies is low. The crucial application is put down in the usage of such methods of harvesting and feed storage. This can be provided with its fully preserving things and keeping its physiological features as well. The minimum labor costs and the material meanings should be done during this period.

However, when we make the bulky feed there can be some problems. This can even occur under good weather conditions. Because, there is the unknown microbiological composition of the epiphytic microflora what can be observed on the plant growing reproductive stage. Moreover, we do not know how this microflora will work during the preserving period. The end result of the process that occur in the raw material what is preserved with the epiphytic microflora is not predictable. Now our researches pay attention to the inoculants developing. Those inoculants should contain the needed lactic acid bacteria in silage. The homofermentative bacterium produces the lactic acid that has a good taste for ruminants. Therefore, we need to search the effective inoculants in order to increase the nutrients preservation during the silage corn harvesting. The research of the impact on the milk productivity of cows is so important nowadays.

The work objective was to study the efficiency of inoculants during the corn silage making period. The cows' milk production research was done as well.

The trials have been done on the white-and-black cattle breeding farm PSP 'Geysys'ke', Stavysche district, Kyiv region.

The first silage samples were selected in October. Analysis of the chemical composition of the corn silage without inoculants showed that there were 14,7 % of the dry matter more and 1,7 % of protein more than in the silage with inoculants accordingly. The active silo acidity was at the level of 3,50–3,66.

Secondary silage samples were taken in early May. They noted the dry matter decrease in both samples.

There were 23,7 g of protein in comparison with the 20,8 g of protein in the traditional silage. This meant that we obtained 13,9 % more than in the traditional making silage. The results of trials showed that we got the mature silage with inoculants and the protein level was increased by 3,5 % comparing to the traditional silage where that level was decreased by 10,7 %.

The silage active acidity with 11C33 inoculant was at the level of 4,10 and it provided the needed mold inhibition in the feed.

There were the feeding rations developed for the getting of the optimum level of milk productivity. During the whole trial period we followed the relevant animal feeding parameters. There were 208 MJ of the metabolic energy at the rate of 205 MJ and the digestible protein – 2043 g at the rate of 2020 g. The dry matter specific weight was at the level of 36,4 %. There were 112 g of digestible protein spent on 1 feed unit.

The milk productivity accounting showed the difference among silage feeding technologies. It has been most clearly seen when we used 11C33 inoculant. The inclusion of this preparation helped to increase the milk production of cows.

Having the same feeding and housing conditions we could see that the milk yield for 305 days of lactation was higher 3,8% in the group where we used 11C33 inoculant than in the control group of dairy cows.

The cows' milk productivity increasing was obtained thanking to the better nutrients preservation and its digestibility. Because, *Lactobacillus buchneri* train (11C33 inoculant) produces the specific esterase enzymes that release polysaccharides cellulose lignin complex. Cleavage of the polysaccharides cellulose lignin complex changes the three-dimensional structure and it gives access for the rumen bacteria. Having this opportunity they speed up the cellulose digestibility. There was not found the significant difference between the milk fat mass fraction and the milk protein.

The inoculants usage is the real positive method in the silage making technology. This leads to the decreasing of the dry matter losses and the protein increasing level during the maturing process.

DuPont Pioneer brand 11C33 inoculants utilization increased the lactation milk yield by 419,7 kg of milk per a head. The silage impact on the milk fat and protein indexes was not observed in this case.

**Key words:** feed production, microbial ferments, silage, conservant, preserving agent, ensilement, inoculant, lactation, ration, milk yield.

### Efficiency of the use of probiotics in combination with enzymic preparation in the feeding of pigs

#### O. Chernyavskiy

The influence of the complex feeding of protector active probiotic and enzymic preparation matseraza on productive indexes of young pigs was studied.

On the results of scientifically-economic experience from the study of efficiency of application of protector active probiotic in a complex with motseraza it was set that for all period of experience the pigs of an experience group to the animals of that a protector active was added to mixed fodder from the first day and matseraza was added from the 61-st day of the experiment had the greatest increases of live weight. The animals of this group at the age of 225 days prevailed control animals in absolute increase by 13,7 %.

The given results were taken for basis for productive approbation, that was conducted in the conditions of LTD. "Oberig-Agro" on two groups of pigs-analogues 100 heads in each selected by origin, living mass and age. Keeping and feeding of pigs were carried out in accordance with the technology accepted in an economy.

During the first period of pigs growing to the composition of mixed fodder such substances were included: corn – 10 %, barley – 40 %, BMVD – 25 %. During the second period: corn – 15 %, barley – 45 %, wheat – 25 % and BMVD – 10 %.

The pigs of an experience group were fed with mixed fodder, protector active was added from a calculation of 3 g per 1 kg of dry mixed fodder (1,5 g per 10 kg of live weight) from the first day and during 90 days, and materaza – from the 61-st day during 60 days. Matseraza was added to the ration from a calculation of 0,5 kg per 1 t of feed (0,5 g per 1 kg). The amount of mixed fodder was changed depending on the age and live weight.

Feed additives were used in the composition of mixture of mixed fodders, prepared in an economy at the mini mixed-fodder plant. To form groups young pigs of Large White breed at the age of 60 days were selected. Production verification lasted 120 days. During it's realization live weight of pigs and mass of eaten feed were taken into account. The check weighing of animals were conducted at the age of 90, 120, 150 and 180 days.

Thus, on results production approbation it is possible to assert, that in the conditions of economy economically advantageous is the use in composition of rations for young pigs protector active in a complex with motseraza, that gives an opportunity to increase the average daily increase of live weight of pigs by 7,7 %, and feed costs on unit of products decreases by 6,3 %.

In the result of production verification it was set, that additional introduction to the ration of young pigs protector active in a complex with motseraza during all period gave an opportunity to increase the gross increase of live weight of animals comparatively with control by 6,46 centner at the identical level of feeding. A difference consisted only in that to the mixed fodder of pigs of an experience group protector active was added from the first day of production approbation, and matseraza was added to the ration on the 61-st day.

The young pigs, fed a protector active that in a complex with motseraza, prevailed after the average daily increase of control analogues by 53,9 g, or 0,0539 kg on a head per day.

An additional increase of head per 120 days of feeding feed additives presents 6,46 kg. Cost of additional increase in purchase prices in 2011 presents 108,15 hrn.

Economic effect per 1 hrn additionally expenses makes 1,57 hrn. Introduction the composition of the ration of young pigs of an experience group of protector active in a complex with motseraza promoted to obtain 39,23 hrn of net income per a head during the period of growing.

Thus, introduction to the composition of ration of young pigs protector active probiotic in a dose of 1,5 g per 10 kg of live weight (3 g per 1kg of fodder) and matseraza from a calculation 0,5 kg per 1 t of dry feed mixture assisted the increase of level of profitability of production of pork in an economy from 38,2 to 39,4 %.

Perspective direction of research is establishment of influence of protector active in combination with motseraza on the environment.

**Key words:** pigs, probiotic Protector active, enzyme Matseraza, mixed fodder, profitability, net income.

#### **Biochemical parameters and productive qualities of hens when using feed additive of cerium dioxide nanoparticles**

**U. Shadura, M. Spivac, V. Bityutskii, O. Melnichenko, I. Sotnichenko, O. Shcherbakov, O. Demchenko, N. Zholobak**

In the modern poultry industry one of the urgent problems is the activation of adaptive capacity birds to enhance their productivity and saving. At the beginning of the XXI century broad prospects for obtaining adaptogenic and antioxidant drugs with unique properties of nanotechnology are shown. During long time lanthanoids are used to improve crop and livestock productivity, among them compounds of lanthanum, cerium and others. These elements with atomic number of 57 (LA – lanthanum) to 71 (Lu – lutetium) are in the third group of the periodic table of elements. To increase the productivity of livestock and poultry there are used complex products containing multiple lanthanide (LA, Ce, etc.). The effectiveness of their using is proved by different authors. New prospects of using of lanthanides as a means of improving the biological functions of the body are opened by nanotechnology. It is shown that the cerium dioxide transition in nanocrystalline state increases its biological activity and to optimize character of intracellular reactions due to inactivation of reactive oxygen in cells. The current strategy to combat oxidative stress involves the introduction of exogenous antioxidant agents that have the ability to recyclization (regeneration) of antioxidant properties and prolonged action. Nanocrystalline ceria (NDC) is an unique multifunctional material. It's using is much promising in many scientific fields and is associated with complex special physical and chemical properties. Those properties include oxygen non-stoichiometry, powerful antioxidant properties as well as the dependence of the obtained effects of particle size. The purpose of research is to study the effect of nanocrystalline cerium dioxide on metabolic parameters, performance and safety of egg birds. Scientific and economic research conducted on chicken laying cross-laying hen «Lohmann Brown» NNDTS Bila Tserkva National Agrarian University. For the experiment there were formed two unique groups of 50 heads of chickens aged 150 days on the basis of analogs. Chicken Laying hens of control group received basic diet (BR), according to the given recipe, which ensured their need for protein, energy and micronutrients and macronutrients with regard to age, live weight and direction of performance. During 20 weeks experimental group got a SRC drug with water (particle size is  $1 < n < 5$  nm and it is stabilized by citrate shell) at a dose of 8.6 mg per liter for 14 days. After 7–10 day break course is repeated.

Studies indicate that blood biochemical parameters in chicken laying hens were within the physiological norm during the experiment. In the study of indicators possible differences between groups were not found, but throughout the experiment tend to increase of total protein, total lipids and calcium chickens in the experimental group was studied. The difference between the rates was not significant. It was found that chickens in experimental group had a trend to reduced activity of ASAT and ALAT in blood. This change of aminotransferase activity of animal blood in the experimental group can be attributed to some hepatoprotective effect of cerium dioxide nanoparticles founded in other studies. The levels of creatinine, uric acid, cholesterol and phosphorus in the blood of the birds of research groups under influence of the cerium dioxide nanoparticles were not significantly different from controls. It is established that the watering of chickens-laying hens with nanocerium at a dose of 8.6 mg/L positively affects for their egg productivity. Studies indicate that in all periods of chicken laying hens in research experimental group exceeded the performance of hens in control group. Using in the experimental group of nanocrystalline cerium dioxide promoted receivable 132.1 eggs per primary chicken laying hen during the whole period of the experiment and 122.2 eggs per chicken laying hen per control group. Safety of chickens in the experimental group was 98 % and 94 % in control group. Number of egg masses which was obtained in laying hen chickens in the experimental group was 7.5 % higher than in the control group.

Thus it was established that the feed additive "nanocerium" in feeding laying hens provides a higher level of performance relative to controls, while it is not show adverse effect on product quality eggs. Results of conducted atomic emission analysis show that the applied dose of nanocrystalline cerium dioxide is not accumulated in protein, yolk, shell eggs, lungs, liver, kidneys and oviduct of laying hens and it was not higher than background values in control group. Thus there was established a positive effect on the studied additives egg performance of chicken laying hens in the experiment. There weke no admitted negative effects on biochemical blood parameters, egg quality product. In the applied dose of nanocrystalline cerium dioxide did not accumulate in the eggs and poultry parenchymal organs.

**Key words:** poultry, antioxidants, nanotechnologies, cerium dioxide, chicken laying hens, biochemical characteristics, egg production.

#### **New aromatic-flavor supplement for feeding foxes, which are raised in cages**

**T. Shevchuk**

The destription and productive effect of the Aromatic-flavor supplement Activo in the diet of silver foxes, breeding in the cages, was given the article. Dietary supplement is represented by the composition of compounds which have nature origin (cinnamon, oregano and rosemary essential oil, chilli pepper extract). Adding such component in the feeding of female silver foxes during the different technological periods had not the same productive effect.

The technology of industrial growing fur animals crucially changes the conditions of their existence. Minks, arctic foxes, foxes, sable and other are yet on the stage of domestication. That's why they are very sensitive to parameters of microclimate, the presence of people and, what is the most impotent, to the changes in feeding. Sometimes captive breeding and the

using of not appetizing, fodder cause the abrupt reduction of animal productivity and even death. Firstly, animals in the period of the rut, pregnancy and lactating females react with the help of refusing the food and also young animals after weaning.

Therefore the development of attractant means, which would stimulate the appetite enhancing, is forward-looking and promising in the technology of cattle-breeding.

The peculiarities of the perception of odors and taste preferences, which fur animals have, having been studied not enough. Rare reports in the scientific literature signify about the heightened senses these animals have. They have the possibility to track down their victim by its smell in the distance of the couple km. They are characterized by the food unpretentiousness eating roots and the stems of definite plants, berries and nuts, dead animals. Although, taste preferences of the fox haven't been discovered to the end for now. It's not revealed also how silver foxes, breeding in cages, can react on the adding new aromatic-flavor supplement Activo into their diet. The previous researches of its productivity action were held on poultry and pigs and showed positive results. The aim of our investigation was to study the effectiveness of its usage in the feeding of female silver foxes during the different technological periods (sexual calmness, pregnancy, lactation). The objective of the experiment were: to determine the intensification of the fodder consumption, to study the dynamics of the animal weight changes, to investigate the reproduction in dices. For the reaching such objectives there were held three scientific-economic experiments on the female-analogue of silver foxes in the conditions of the private animal farm owed by O.M. Bakun.

During the research it was determined that implementing the new dietary supplement Activo in the ration of mating females during the summer month assisted the intensification of weight accumulation in the way of appetite enhancing and also the increasing of the growth and reproductive features. The results of adding Activo to the fodder of pregnant foxes were negative: the part of food consumption was essentially increased, the appetite became worse and, therefore, the livestock, it was observed that the reproductive function was reduced. The usage of the new aromatic-flavor supplement Activo in the feeding of lactating animals was authorized, because fruitfulness fecundity and the quality indices of the received young animals exceed the control.

**Key words:** aromatic-flavor supplement, silver foxes, female, fodder consumption, live weight, reproduction indices.

#### **Breed features of inheritance of pedigree value of mass part of fat in milk of dairy cows**

**O. Babenko, V. Afanasenko, V. Oleshko**

In the dairy cattle breeding an important selection breeding sign is mass part of fat in milk, that is one of the indexes of milk quality.

The feature of inheritance of pedigree value of mass part of fat in milk is absence of such form, as over dominance, that is possible to explain by low changeability of this sign ( $C_v = 2,4-5,1\%$ ).

The main form of inheritance of mass part of fat in milk is intermediate that in the cows of Holstein breed presents 70,7 % and in the cows of the Ukrainian Black – and White dairy breed – 52,6 %. Characteristic feature of inheritance of pedigree value of mass part of fat in milk is that at all forms of inheritance indexes of pedigree value for daughters are with a minus meaning. It should be noted that for all four forms of inheritance of pedigree value daughters are characterized by the best indexes that inherited pedigree value of an intermediate form. Their advantage above Holstein breed cows of the same age where regression were shown is 0,67 % ( $P < 0,001$ ), above the cows of the same age with dominance of mother on 0,23 % ( $P < 0,01$ ) and above the cows of the same age with dominance of father on 0,18% ( $P < 0,001$ ).

There is analogous appropriateness for the cows of the Ukrainian Black-and-White dairy breed. Daughters with the intermediate form of inheritance are also characterized by the best pedigree value of mass part of fat in milk, comparatively with other forms. So, comparatively with regression advantage presents 0,37 % ( $P < 0,001$ ), with dominance of father 0,47 % ( $P < 0,001$ ) and with dominance of mother 0,17 % ( $P < 0,01$ ).

Thus, selection among the population of dams and sires on mass part of fat in milk will assist the improvement of this sign in breeds mostly at the intermediate form of inheritance. At the same time, among cows of Holstein and the Ukrainian Black-and-White dairy breed regression is appeared that presents respectively 13,5% and 37,3% and pedigree value of daughters is at the level – 0,7 and – 0,5 %. In both breeds paternal features of daughters, in that regression was shown had not high, but positive pedigree value though.

To our opinion it can be explained by unsuccessful combination of genotypes of paternal features, that is impossible to foresee if it is predicted only on the indexes of pedigree value of paternal features. In fact the phenomenon to the crossing-over provides genetic changeability of every new combination. Obviously, such genetic secrets can be exposed with introduction of genome estimation of animals already after birth of descendants and to determine the grade of concrete animal on the genotype. Amount of structural areas of DNA, so-called SNP, where the information is coded about the level of development of selection sign, testifies the genetic grade of animal.

Inheritance of pedigree value on mass part of fat in milk at dominance of father and mother in both breeds appeared negative. At dominance of father a pedigree value for daughters of Holstein breed presents –0,21 % and for daughters of the Ukrainian Black-and-White dairy breed –0,5 %. At dominance of mother –0,26 % and –0,2 % respectively. Pedigree value of parents in both breeds at their dominance appeared with minus meaning that testifies unsuccessful selection of sires to the concrete dams, that is why in this case it is possible to talk not about dominance of father, but about regression of pedigree value of daughters to the genotype of parents. For the forms of inheritance dominance of mother we have an example of regression of pedigree value of daughters on a genotype of mothers.

The best absolute indexes and pedigree value on mass part of fat in milk are educed for the cows of Holstein and Ukrainian Black-and White dairy breeds at dominance of father and intermediate inheritance, mainly at the terms of reliable advantages of pedigree value of fathers above mothers. The main form of inheritance of pedigree value on mass part of fat in milk for the cows of both breeds is intermediate and it's frequency presents (52,6–70,7 %). Other forms of inheritance present: dominance of mother is (4,4–5,8 %); regression – (13,5–37,3 %) and dominance of father – (4,3–11,3 %). The most

desirable form of inheritance of pedigree value on mass part of fat in milk, over dominance is absent in the cows of Holstein and Ukrainian Black-and-White dairy breeds.

**Key words:** Ukrainian Black-and-White dairy breeds, Holstein breeds, pedigree value, mass part of fat, forms of inheritance: intermediate, dominance of mother, dominance of father, over dominance, regression.

### **Selection problems of sexual dimorphism of dairy cattle**

**I. Goncharenko, D. Vinnichuk**

The biological significance of sexual dimorphism is that leaders of herd receive preference for mating with a female in natural populations.

This leaders-bulls who have surpassed their opponents in tournament battles. Due to the natural selection of bulls with marked sexual dimorphism led to the spread and maintenance in populations of cattle are important for species such features as high reproduction performance, endurance, resistance to disease, survival of young animals and others.

Pursuing of economic goals, people in their activities directs the development of exterior features in future breeder on the presence of a dense delicate constitution, good chest development, proportional development of the posterior third of the body, a light-weight skeleton, quiet temper, etc. Therefore, the selectors do not pay attention to signs of sexual dimorphism of sires breeders.

However, it is not difficult to see that in the selection process of the bulls, throughout generations, there is a convergence of the type of males and females body structure, the result of which there is a phenomenon of "somatic feminization" sires, leveling features of sexual selection. Among today's specialized high-performance species versus species of combined type performance there received widespread such undesirable features as a breach of fertility, irregular cyclical phases of sexual inclination, ovarian cysts, nymphomania, etc. Most of these disorders have hereditary basis.

Development of signs of sex is determined by genotype and environmental factors as any other characteristics of the organism.

The process of differentiation of the sex is difficult and predefined by the large number of alleles of different loci of cumulative action, the synchronous work of ductless glands, the endocrine system, by the presence of those or other hormones.

Thus, clearly expressed sexual dimorphism in animals is an important criterion in the estimation of constitution and influences on appearance of the animal and her habitus.

Unfortunately the generally accepted index of estimation of degree of development of sexual dimorphism is not worked out yet, and the selection of breeding bulls on this characteristic is practically not come true.

Considering the above information, we have studied the energy of growth descendants of bulls with well-defined characteristics of dimorphism and researched the fertilizing capacity of sperm in bulls with varying degrees of expression characteristic of sexual dimorphism. There were used materials of tribal accounting of breeding plants "Shamrayevskyy" and "Polyvanivka" which had 1300–1400 kg live weight at the age of 3–4 years. The manifestation of sexual was dimorphism evaluated in the herd visually.

The findings proved that. 1. The intensity of growth of the posterity of breeder with high dimorphism significantly higher (2–30 %) of the indices in the offspring of bulls slightly pronounced dimorphism.

2. The fertilizing capacity of sperm bulls with distinct manifestation of sexual dimorphism significantly higher (6.5–14.2 %) compared to their peers who have poorly pronounced dimorphism.

3. Maternal influence is 4.46–18.6 % by the magnitude of the increase in body weight of offspring with varying degrees of dimorphism.

An assessment refine sires and cows at linear exterior evaluation system of animals.

**Key words:** sexual dimorphism, development signs, increased fertility, the degree of manifestation, bull-sires, cows.

### **General characteristics of modern gene pool of milk type buffalo**

**Yu. Huzyeyev, D. Vinnychuk**

The paper highlights the results of studies on the expediency of using the foreign countries experience in buffalo breeding in order to create a new branch of livestock industry in Ukraine.

The subject of the research was general characteristics of the modern gene pool of milk type buffalo, buffaloes milk productivity, their lactation duration, record levels of milk productivity, bulls-sires genetic indexes for milk production indices and their frequency.

The buffalo competitiveness in milk production is proved by actual data according to the yield amount in terms of basic fat, milk fat and milk protein yield. It is proved that the stability of the physiological processes of milk synthesis in the buffaloes lactiferous gland and genetic predetermination of lactation duration are important factors in milk production. These criteria, in turn, make the basis for the selection process of creating buffalo populations with optimal lactation duration of 305 days.

The highest milk production indices (over 6000 kg) were in the buffaloes of Italian and Indian selection and the lowest ones (up to 500 kg of milk per 250 days of lactation) were in buffaloes of Tarai and Toda as well as in buffaloes of paludal buffalo breeds. Bhadavari and Todd breeds dominated by the percentage of fat mass concentration; Kundi, Mediterranean (Italy), Surti and others dominated by the percentage of protein mass concentration.

Is one of the features of buffalo breeding peculiarity is the fact that one can calculate separately the index of MIC mozzarella output from the buffaloes raw milk by the formula set by Altiero V. et al.

Buffaloes have no peers among cattle by milk saturation with dry substances, protein, milk fat, vitamins, amino- and fatty acids.

The duration of lactation in mothers bulls-sires, the semen of which is imported to Ukraine, is 270 days on the average, the yield per lactation ranges from 3236 to 5967 kg with fat mass concentration in milk of 7.3–9.6 %, protein mass concentration of 4.4–5.7 %, indicating a high genetic potential of bulls-sires for milk production and the further possibility of successful breeding. According to the forecasts of the world leading research centers, including FAO offices, exploring the conditions that ensure the nutrition of the population according to the standards of modern medical science and environmental conditions, buffaloes make no threat



in grain stocks reduce and agricultural land areas. They consume mostly coarse and fibrous food, do not require significant energy costs in the process of technological methods and the animal farming.

New breeds of buffalo have been created in many countries and they are competitive with dairy cattle breeds in the main indicators of milk quality.

The material stated in the article suggests the possibility of forming a new branch in Ukraine dairy farming, i.e. buffalo breeding, based on the increase of buffalo breeding stock of Ukrainian populations and importing the material from other countries. The studies confirm the feasibility of buffalo breeding as a separate branch of animal husbandry in Ukraine.

**Key words:** buffalo breeding, milk productivity, buffalo females, lactation, breeding and genetic parameters, buffalo breeds.

### **The influence of genotypic and paratypic factors on reproductive qualities of sows**

**V. Likhach**

The problem of providing the population with the food industry and meat of own production most of the world is solved by the intensive development of pig industry. For example, in the production of meat in the world pork accounts for about 41 %. The balance of meat in some European countries part of pork exceeds 60 %. The development of the pig industry are largely attributable to biological characteristics of pigs, their good adaptive abilities to the environmental conditions. It should be noted that as a result of high fertility, precocity, low cost feed from each sows by feeding her litter can be obtained for the year of 2.0–2.5 tons of pork.

However, to achieve such performance is only possible through ensuring physiological requirements of the body: full feeding and optimal living conditions. Modern, advanced technology of pig production involves the keeping of animals indoors, in the absence of exercise and walking. This management creates the conditions for a more intensive use of animals, full mechanization and automation of production processes. Therefore, animals should be provided with conditions that increased their performance and provided reactivity.

The management of mating and pregnant sows on a pig farm is quite a complex process. There are various ways of keeping animals in this technological group: group housing, individual housing, with or without bedding, with or without pasture, with artificial or natural microclimate and etc. Creating a comfortable environment is one of the main components at intensive technologies of breeding pigs. Reproductive quality, except breeding and aggregate genetic inclinations, is determined by the factors according to the content of the pigs biological characteristics. Taking this into consideration, a considerable interest occurs in studying the influence of the management technology of pregnant sows on their productivity.

Thus, reproductive quality, in addition to breed and the population genetic inclinations, is determined by the conformity factors of management of the biological characteristics of pigs.

The aim of the research was to study the reproductive qualities of sows by different breeding methods and by different management technologies. Experimental studies were carried out on the farm APC «Agricultural firm «MIG-Service-Agro» in Mykolayiv region and on the PJSC "Breed-Stock Plant "Steppe" in Zaporizhya region. For this experiment three breeds of pigs were taken: a interbreed type of Duroc Ukrainian selection "Steppe" – DUSS, a Large White of Foreign selection – LW (FS) and a Landrace of French selection – L (FS).

Group of sows were selected on the principle of analogues, with taking into account their age, their life weight and origin. For this experience selected sows were divided into two groups, this selection was based on the dependence of the technology content. From the group of mating sows for insemination 20 heads of sows (2 or more farrowing) were selected to determine the performance of failed impregnation and fertility. After determination of gestation, sows on the second day were selected for further studies in the amount of 15 heads in each combination at different types of management. In the experimental group sows were kept under traditional management technology. In the mating period sows were kept in groups for 20 heads. After insemination within 5 days they were kept in individual stalls. Then before the onset of pregnancy and during the entire period of gestation sows were kept in groups for 15 animals in each stall. Within 7 days before the expected date of farrowing sows were transferred to the farrowing room, where they were kept in individual stalls. In the experimental group is mating, conditionally gestating, gestating, deep gestating and lactating sows during the entire period were kept in individual stalls.

Reproductive qualities of sows of the experimental groups depending on the way content was determined by the following indicators: the percentage of fertility, percentage of failed impregnation, multiple pregnancy, live weight of each piglet at birth and weaning (30 days), number of piglets in the nest at weaning and the preservation of litter.

The results of the research showed that the individual contents of empty and pregnant sows in stalls increases the fertility index by 5.8% ( $P>0,95$ ), increased multiple pregnancy by 0.94 heads, number of piglets at weaning by 1.42 head ( $P>0,999$ ), live weight at 30 days 0.7 kg as compared with animals of group method of management. Higher reproductive qualities of animals in the individual stalls for sows during the period of gestation suggests that the intrauterine growth of piglets have been given more favorable conditions, which influenced the decrease of embryonic mortality and further led to an increase in growth of piglets.

**Key words:** technology, type of management, breed, purebred breeding, crossbreeding, reproductive qualities.

### **Reproductive performance of different genotype sows depending on the nonproductive days**

**N. Piotrovych**

The aim of research was to study the effect of the non-productive days (NPDs) of different genotypes sows (purebred, two-breed and sows with genotype purebred father × hybrid mother) on their reproductive performance (litter size at birth, milk production, litter size at weaning, litter weight at weaning, weaning weight and piglet survival). The study was conducted in PJSC "PC Podillia" of Vinnytsia region and PAE "Agroprodservice" of Ternopil region in 2014.

It was established that NPDs affect the sow reproductive performance. In the herd PJSC "PC Podillia" in the purebred sows group higher litter size at birth (14,1 piglets) and litter size at weaning (82,2 kg) had sows with NPDs 6–10 days; higher

milk production (64,8 kg) and weaning weight (7,7 kg) had sows with NPDs less than 5 days. Higher litter size at weaning (10,1 piglets,  $p<0,01$ ) and piglet survival (83,1%) were characteristic for sow with NPDs 11 days or longer.

Two-breed sows with NPDs less than 5 days had greater litter weight at weaning (82,1 kg) and weaning weight (7,9 kg); sows with NPDs 6–10 days had greater litter size at birth (12,3 piglets) and litter size at weaning (10,1 piglets); sows with NPDs 11 days or longer had greater milk production (70,7 kg) and piglet survival (86,1 %).

Sows with genotype purebred father  $\times$  hybrid mother and with NPDs 6–10 days had higher litter size at birth (11,4 piglets), litter size at weaning (9,8 piglets) and piglet survival (86,4%). In this group higher milk production (76,9 kg) and litter weight at weaning (84,0 kg) were characteristic for sow with NPDs 11 days or longer, but significant difference for the studied parameters was not found.

In PAE “Agroprodservice” better reproductive performance, except piglet survival, had sows with NPDs 6–10 days but higher piglet survival had sows with NPDs 11 days or longer (91,2 %).

Based on the data we calculated the complex index of reproductive parameters (CIRP), selection index of sows’ reproductive parameters (SISRP) and survival index.

On average in the herd PJSC “PC Podillia” sows with NPDs 6–10 days took precedence over the same age sows with NPDs less than 5 days in the complex index CIRP by 5 points, sows with NPDs 11 days or longer – by 3 points, in the selection index SISRP – by 7 points in both cases, survival index – by 5 % and 3 %, respectively; in PAE “Agroprodservice”: CIRP – 23 and 24 points, SISRP – 10 and 15 points, survival index – 5 % and 9 %, respectively.

On average the greater CIRP characterized sows with NPDs 6–10 days (106 points – PJSC “PC Podillia”, 102 points – PAE “Agroprodservice”), they took precedence over sows with NPDs less than 5 days by 7–10 points and over sows with NPDs 11 days or longer by 7–15 points.

The sows’ reproductive performance was studied by the survival index, which depends on litter size at birth and piglet survival. Its highest value observed in the studied herds in the group of sows with NPDs 6–10 days regardless of genotype.

Thus, in both herds higher CIRP index, SISRP index and survival index had sows with NPDs 6–10 day: CIRP – 106–119 points, SISRP – 102–106 points, survival index – 83–93 %.

Effect sizes calculations ( $\eta^2$ ) of NPDs on sows reproductive performance by method of analysis of variance showed, that its value was different – from 1,4 % to 45,0 % and varied depending on sow genotype. Effect sizes of NPDs on litter size at birth was 8,8–41,2 %, milk production – 7,1–37,0 %, litter size at weaning – 6,8–36,2%, litter weight at weaning and weaning weight – 4,4–26,0 % 7,4–29,4 %, respectively, piglet survival – 1,4–45,0 %.

Calculations show that between sows NPDs and their reproductive parameters there were both positive and negative correlations for weak and medium strength.

In the herd PJSC “PC Podillia” medium-strength correction there was seen in purebred sows between NPDs and litter size at weaning ( $r = +0,25$ ) and in group of sows with genotype purebred father  $\times$  hybrid mother – with milk production ( $r = +0,37$ ,  $p<0,05$ ); in the herd PAE “Agroprodservice”: in two-breed sows group – with litter size at weaning and litter weight at weaning ( $r = -0,25$ ,  $r = -0,26$ , respectively,  $p<0,01$  in both cases).

**Key words:** sows reproductive performance, nonproductive days (NPDs), complex index of reproductive parameters (CIRP), selection index of sows’ reproductive parameters (SISRP), survival index.

### Effect of the service period on milk productivity indicators and economic usage of dairy cows

R. Stavetska, O. Boiko

Milk productivity indicators (length of lactation, milk yield per 305 days, fat yield), economic usage (longevity, productive usage duration, economic usage coefficient) and lifetime productivity (number of calves per cow, lifetime milk yield, lifetime fat yield + protein yield, milk yield per one day of life and one day of lactation) of 421 Ukrainian Black and White Dairy breed cows were studied.

Reproductive performance of Ukrainian Black and White Dairy breed cows in LLC «Agro-Start» Cherkassy region for the period of 2001–2004 and 2009–2012 have undergone some changes: there were reduced age at first calving (–179 days,  $p<0,001$ ), duration of dry period (–3 days) and economic usage coefficient (–0,05,  $p<0,05$ ), but there were increased length of service period (+29 days,  $p<0,05$ ), calving interval (+24 days) and insemination index (+0,37). This confirms the general trend of deterioration of reproduction in dairy herds.

It was established that the extension of the service period length increased the length of lactation, milk yield and fat yield for the lactation. Length of lactation in the group of cows with length of service period 211 days or more was higher 182 days ( $p<0,001$ ) compared with the group of cows with length of service period 60 days and less; the difference in milk yield between these groups was 1266 kg ( $p<0,001$ ), fat yield – 45 kg ( $p<0,001$ ). For the length of lactation, milk yield per 305 days and fat yield significant difference was observed since the 121-st day of service period. Higher milk yield per 305 days and fat yield had cows with length of service period 181–210 days – 5663 kg and 203 kg, respectively. They dominated on these indicators cows with length of service period 60 days and less by 1624 kg (40%) and 57 kg (39 %), cows with length of service period 61–90 days – 1623 kg (40 %) and 56 kg (38 %), 91–120 days – 1564 kg (38 %) and 54 kg (36 %), respectively.

For fat content in milk significant difference between groups of cows with different length of service period were not found.

In a result of our research it was found that the longevity of Ukrainian Black and White Dairy breed cows in the herd LLC «Agro-Start» was in the range of 2433 to 2684 days, productive usage duration – 1396–1671 days or 3,51–4,04 lactations, economic usage coefficient – 0,60–0,64 depending on length of service period.

The best indicators of economic usage characterized cows with length of service period from 91 to 180 days (economic usage coefficient = 0,64), cows with lower and higher length of service period had less longevity, productive usage duration and economic usage coefficient. That is, the length of service period affects the value of cows’ economic usage indicators.

In the herd LLC «Agro-Start» from each cow during the lifetime was got 3,15–3,76 calves depending on length of service period. More calves, higher lifetime milk yield, lifetime fat yield + protein yield and milk yield per one day of life were got from cows with length of service period from 91 to 180 days: calves for the period of productive life – 3,73 heads (on average in groups of cows with length of service period 91–120, 121–150, 151–180 days), lifetime milk yield – 19,185 kg, lifetime fat yield + protein yield – 1371 kg, milk yield per one day of life – 7,16 kg. The largest advantage by lifetime milk yield and milk yield per one day of life was found in groups of cows with length of service period 91–120 days (+2835 kg; +0,5 kg, respectively) and 151–180 days (+3416 kg; +0,7,  $p < 0,05$ ) compared with similar indicators of cows with length of service period 60 days and less.

Milk yield per one day of lactation depending on length of service period in the research herd were within 13,8–14,9 kg. There is a tendency of reducing its value by lengthening of service period length. Significant lower milk yield per one day of lactation was observed in cows with length of service period 121–150 days (13,8 kg,  $p < 0,01$ ) and 211 days or more (13,9 kg,  $p < 0,05$ ).

Effect sizes calculations ( $\eta^2_x$ ) of service period length on indicators of milk productivity, economic usage and lifetime productivity of Ukrainian Black and White Dairy breed cows by method of analysis of variance showed, that its value was different – from 6,2 % to 49,5 % and varied depending on the indicator.

Among researched milk productivity indicators the significant impact the length of service period had on length of lactation (35,7 %,  $p < 0,01$ ); among economic usage indicators – on longevity (32,3 %,  $p < 0,05$ ), productive usage duration in lactations (27,4 %,  $p < 0,05$ ) and economic usage coefficient, which depends on longevity (24,3%,  $p < 0,05$ ); among lifetime productivity indicators – on number of calves per cow (41,4 %,  $p < 0,01$ ), lifetime milk yield (49,5 %,  $p < 0,001$ ), lifetime fat yield + protein yield (47,7 %,  $p < 0,001$ ).

The influence of the length of service period on indicators of milk productivity, economic usage and lifetime productivity of cows is the basis for improving the breeding efficiency in dairy herds.

**Key words:** Ukrainian Black and White Dairy breed, service period, milk productivity, economic usage, lifetime productivity.

### **Biotechnology of using polyhexamethyleneguanidine based disinfectants**

**Yu. Mandygra**

One of crucial issues of the national agriculture development are biotechnological bases for creating and applying competitive domestic preventive and curative remedies.

Solving this problem is based on increasing the efficiency of stock-raising development and improving the quality of products on the basis of environmentally friendly scientific technologies.

The issues of the biotechnology of introducing disinfectant measures and agents as well as their biological, ecological and economic efficiency increase has always been topical.

The aim of the research. The research was aimed to develop the biotechnology of implementing disinfectants based on polymeric derivatives of guanidine into different industries of stock-raising through studying their influence on microorganisms and mammals.

Research methods. Biotechnological, bacteriological, mycological, biochemical, physical and chemical, toxicological and statistical research methods.

Results and discussions. The present Ukrainian market is represented with wide assortment of disinfectant agents. The majority of the suggested disinfectants are meant for application only in humane medicine and are low-efficient under application by veterinary medicine specialists. It is predetermined by considerable bacterial contamination of veterinary supervision objects with conditionally pathogenic and pathogenic microflora. Application of a number of disinfectant agents under such terms does not provide the microorganisms devitalization.

Annual production volumes and application of disinfectant preparations have been increasing in the world. the 42 foreign and 22 domestic preparations are registered in Ukraine.

We have synthesized a new disinfectant preparation Epidez. It is a homogeneous transparent 20 % solution colorless and odorless, with specific weight of 1.128 g/cm<sup>3</sup> and pH 7.0±0.5.

The disinfectant is applied by spraying or wet wiping with 0,1–0,5 % aqueous solutions.

Toxicological studying of the Epidez preparation found that its working solutions did not result in hyperaemia, edema and changes in the studied animals eye vessels, LD<sub>50</sub> is 5 907.5 mg/kg, indicating its belonging to the 3<sup>rd</sup> toxicity level (moderate toxic substances) under oral use and the 4<sup>th</sup> level (low toxic substances) under external use.

The Epidez disinfectant has high antiseptic properties. Thus, under 0.05 % concentration for 3 hours at room temperature it exhibits bactericidal effect on gram-positive and gram-negative bacteria and under 0.1 % concentration it kills clostridia and bacilli; exposed for 2 hours at a concentration of 0.05 % it has bactericidal effect on microorganisms and bacteriostatic one on nosprous microorganisms as well as on bacilli and clostridia; exposed for 1 hour at 0.05 % concentration it has bacteriostatic effect, and at 1% concentration it has bactericidal effect.

0.05 % working solution at room temperature and 30 min exposure did not kill microorganisms deposited on wood and concrete, while Epidez working solutions at 0.1 % concentration showed 100% bactericidal action even under organic protection of the test cultures.

The efficiency of fungicidal activity of Epidez at different concentrations was determined on test cultures of museum strains of *Aspergillus* genus molds under different exposures. Epidez disinfectant showed fungicidal effect at the concentrations above 3.0 % under exposition at room temperature for 60 minutes and the effect was higher as compared to the control.

We have developed efficient, environmentally friendly and inexpensive water-based disinfectant for using in winter. Carbamide [(NH<sub>2</sub>)<sub>2</sub>CO] and dimethyl sulfoxide (DMSO) [(SH<sub>3</sub>)<sub>2</sub>SO] were chosen as substances with cold-resistant properties. Bactericidal activity on the test organisms (*E. coli* and *Staph. Aureus*) is found the best in 0.1 % solution in the composition with urea at the ratio of 1:38.

Testing the efficiency of Epidez for the needs of livestock was carried out on dairy farms of three enterprises during the outbreak of infectious diseases on their territory. The disinfection was carried out in the summer months at the temperature of 20–29 °C by irrigation method, 3 h. exposure, spending  $0.33 \pm 0.02$  l/m<sup>2</sup> of 0.1 % Epidez solution. Bactericidal effect on *E. coli*, bacilli and clostridia under such technology was 100%.

Production testing of the application of biotechnology of frost resistant Epidez barrier drug for disinfection of livestock buildings in the winter was performed on two dairy farms. The disinfection was performed by irrigation spending  $0.33 \pm 0.02$  l/m<sup>2</sup> of the 0.5 % Epidez barrier solution heated to 50±5 °C, which had 100% bactericidal effect on all types of the test microorganisms (*E. coli*, *Bacillus* and *Clostridium*).

Disinfection of the equipment at meat processing enterprises was conducted with 0.05% solution at a temperature of 40±3°C, applying  $0.3 \pm 0.05$  l/m<sup>2</sup> of the disinfectant, the exposure time was 1 hour. The disinfection in this mode turned to be qualitative according to all sanitary indicators.

Epidez disinfectant at concentration of 0.5 % was used at a rate of  $0.3 \pm 0.05$  l/m<sup>2</sup> for the prophylactic treatment of pond beds where marketable fish carp was grown in the summer. The treatment was carried out after fishing and complete drainage of the ponds.

It has been found out that the treatment of meat processing plants equipment with Epidez is 7.3 times cheaper, livestock buildings treatment is 13.3 times cheaper, and the pond beds – 17.6 times cheaper than the disinfection carried out according to the price list for veterinary services.

**Key words:** biotechnology, polyhexamethyleneguanidine, disinfection, disinfectants, Epidez.

### Assessment of milk productivity in connection with polymorphism of alfa-lactalbumin gene

#### O. Plivachuk

Milk protein genes are the preferred DNA-markers which stipulate quantitative and qualitative levels of milk performance of cattle. The structure genes – kappa-casein, beta-lactoglobulin and alfa-lactalbumin – are characterized by special impact on milk productivity and technological properties of milk.

$\alpha$ -Lactalbumin ( $\alpha$ -LA) is a metallic protein, major whey protein of bovine milk. Its part in whole milk protein is 2–5 %. The main biologic role of  $\alpha$ -LA is the involving in the synthesis of lactose.

$\alpha$ -LA polymorphism regarding to indices of milk productivity was studied for many cattle breeds. Particularly, Bleck and Bermel (2009) revealed that allele A of  $\alpha$ -LA in Holstein cattle associated with higher milk, fat and protein yield. At the same time allele B associated with higher fat and protein content.

The objective of this work was to study the possibilities of  $\alpha$ -LA polymorphism using for assessment of milk productivity potential in Ukrainian Black-and-White breed.

We took into account the main indices of milk productivity in 200 Ukrainian Black-and-White cows tested on  $\alpha$ -LA polymorphism.

Milk yield was calculated based on the results of monthly control milking. Fat and protein content in milk was measured by means of device «Ekomilk KAM-98.2». Total solids content was determined by method of drying to constant weight, milk solids non-fat (MSNF) content and lactose content – by using milk analyzer AM-2, casein content – by formol method. The casein number was calculated as the ratio of casein to whole protein. Milk density was measured using a lactodensimeter.

The rennetability of milk was ascertained by the trial of rennetability. 20 cm<sup>3</sup> of milk was heated up to 35 °C in water bath, 1 cm<sup>3</sup> of rennet powder with the strength of 1:400 was added, milk was stirred. The time till the creation of first curd flakes was measured.

Heat stability (alcohol number) was determined by the titration with 96 % ethanol.

Statistical analysis was carried out in program Statistica 6.0.

In the examined herd of dairy cows, two alleles of the  $\alpha$ -LA gene ( $\alpha$ -LA A and  $\alpha$ -LA B) and three genotypes (AA, AB та BB) were identified. The conducted research showed that 45 % of the population had the AB genotype, 36,5 % had the AA genotype and 18 % had the BB genotype. This has been confirmed by the results obtained for different populations of Black-and-White cattle.

The highest milk yield (5615 kg) was received from cows with genotype  $\alpha$ -LA BB. It was 243 (p<0,05) and 107 (p<0,05) kg higher than milk productivity of cows-carriers of AA and BB genotypes respectively. These results are in agreement with data obtained for Russian Black-and-White breed.

Significant differences between the cows of different  $\alpha$ -LA genotypes were not found for the content of main substances of milk. Animals with heterozygote genotype had slightly higher indices of fat, protein, total solids and lactose content in comparison with homozygotes, but the statistically significant differences were revealed only on protein content – AB>AA, 0,04 %, p<0,05; AB>BB, 0,08 %, p<0,05.

We determined the highest casein content in cows with genotype  $\alpha$ -LA BB. The casein number of this milk was 78,8 %, that copulate its best rennetability (28,4 min). Such characteristics are desirable for cheese making. At the same time the highest heat stability was in milk from cows with genotype  $\alpha$ -LA AA, alcohol number of this milk was 59,4 % of ethanol.

Results of disperse analysis showed the absence of significant associative relationships between milk performance traits and polymorphism of  $\alpha$ -LA gene except for milk and protein yield where we observed the significant dependence. The force of impact ( $\eta^2$ ) of genotype on milk yield was 1,4 % (p=0,037), protein content – 2,5 % (p=0,041). The direction of this connection indicates that allele  $\alpha$ -LA A is desired in case of animal selection on protein content.

The results presented here prove the feasibility of using the  $\alpha$ -LA gene polymorphism for assessment of milk productivity potential in Ukrainian Black-and-White dairy cattle.

**Key words:** milk productivity, alfa-lactalbumin gene, PCR-RFLP, genotypes, milk yield, milk content, cheese-making properties, heat stability.