AGROTECHNOLOGY AND FOOD RESOURCES

(FOUO 1/80)

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USSR Report

LIFE SCIENCES

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INDUSTRIAL MICROBIOLOGY

UDC 636.087.7

PRESERVED MIXED FEEDS. REVIEW INFORMATION

Moscow KONSERVANTY KOMBIKORMOV. OBZORNAYA INFORMATSIYA 5 p brochure in Russian (translation of brochure title, above) 1978

BRATERSKIY, F. D. and PELEVIN, A. D.

[From MIKROBIOLOGICHESKAYA PROMYSHLENNOST', NAUCHNO-TEKHNICHESKIY REFERATIVNYY SBORNIK No 2 1979 p 3 abstract dated 14 Feb 79 by Ye. A. Andreyeva under the heading "Biologically Active Substances in Mixed Feeds"]

[Text] Practice has shown the great economic effectiveness of using high quality mixed feeds for animals and poultry; their production specifies use of protein-vitamin additives (PVA), enriched combinations of biologically-active substances such as bacterial enzyme preparations--aminosubtilin G3x, protosubtilin G3x and others. Under conditions of continuous improvement of the technological process of production of mixed feeds, special importance is acquired by questions of stabilization of the various biologically-active substances in the mixed feeds and the PVA. This stabilization is accomplished basically by addition of antioxidants to the components of the enriching additives. Study was made of the economic effectiveness on broiler chickens of use of antioxidants. Results of the research undertaken showed that feeding mixed fodders containing santokhin makes it possible to increase growth of the broilers by 9.4-9.8%, and, containing diludin, by 8.3-8.5%, as compared with poultry whose feed is prepared without antioxidants. In addition, antioxidants have a positive effect on the biochemical processes in the body of animals: they promote an increase in reserves of carotene and fat-soluble vitamins in the blood, they protect against oxidation of internal and subcutaneous fat of poultry carcasses during storage.

[542-8586]

UDC 636.087.74

INFLUENCE OF BACTERIAL BIOMASSES FROM N-PARAFFINS ON THE BODY OF MEAT SWINE

Persianovka POVYSHENIYE PRODUKTIVNOSTI SEL'SKOKHOZYAYSTVENNYKH ZHIVOTNYKH. SB. STATEY a collection of articles in Russian (translation of the title of this article, above) Vol 13 No 2 1978 p 73

KINDYA, V. I.

[From MIKROBIOLOGICHESKAYA PROMYSHLENNOST', NAUCHNO-TEKHNICHESKIY REFERATIVNYY SBORNIK No 2 1979 pp 3-4 abstract dated 14 Feb 79 by Ye. A. Andreyeva under the heading "Pig Ration Containing a Bacterial Biomass Based on N-Paraffins"]

[Text] For fuller realization of the individual features of meat stock swine, high-quality feeding is of great importance. In this connection, research was carried out to study the effect of bacterial biomass from n-paraffins on the body of meat swine. For this purpose, a bacterial biomass from n-paraffins was used as a protein supplement in a pig ration; the biomass replaced 25% of the daily requirement of the animals in digestible protein.

Results of the tests showed that the mean daily growth in the period of the experiment was higher in the pigs which got the bacterial biomass from n-paraffins (group 1) as compared with the control (group 2) by 1.77%. In study of the morphological and biochemical indices of the pig blood no reliable difference was found but a tendency was noted to an increase in content of protein and its fractions in the pigs of group 1, especially during the first and second month of the experiment, which indicates a higher level of synthesis in them of serum proteins. Content of protein in the spinal longissimus muscle was higher in pigs of group 1 by 1.81%, while the content of fat and hydroxyproline was, respectively, lower by 20.1 and 6.5%. Inclusion, in the animal ration, of the bacterial biomass from n-paraffins intensifies the anabolic processes of protein in the pig body and it provides a mean daily rise in fat mass of the pigs in the range of 496-505 g.

[542-8586]

UDC 636.087.74

GROWTH AND DEVELOPMENT OF LAMBS RAISED WITHOUT MOTHERS AND USING VARIOUS SOURCES OF PROTEIN IN MILK SUBSTITUTES

POVYSHENIYE PRODUKTIVNOSTI SEL'SKOKHOZYAYSTVENNYKH ZHIVOTNYKH. SB. STATEY a collection of articles in Russian (translation of title of this article, above) Vol 13 No 2 1978 p 17

KOLOSOV, YU. A.

[From MIKROBIOLOGICHESKAYA PROMYSHLENNOST', NAUCHNO-TEKHNICHESKIY REFERATIVNYY SBORNIK No 2 1979 p 4 abstract dated 14 Feb 79 by Ye. A. Andreyeva under the heading "Use of Hydrocarbons of Yeasts in place of Skim Milk in a Sheep Milk Substitute"]

[Text] An important place, among the complex of problems in the field of sheep raising, has been occupied in recent years by working out new procedures to increase the preservation of lambs. For this reason, ever broader extension is being received by artificial raising of lambs, in specialized quarters, on sheep milk substitutes. However, growth in demand for a milk substitute is outstripping by far the possibilities for its preparation according to formulas in which the basic component is skim milk. In this connection, for partial replacement in the composition of the milk substitute it has been suggested to use yeasts based on hydrocarbons; these yeasts are high quality feeds, containing up to 50% protein, approaching, in biological value, protein of animal origin. To test this suggestion, tests were carried out which permit discovery of the optimal quantity of yeasts in the composition of the sheep milk substitute. For the tests, lambs were divided into five groups three of which received yeast in the composition of milk substitute in an amount of 5.4, 8.1 and 13.5% of the dry substance, respectively. Animals of the fourth group got a substitute composed only of skim milk in a hydrofat with inclusion of vitamin-mineral additives; the fifth group was kept with the mothers and served as a control.

The mean daily increases in the milk period indicated best growth and development of animals kept with the mothers. However, in 4.5-month growth this lag was decreased, and lambs of groups 3 and 4- with respect to fat mass-reached the levels of the control lambs. In this case, probably, this was the result of earlier accustoming of the lambs to the coarse

concentrates and, subsequently, to green feed. As a result of earlier and intensive development of the digestive system, better use of the feeds, and higher assimilation of them by the lambs with the artificially feeding, was observed.

[542-8586]

8586
CSO: 1840

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EFFECT ON PIGS OF FODDER YEASTS PRODUCED ON METHANOL

Persianovka POVYSHENIYE PRODUKTIVNOSTI S/Kh. ZHIVOTNYKH Sb. in Russian (translation of the title of this article, above) Vol 13 No 2 1978 p 87
LADAN, P. YE., UZHAKO, L. V., STEPANOV, V. I. and TOKAPENKO, I. P.

[From MIKROBIOLOGICHESKAYA PROMYSHLENNOST', NAUCHNO-TEKHNICHESKIY REFERATIVNYY SBORNIK No 2 1979 pp 4-5 abstract dated 14 Feb 79 by Ye. A. Andreyeva, under the heading "Fodder Yeasts Produced on Methanol in the Ration of Pigs"]

[Text] At the present time, studies of new sources of protein fodder are taking on a broad scope. One such source is fodder protein produced via microbiological synthesis on low molecular weight alcohols.

A number of investigations have been carried out to determine the possibility of using yeasts from methanol in the diet of swine. For this purpose a piglet control group, I, was fed meat-bone-and-fish-meal--20% of their protein requirement--and, groups II and III, yeasts from methanol--20 and 15% respectively.

Study results show that intensity of growth of the piglets was higher than that of the controls. Rise in live weight in the first and second month of the experiment exceeded the control by 14.4-21.5%. Expenditures of fodder per rise in the test groups were lower than in the control. Feeding of the fodder products, obtained on methanol, did not cause a depressing action on the hemiopoetic function of the animals. The amount of erythrocytes, hemoglobin, leukocytes in the blood of all groups was practically the same. Results of the control slaughter indicate a higher level of biosynthesis of proteins in the pigs of the experimental groups as compared with the control. In the carcasses of the animals of the experimental group, as compared with the control, the meat yield was somewhat higher and the fat, lower. In addition, there were seen some differences in content of individual aminoacids in the pig muscle. Thus, swine of groups II and III, as compared with I, showed a higher content of lysine, arginine, histidine, with a lower level of tryptophan. This permitted concluding that the meat of the pigs getting yeast from methanol was of adequately good quality.

Thus, study results indicate that yeasts produced on synthetic methanol when fed to swine in rations, in an amount up to 20% of the protein requirement, do not cause a negative influence on growth, slaughter qualities, chemical and aminoacid composition of the tissue.

[542-8586]

UDC 636.087.74

PROTEIN-VITAMIN PREPARATION AS A COMPONENT OF A MIXED FEED

MUKOMOL'NO-ELEVATORNAYA I KOMBIKORMOVAYA PROMYSHLENNOST' in Russian (translation of article title, above) No 4 1978 pp 29-30

STAKHEYEV, I., BABITSKAYA, V. and KARPLYUK, T.

[From MIKROBIOLOGICHESKAYA PROMYSHLENNOST', NAUCHNO-TEKHNICHESKIY REFERATIVNYY SBORNIK No 2 1979 p 8 abstract dated 14 Feb 79 by L. V. Dmitriyeva under the heading "New Protein-Vitamin Preparation"]

[Text] One of the most effective ways to increase reserves of protein raw material for the mixed feed industry is use of protein sources such as microorganism biomasses produced by culturing, under industrial conditions, of yeasts, microscopic fungi, bacteria and algae.

Research carried out in the Institute of Microbiology, BSSR Academy of Sciences, has shown that some microscopic fungi are able--without a preliminary hydrolysis--to assimilate such polysaccharides of potato wastes as starch, cellulose, hemicellulose and pectin, hereby accumulating a first class protein mass. It was shown that the best protein producers on wastes of processed potatoes turned out to be the microscopic fungi Penicillium digitatum and P. notatum which synthesize a complex of hydrolytic enzymes and form, in 48-72 hrs, up to 10-24 g of biomass/l calculated on dry weight, with a content of 50-60% of dry protein, 36-40% real protein of full aminoacid makeup. The producer P. digitatum 24P also synthesized fat, 7%, vitamin B group, and provitamin D, ergosterol: The content of saturated fatty acids in the fat amounted to 15.1%, of trace elements, from 0.8 to 50 mg% of the salt mass.

A preparation, digitatin, was made in which the basic mass of protein amounts to 50-60%; the fractional composition of protein in the new preparation did not differ from the composition of grain protein and included the same groups as are in the protein of wheat, rye and barley. About 86.1% of the total amount of protein was made up of albumins, globulins and prolamines. The aminoacid composition of the preparation satisfied the requirements posed for the quality of protein raw material for production of mixed feeds. The digitatin preparation contains vitamins:

thiamin (B_1)--1.6 mcg/g, riboflavin (B_2)--66.5, nicotinic acid (B_5)--12.7 mcg/g and, also, ergosterol (provitamin D) in the amount 0.19% and vitamin F (a mixture of linoleic and linolenic acids)--1.3-1.5% with respect to dry biomass. The digitatin preparation is a fine-grained product with 6-8% moisture. After preliminary milling it can be introduced into a mixed feed. Trial of digitatin, conducted with swine, showed positive results.

[542-8586]

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USE OF AN ENZYME PREPARATION PECTOFETIDIN P10x IN DIETS OF BROILERS

Moscow ZHIVOTNOVODSTVO in Russian No 7, 1978 pp 61-62

SACHKOVA, T. P.

[From MIKROBIOLOGICHESKAYA PROMYSHLENNOST', NAUCHNO-TEKHNICHESKIY REFERATIVNYY SBORNIK No 2 1979 p 28 abstract 14/P-1979 by L. V. Dmitriyeva, under the heading "Use of Pectofetidin P10x in Poultry Farming"]

[Text] The substance studied was an enzyme preparation, pectofetidin P10x, of fungus origin, obtained in growing a surface culture of Aspergillus foetidus. The preparation contains a broad spectrum of enzymes, including polygalacturonase, pectinesterase, transeliminase, cellulase and protease which act on pectins, lipids, cellulose, hemicellulose and other substances. A series of experiments were carried out on use of pectofetidin P10x in diets of broilers. A control group of broilers received the basic ration without the enzyme preparations. Birds of another, experimental group got, along with the basal diet, 0.02% pectofetidin P10x. Results of the experiments are presented below:

Index		Control Group	Experimental Group
Initial number of chicks		2,880	2,880
Average mass of one chick at start of test, g.		40	40
Final number of chicks		2,376	2,687
Preservation of chicks, %		82.5	93.3
Mean mass of a chick on the 73d day of experiment:	g.	1,341	1,406
	% of control	100	104.5
Outlay of fodder per 1 kg gain, kg		3.8	3.2
Yield of carcasses, by category			
	1	80.5	85.2
	P	12.4	10.5
	Sh	7.1	4.3

[542-8586]

UDC 061.3:/663.18:636.087.7/

ALL-UNION MEETING ON ENZYMES OF MICROORGANISMS

Moscow MIKROBIOLOGICHESKAYA PROMYSHLENNOST', NAUCHNO-TEKHNICHESKIY REFERATIVNYY SBORNIK in Russian No 2 1979 pp 10-12 manuscript received 26 Feb 79

MININA, V. S., ONTITEImikrobioprom

/Text/ The Second All-Union Meeting on Enzymes of Microorganisms took place in Minsk in 1978. It was organized by the Scientific Council of the USSR Academy of Sciences (AS) on Problems of the Physiology and Biochemistry of Microorganisms, by the Institute of Microbiology, USSR AS, by the Institute of Microbiology BSSR AS, by the Scientific Council on the Problem "Enzymes and Their Use in the National Economy and Medicine" of the State Committee of the USSR on Science and Technology and by the Main Administration of the Microbiological Industry, USSR Council of Ministers. Participating in the work of the meeting were 200 specialists of various ministries and departments in the field of biotechnology, bioengineering, microbiology and biochemistry, Plenary and sectional sessions heard 4 review and 39 sectional reports. Materials of the meeting were published in two parts. The first part sheds light on the biosynthesis of enzymes by microorganisms (purification, properties and immobilization of enzymes), while the second part has dealt with the technology of preparing enzyme preparations (apparatus and control, use of enzymes in various branches of the national economy).

The following reports were given and discussed at the meeting:

study of enzyme producers and production with the help of mutagens of active strains--L. I. Yerozhinoy (All-Union Scientific Research Institute of Genetics), Z. A. Yushkayte (All-Union SciRes Institute of Applied Enzymology), A. I. Panfilova, et al. (Institute of Cytology and Genetics of the Siberian Department, USSR AS), A. A. Dunayeva, et al. (Institute of Microbiology, BSSR AS), I. R. Sultanova, et al. (Institute of Microbiology, UzbekSSR AS) and others;

study of mechanisms and regulation of synthesis of function of enzymes

in cells--V. V. Yurkevich (MSU), G. V. Samsonova (Institute of Vaccines and Sera, USSR AS), A. M. Bezborodova (Institute of Biochemistry imeni Bakh, USSR AS), L. G. Loginovoy (Institute of Microbiology, USSR AS), Ye. L. Ruban (I. Microbiology, USSR AS), V. I. Bilay (IMV, UkrSSR AS), N. S. Yegorova (MSU), A. G. Lobanok (Institute of Microbiology, BSSR AS) and others;

purification and immobilization of enzymes--A. Ya. Stroyatina, V. M. Stepanova (All-Union SciRes Institute of Genetics), A. M. Yegorova (MSU), S. I. Bezborodovoy (Institute of Biochemistry and Physiology of Microorganisms, USSR AS), Ye. M. Savitskoy (All-Union SciRes Institute of Antibiotics), A. L. Losevoy, et al. (Institute of Biochemistry UkrSSR AS), and others;

questions on the technology of production of enzymes and their use in various branches of the national economy and medicine--L. S. Losyakovoy, L. I. Golger, L. I. Oreshchenko, N. V. Belykh, L. M. Vayner, V. V. Dorokhova (All-Union SciRes Institute of Biotechnology), V. L. Yarovenko (All-Union SciRes Institute of Industrial Biology,?), M. V. Gernet (Moscow Technological Institute of the Food Industry), A. A. Klesova (MSU), N. M. Brazhnikovoy (SciRes Institute of Chemical Machine Building) and others.

The meeting noted that in recent years successes have been achieved in the extension and intensification of research on biosynthesis of enzymes of microorganisms, on creation of new progressive technological processes and highly-productive equipment and, also, on extension of the area of use of enzyme preparations. Active producers have been selected of amylases, pectinases, proteases, catalases, lipases and other enzymes. Production has been worked out and introduced of amylolytic, proteolytic and pectolytic enzyme preparations with the use of submerged and surface cultivation of microorganisms. The first native Soviet enzyme preparations have been produced for use in medicine (terrilitin and beta-asparaginase). Highly-productive mutant strains have been created with the help of devised selecto-genetic procedures; these strains synthesize various enzymes.

Work has been developing broadly on preparation of homogenous and immobilized enzymes of microbial origin, on evaluation of their quality and on establishment of their physical chemical functional characteristics. Already produced are some chemically pure individual preparations (proteases, glucooxidases, nucleases, lipases). The technological orders have been worked out for production of proteases under highly-purified and homogenous states, (acid, neutral and alkaline proteases), alpha-amylase, lipase and others. Research has found broad use for new methods of isolation, such as ultrafiltration, aphinic, hydrophobic and covalent chromatography. Native Soviet immobilized enzymes have been prepared and, based on them, the technology has been worked out of production of 6-aminopenicillanic acid and, also, of glucose from starch with the help

of an immobilized glucoamylase.

Significant work has been done on improvement of existing, and creation of new technology and of highly-productive equipment for making various enzyme preparations, on raising their quality and on broadening the assortment. In recent years, two technological lines have been worked out and introduced for cultivation of microorganisms by surface and submerged methods and more than 200 new models have been created of equipment with great unit capacity. Development has been realized of technological lines of continuous cultivation, exceeding in capacity the existing lines by a factor of 6-8.

In recent years, high efficiency has been shown for use of enzyme preparations in various branches of industry: alcohol, beer-brewing, juice extraction, wine-making, meat, fish, bread-baking, starch-molasses, leather, textile and others.

Based on study of a complex of enzyme preparations, and, also, of biochemical conversion of substrates under the action of the preparations on various raw material, the scientifically-based requirements have been worked out for the quality of enzymes used in industry and agriculture. A period of mass use of enzyme preparations in the national economy has started. The volume of manufacturing production with use of enzymes in several branches of industry has doubled and in beer-brewing has reached 40% of the total volume of manufacturing production.

The meeting noted the basic trends of research on which it is necessary to concentrate the strengths of our nation's scientists. Above all, it is necessary to broaden scientific research on search in nature, isolation and selection, including autoselection, producing microorganisms of various exo- and endoenzymes which have theoretical and practical value for the national economy, medicine and scientific research; to use, extensively, anerobic forms of microorganisms in selection of producers. It is necessary to increase the effectiveness of selection work directed to obtaining, with the help of mutagens, the producer strains of enzymes, with increased productivity; obtaining strains with improved technological properties, and, also, further development of new genetic-selection approaches, based on development of gene engineering; to study genetic control of high synthesis of exoenzymes on the basis of research on genetic, biochemical and physiological principles of regulation of biosynthesis of industrial enzymes.

It is extremely important to work out and introduce new methods of storing cultures of microorganisms which are active producers of enzymes, to study the lysogenic properties of enzyme producers and to create the theoretical and practical bases to control phagolysis.

Necessary are the extension and intensification of research in the field of study of control mechanisms of regulation of formation of internal

and external enzymes, study of localization of enzymes in cells of microorganisms, mechanisms of transport of enzymes from the cell into a medium, isolation and purification of enzymes with broad use of new methods, study of structural and physical chemical properties of homogeneous enzymes, of the active center, mechanism of enzymatic catalysis, and, also, stabilization of enzyme preparations by addition of fillers, specific inhibitors, immobilization of enzymes and enzymologically-active cells of microorganisms.

Creation and introduction is required of new, more improved construction of highly-productive automated, technological equipment for submerged, surface, and, also, continuous cultivation of enzyme producers in industrial enterprises, further search and creation of new more effective compositions of enzyme preparations and improved ways to use enzyme preparations and broadening the spheres of their use.

In the area of industrial microbiology, the meeting has felt it necessary to intensify work on control of phagolysis in plant enterprises which produce enzyme preparations; to create a laboratory to store pure cultures and supply them to enterprises which put out enzymes; to broaden the assortment of developed enzyme preparations in consonance with requirements for their composition, degree of purity and quality for each industrial branch and to investigate the possibility for further lowering of the cost of these preparations.

In order to raise the theoretical level of research, to accelerate work tempos and to increase their effectiveness, the meeting has recommended the broad practise of organizing schools and symposia, with discussions at them of results of research on problems of biosynthesis of enzymes;

creation, in the systems of Glavmikrobioprom /Main Microbiological Industry Administration/ and the USSR Ministry of Chemical Industry, of laboratories for standardization of components of nutrient media used for cultivation of microorganisms--the enzyme producers--and, in the systems of the USSR Ministry of Food Industry and Glavmikrobiolprom, an inter-departmental arbitration laboratory for comparative evaluation of the activity of cultures of microorganisms and determination of the quality of enzyme preparations supplied by enterprises of the food industry;

broadening of scientific research in institutes of the USSR Ministry of Agriculture and VASKh NIL /All-Union Academy of Agricultural Sciences imeni Lenin/ on use of microbial enzyme preparations in mixed feed manufacture (to increase assimilability of crude fodders, silaging of difficultly-silaged fodders);

establishment of the economic effectiveness of use of enzymes in various branches of the national economy and medicine prior to their introduction;

organization, in 1980, of a school for microbiologists on regulation of enzyme activity of microorganisms;

rganization of output of sorbents for separation and purification of enzymes;

strengthening of propaganda for application of enzyme preparations in the national economy, using the organization of special exhibition fairs, stands, scientific journals, periodicals, radio and television;

conduct of All-Union meetings on enzymes of microorganisms every five years and publication of the work of those meetings.

[542-8586]

8586
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PECTOFETIDIN G3x IN DIETS OF FATTENED YOUNG CATTLE

Moscow MIKROBIOLOGICHESKAYA PROMYSHLENNOST', NAUCHNO-TEKHNICHESKIY REFERATIVNYY SBORNIK in Russian No 2 1979 pp 18-19 manuscript received 28 Feb 78

AKHMEDOV, G. A., All-Union SciRes Institute of Biotechnology

/Text/ The enzyme preparation pectofetidin G3x has been developed at the Privolzhskiy Biochemical Plant by submerged cultivation of the non-pathogenic fungus Aspergillus foetidus on a medium composed of beet pulp, wheat bran and salts of calcium, magnesium, sodium and phosphorus, with subsequent drying of the culture liquid in a spray drier. The preparation is designed for use in rations of agricultural animals. Standard activity of the preparation is 3 units/g.

Pectolytic and cellulolytic enzymes are not formed in the animal body. Cellulose of fodders is partially digested with the help of enzymes of microorganisms which live in the rumen, third stomach and large intestine. The presence of a large amount of cellulose in fodder impedes the assimilation of easily-digested food substances. Fodders which have a high content of pectin substances include grain and beet pulp. In feeding cattle with these products, almost one third of the food substances remains undigested and proceeds by transit through the digestive tract.

In order to establish the effectiveness of use of the enzyme preparation pectofetidin G3x, in feeding of young cattle on grain at the "Mayak" sovkhoz, Kimrskiy Rayon, Kalinskaya Oblast, two trials were carried out from November 1975 to March 1976. The first trial was a scientific farm trial on three groups of young bulls, the second was an industrial trial on two groups of young bulls. In the first trial (119 days, from 25 October to 23 March), two doses of the enzyme preparation were used: 0.3 and 0.6 g per one fodder unit of ration. In the second trial (79 days, from 8 January to 27 March), one dose of the preparation was taken: 0.6 g per one fodder unit, which, according to data of the first trial was better in the first month. The animal groups (10 head each) for the trial were analogous in growth and live mass. The animals in the experimental groups were fed, twice a day, with the enzyme preparation pectofetidin G3x mixed

Effect of pectofetidin G3x supplements in the ration of bulls on their growth and on expenditure of fodders per 1 mg of growth

Index	Control Group	Experiment 1	Experiment 2
1	2	3	4
Scientific-farm trial (10 animals)			
Dose of preparation, g/fodder unit	-	0.3	0.6
Average mass of animals, kg:			
at start of trial	190.0	190.0	190.0
at end of trial	263.5	273.5	281.0
Growth			
kg	73.5	83.5	91.0
% of control	100.0	113.6	123.0
Outlay of fodders per 1 kg growth			
fodder units	7.9	6.9	6.4
% of control	100.0	88.0	84.0
Industrial trial (75 animals)			
Total mass of animals at start of experiment, kg	17592	17512	
Special slaughter			
20/P head	1	-	
kg	270	-	
4/Sh head	2	1	
kg	400	200	
23/Sh head	-	1	
kg	-	375	
Number of animals at end of trial	72	73	
Total mass of animals at end of trial	20780	21270	
Total mass of animals, taking into account the slaughter	21450	21845	
Growth			
kg	3854	4630	
% of control	100.0	118.0	
Outlay of fodders, fodder units	25283	25283	
Outlay of fodders per 1 kg of growth			
fodder units	6.555	5.461	
% of control	100.0	83.3	

in the concentrated fodder.

In the period of the trials, all animals were healthy and ate up the fodder completely. Animals of the experimental groups and the control groups in the trial were fed the same amount of fodder for each group: in the experiment--grain, 56560 kg; concentrated fodder, 1286; hay, 3250; straw, 950 kg; fodder units, 5796; digested protein 1185 kg; in a second experiment--grain, 281437 kg; concentrated fodders, 4072; hay, 13690; straw, 4917; fodder units, 25283; digested protein, 5325 kg. Results of the experiments are presented in the table.

The data of the table show that growth of the animals in the experimental groups (scientific-farm trial) was greater than growth of the animals in the control group by 13.6-23.0%. Expenditure of fodder units per 1 kg of growth, in the animals of the experimental groups, was less than in the animals of the control group by 12-16%. These data indicate that pectofetidin G3x promotes an increase of growth and improvement in fodder cost.

In the period of the second experiment, each animal showed a growth exceeding the growth of control animals, by 17.5 kg. Outlay of the preparation per one animal for the trial amounted to 428.4 g. Cost of such an amount of the preparation, when 1 kg costs 5 r., amounts to 2 r. 14 k, and an outlay per 1 kg of additional growth--12.2 k. With a cash cost of 1 r. 46 k for 1 kg of live mass, the economic effectiveness of use of pectofetidin G3x amounts to: 21 r. 80 k when 428.4 g of preparation is used and 50887 r. when 1 t of preparation is used.

In the industrial trial, the animals which got 0.6 g of pectofetidin per one fodder unit, in their ration, had a greater growth (by 18.9%) as compared with the animals which got the ration without the enzyme preparation. With respect to fodder payment, better indices were in the experimental group of animals. Outlays of fodder per unit of growth in animals of the experimental group were less than the outlays in animals of the control group by 16.7%. At the beginning and at the end of the industrial trial, controlled slaughter of the animals was carried out in order to examine the internal organs. The digestive tract, lungs, liver, kidneys, spleen, heart, lymphatic and blood vessels, bones and skeleton did not have any sort of deviation from the normal.

CONCLUSIONS

1. Use of the enzyme preparation, pectofetidin G3x, in feeding of young cattle with grain residue, promotes an increase in their growth by 13-23% and a decrease in expenditure of fodder per unit of growth by 12-17%, and, also, it gives a substantial economic effect.

2. Optimal dose of pectofetidin G3x, in feeding young cattle on grain residue, is 0.6 g per one fodder unit. Pectofetidin G3x must not be subjected to thermal processing (over 50°C).

[542-8586]
8586
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DEVISING AN INDUSTRY-BRANCH STANDARD OF PRODUCTION BY THE MICROBIOLOGICAL INDUSTRY. TERMS AND DEFINITIONS

Moscow MIKROBIOLOGICHESKAYA PROMYSHLENNOST', NAUCHNO-TEKHNICHESKIY REFERATIVNYY SBORNIK in Russian No 2 1979 p 39 manuscript received 26 Jan 79

DERBENEV, YU. YU. and SMYCHNIKOV, YU. I., ONTITEI mikrobioprom [Dept. of Scientific Technical Information and Technical Economic Research of the Microbiological Industry]

[Text] In consonance with the Plan for industry-branch standardization of Glavmikrobioprom, the ONTITEI mikrobioprom together with the All-Union SciRes Institute of Protein Synthesis, the A-U SciRes I. of Hydrolysis, the A-U SciRes I. of Bacterial Preparations, the A-U SciRes I. of Biotechnology and the A-U SciRes I. of Genetics have begun to devise an industry-branch standard "Production by the Microbiological Industry. Terms and Definitions", the completion of which is planned in 1981.

The purpose of devising the standard consists in establishing unequivocal, scientifically-based terms and definitions on production of the microbiological industry to assure identical understanding, by specialists of various profiles, of scientific publications, technological and normative-technical documentation, linguistic security of ASU (automated control systems), lessening the laboriousness of developing classifiers of information and of unified systems of documentation, and concurrence of international cooperation in a given field. Subject to standardization are the terms and definitions with respect to individual kinds of microbiological production, terms and definitions which have come into use in connection with their development and release and, also, terms included in normative-technical and technological documentation in reference, teaching and scientific-technical literature.

Standardization of microbiological terminology up to the present time has not occurred except the terms "premix", "filler of premixes", "protein-vitamin supplements" included in GOST 21660-75 "Mixed feed. Terms and Definitions", worked out by the All-Union SciRes Institute of the Mixed Feed Industry. In foreign countries, terms on production of the microbiological industry have also not been developed. Developments are lacking

in this area also in the recommendations and standards of international organizations (ISO, SEV, MEK).

It is suggested that a standard will consist of three parts—introduction, subject and alphabetical index. In the introductory part will be indicated the fields of use of the standardized terms (standards, TU—technical specifications?--technical, teaching and scientific-technical literature, guides and others). A list and definitions of terms on production of the microbiological industry will be set forth in the subject part of the standard. An index of terms is to be placed in the concluding part.

The standard is brought into harmony with existing standards of the State System of Standardization (GOST 1.0-68, GOST 1.2-68, GOST 1.5-68, GOST 1.11-75). In working out standards, the procedural workups are used from the All-Union SciRes Institute of Technical Information, Classification and Coding. A layout of the standard will be distributed for review by interested organizations and departments.

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REPUBLIC STANDARDS FOR MICROBIOLOGICAL PRODUCTION

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SMYCHNIKOV, YU. I., ONTITEI mikrobioprom [Dept. of Scientific Technical Information and Technical Economic Research of the Microbiological Industry]

[Text] For production in the microbiological industry there are, at the present time, 23 state standards, 17 industry-branch standards and 114 technical conditions. Also in effect are 5 state standards for methods of assay of enzyme preparations and 4 organizational-procedural, industry-branch standards. Besides this there are a number of republic standards for products of microbiological synthesis:

RST KazSSR 1 83-72 "Leaven for silaging of fodders dry (from a culture of propionic acid bacteria)".

RST KazSSR 1 84-72 "Leaven for silaging fodders dry (bacterial preparation from pure cultures of amylolytic streptococcus)".

RST UkrSSR 1658-75 "Leavens for silaging fodders dry".

RST KazSSR 354-74 "Biopreparations combined from surplus beer yeasts".

RST BSSR 621-75 "Kormolizin".

RST UkrSSR 1203-71 "Vitamin B_{12} fodder (concentrate)".

Also in effect are a number of republic standards for yeasts beer fodder dry (RST KazSSR 26-70; RST UzbSSR 213-73; RST KirgSSR 272-73; RST UkrSSR 483-73; RST TadzhSSR 532-73; RST UkrSSR 485-73); for mash beer dry (RST UzbSSR 202-73; RST LitSSR 346-73; RST UkrSSR 484-72; RST TadzhSSR 531-73). Besides this, there exist the following industry-branch standards: of the food industry OST 18-15-70 "Yeasts fodder dry" and of the medical industry OST 64 5-114-73 "Solution of vitamin D_2 in oil for animal husbandry". The republic standards are published by the Gosplans of the union republics.

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CONFERENCE ON TECHNOLOGY OF PRODUCTION OF BIOLOGICAL PREPARATIONS

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KRISTAPSONS, M. ZH. and GAYDENKO, B. P., Institute of Microbiology imeni Kirkhenshteyn, LatvSSR Academy of Sciences; VNIiTIBP (All-Union SciRes and Technological Institute of the Biological Industry)

[Text] With the intensification of agricultural production and the concentration of livestock, there has been a substantial rise in the role of specific prophylaxis of animals and poultry against infectious diseases.

The Main Administration of the Biological Industry of the USSR Ministry of Agriculture conducted, in Shchelkovo, in 1978, in the facilities of the VNIiTIBP, the first All-Union Scientific-Practical Conference on "Scientific Bases of the Technology of Industrial Production of Veterinary Biological Preparations".

Participating in the work of the conference were 350 scientific personnel and specialists from 26 bio-enterprises of the Glavbioprom, USSR Ministry of Agriculture, representatives of 38 sci-res organizations of the USSR Academy of Sciences, UkrSSR and Latvian SSR AS, VASKhNIL (All-Union Academy of Agricultural Sciences imeni Lenin), Academy of Medical Sciences, a number of ministries and Glavmikrobioprom. Fourteen review reports and 132 exhibit-contributions were presented in the plenary sessions.

Opening the conference, the Deputy Minister of Agriculture, USSR, L. N. Kuznetsov, noted the need for creation of a modern theory and practise of technology of production of biological preparations. The report of the chief of the Main Administration of the Biological Industry, USSR Ministry of Agriculture, M. V. Zvyagin, contained a detailed analysis of work of the Administration as a whole and with respect to individual biofactories. It was noted that, along with the accomplishments, native Soviet industry is not yet preparing--for the biological industry--a complex equipping or automated technological lines of the required capacity. The industry is not issuing, centrally, in adequately broad assortment, nutrient media for culturing specific viruses and bacteria and for preparaing therapeutic sera.

The basic tasks of the biological industry are defined by the epizootic situation in our country and worldwide. According to data of the International Epizootic Bureau, breeding animals are subject, on a world scale, to about 100 infectious diseases caused by microorganisms, viruses, mycoplasms, rickettsiae and fungi. Therapeutic agents are prepared against only two thirds of the diseases. The creation of prophylactic means is one of the main tasks of the scientific research institutions of the country.

A number of the reports were unique accounts of individual laboratories of VNIITIBP on developing new virus-control preparations and prognostication of their issuance (P. P. Kuznetsov and M. G. Tarshis), on preparation of vaccines against diseases of birds (V. A. Lukina), on creation of the industrial technology of hormone preparations (V. A. Pershin). Designed for a broader audience were the reports of E. F. Tokarik on drying biological preparations by sublimation and of Ye. A. Ruban on automatic control and optimization of the technology of industrial production. The latter brought forward the stages of work on creation of ASUTP--an analog system for the microbiological industry, a hierarchic system of control whose purpose is to liquidate bottlenecks in production. The need was shown for selection of optimal conditions, based on a mathematical and physical model of a process under a given criterion of optimality with the wide use of computer technology and electronic computers.

The Director of the State Scientific-Control Institute of Veterinary Preparations, D. F. Osidze, familiarized the participants of the conference with the System of State Control of Biological Preparations; he showed how important it is to maintain a quality standard for preparations.

The Chairman of the Irkutsk SciRes Institute of Chemical Machine Making, I. P. Lapinskiy, talked about the perspective developments in creation of high-intensity fermenters with a volume up to 320 m^3 for work under sterile conditions. He noted differences in putting them together with control and measuring instruments and automation equipment and, also, the lack of an adequate amount of non-corroding material which makes the work of designers difficult.

A discussion took place after the reports and touched upon questions of creation of laboratory fermentation apparatus and engineering science (M. Zh. Kristapsons), a bank or museum of cell cultures (S. M. Borisova), new hormone preparations (B. I. Smolyaninov), improvement in designing (B. V. Feygel'man) and others.

The exhibit-contributions, which received positive response from all conference participants, can be divided into several groups or sections: reports dealing with apparatus for fermentation (M. Zh. Kristapsons), purification of preparations (V. P. Gaydenko, et al., I. A. Khor'kov), preparation of nutrient medium (G. A. Kutasova, et al., I. M. Gracheva, et al.), use of biopreparations in the national economy (K. N. Buchnev,

et al., S. A. Dzharylgasov, et al., E. Ya. Yaunsleynis, et al.). The majority of the contributions reflected modern methods of research. Along with the contributions of the scientific research collectives comparatively many of the contributions had been prepared by biofactory workers.

The reports delivered at the conference and the exhibits encompassed on the whole all the problem topics of creating the scientific bases of technology of production and the use of biological preparations for raising the effectiveness of animal husbandry and the veterinary service to it.

The conference resolution formulated the basic goals and an extended program of action for the immediate future. The basic trends of scientific research recommended include: preparation of highly-immunogenic strains of microorganisms (viruses, bacteria, fungi) using modern molecular-genetic methods; working out the industrial technology of preparing associated antiviral and antibacterial biopreparations using highly-effective adjuvants and stabilizers; improvement in the technology of production of microbiological preparations; working out new industrial methods to prepare dry and liquid nutrient media for cultivation of viruses and bacteria; physical chemical methods of purification and concentration of antigens and antibodies using the latest accomplishments of modern bioengineers and immunologists; development of methods to control technological preparations, using electronic computers; creation of methods of mass immunization of agricultural animals (aerosol, oral, jet) and others.

The conference promoted a broad exchange of experience on development, preparation and use of biological preparations, and the establishment of working and creative associations between the specialists.

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