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UTILIZATION OF THE FERMENT PREPARATION FARMAZYME 2575 IN THE MIXED FODDER FOR YOUNG PIGS

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Abstract: The researches were carried out in the period from November 2007 to May 2008 in the conditions of the enterprise "Moldsuinghibrid". The purpose of the experiment was to study the effectiveness of the utilization of the ferment preparation Farmezyme 2575 addition at different level using the indices of weight growth and substance exchange in the young pigs. The data obtained in the scientific and economic experiment showed, that the addition of ferment preparation Farmazyme 2575 into the mixed fodders for young pigs at the level of 0.8-1.0 g/t contributed to the living mass increase (with 3.8 – 4.14 % in the experimental groups in comparison with the control group correspondingly), to the decrease of fodder expenditure, and to their better consumption, but it did not exert any influence on the blood biochemical indices.

INTRODUCTION

Vegetable fodders contain much cellulose, which is not assimilated by organisms, though by their chemical composition they are very valuable from the point of view of nutritiousness. Under the action of ferments vegetable polymers break up into simpler protein combinations accessible for the assimilation by organisms. (5)

It is well known that a third of organic substance entering with fodders usually is not digested by animals. The reduction of this loss with 2-3 % would help to obtain hundreds of kilos of additional production**.** One of the means to solve this task is to add into the fodder ferment preparations of microbial origin with the help of which it is possible to appreciably improve the digestion and the assimilation by organisms of the nutritious substances of fodders, and also to speed the digestion processes.

It is also very important to find out what sex and age-group structure animals could be reasonably fed with ferment preparations, because their utilization at an early stage of the ontogenesis could lead to the decrease of the ferment system activity of the organism at later stages. It is also necessary to trace out the reciprocal influence between the intensity of the fermentative activity in the digestive tract and the body hormonal status.

Ezdacov P.B. (2) insistently recommends using ferments differentially. Thus, breeding and feeding pigs it is more right to use complex ferment preparations with an optimal activity in the neuter and weak sour environments that possess a high proteolytic and moderate amylolytic activity. It is not less important to find out the optimal dose of the preparation. It is observed that the utilization of big ferment doses does not bring the necessary effect. It must be also taken into account the animal age, the composition of the rations, and the feeding period.

The researches show that the enrichment of the rations for pigs with ferment preparations, which contain amylolytic and proteolytic ferments improves the digestion and the utilization of the nutritive substances of the fodder that ensures their better growth and development. Many scientists have tried to increase the metabolic processes of pig digestion

via the introduction of the exogenous ferments and thus to improve the utilization of the nutritive substances of vegetable fodders (6, 7). Ferment preparations are largely utilized in the production of mixed fodders and premixes for pigs, cattle and poultry.

MATERIAL AND METHODS

In order to study the effectiveness of the addition of the ferment preparation Farmazyme 2575 into the mixed fodders for young pigs using the indices of weight growth and substance exchange a scientific and economic experiment was performed in the conditions of the enterprise "Moldsuingibrid" from 16.11.07 to 14.05.08.

To carry out the experiment using the analogue principle pigs of the same age, live mass, and breed were taken using the method of the realization of scientific and economic experiments (4).

The experiment length was of 170 days; 10 days were used for preparing period and 160 days for control period.

All the selected pigs were divided into three groups by 10 heads and they were fed in accordance with the scheme of research realization (Table 1).

Table 1

The Scheme of the Scientific and Economic Experiment

Groups	Number of pigs in the groups, heads	Feeding characteristics
I - control	10	BR - Base ration
II - experimental	10	BR + Farmazyme 2575 (0,8 kg/t)
III - experimental	10	BR + Farmazyme 2575 (1,0 kg/t)

The keeping conditions of pigs in the control and experimental groups were equal. The differences between the control and experimental groups were that the ferment preparation Farmazyme 2575 at different level was added to the main mixed fodder for experimental groups.

The results obtained in the experiments were worked up using the method of statistics of variations (1).

RESULTS AND DISCUSSIONS

The mixed fodders for the scientific and economic experiment were prepared at the mixed fodder factory of the enterprise "Moldsuingibrid" for the whole experimental period according to the formula of the following composition (Table 2).

Table 2

Mixed Fodder Composition for Experimental Animals in the Scientific and Economic Experiment

Ingredients, %	Experiment periods		
	I	II	III
Corn grain	25.0	36.4	39.0
Soy beans	15.0	12.0	17.0
Barley	20.0	31.4	41.1
Wheat grain	10.0	10.0	-
Fish flour	10.0	5.0	-
Milk	5.0	-	-
Dried milk-5135	10.0	-	-
Premix 2231	3.0	3.0	-
Premix 2431	-	-	2.5

Salt	0.1	0.2	0.4
Soy oil	4.0	2.0	-
Sugar	2.0	-	-
Chalk	0.9	-	

The pig feeding was organized taking into account the age and weight according to the normative indices and recommendations for the remount young pigs. (3). The concentration of nutritive substances in the mixed fodders for the experimental pigs corresponded to the requirements in the feeding norms (Table 3).

Table 3

The Concentration of Nutritive Substances in the Mixed Fodder for Experimental Pigs

Indices	Experiment Periods		
	I	II	III
Fodder Unities	1.3	12.1	1.4
Exchange Energy, MJ	14.0	11.8	13.4
Raw Protein	218.0	150.9	154.0
Digestible Protein, g	187.9	121.3	121.7
Lysine, g	13.0	70.1	63.9
Methionine + Cystine, g	7.3	49.7	47.7
Raw Cellulose, g	31.4	55.0	70.0
Salt, g	3.5	-	-
Calcium, g	8.3	8.0	7.5
Phosphorus, g	6.2	6.5	6.2
Iron, g	130.4	148.5	163.9
Cuprum, g	15.0	10.0	10.0
Zinc, g	75.0	50.0	75.0
Manganese, g	40.0	40.0	75.0
Cobalt, g	1.0	1.0	1.0
Iodine, g	0.3	2.0	2.0
Vitamins:			
Carotene, mg	6.0	6.0	6.0
E, mg	4.0	3.5	3.7
B_1, mg	3.4	3.8	4.6
B_2, mg	8.0	6.0	6.0
B_3, mg	20.0	85.0	10.4
B_4, g	1.5	9.0	11.5
B_5, mg	40.0	40.5	19.2
B_{12}, mg	30.0	-	-

During the whole period of the scientific and economic experiment the change of the pig living mass was determined by individual weighting at the beginning of preparing and control periods and at the end of the experiment. The data obtained when weighting the pigs testified (table 4, diagram 1), that at a practically the same living mass at the beginning of the experiment the living mass of the pigs in the second experimental group which received the addition of the ferment Farmazyme 2575 at the level 0.8 kg/t was of 69.69 kg at the end of the first period, thus it was 3.3 % higher than in the control group, at a high reliable difference (B=0999). The living pig mass in the third experimental group which received the addition of the ferment Farmazyme 2575 at the level of 1.0 kg/t both during the growth periods and during the whole experiment period was higher in comparison with the first and second experimental groups, and made up 107.93 kg while in the second experimental group it constituted 107.53 kg, and in the first control group it constituted 104.09 kg at a daily average mass accretion during the whole experiment at the average in the first control group – 0.552

kg, in the second experimental group – 0.570 kg and in the third experimental group – 0.575 kg (B=0.90).

Diagram 1

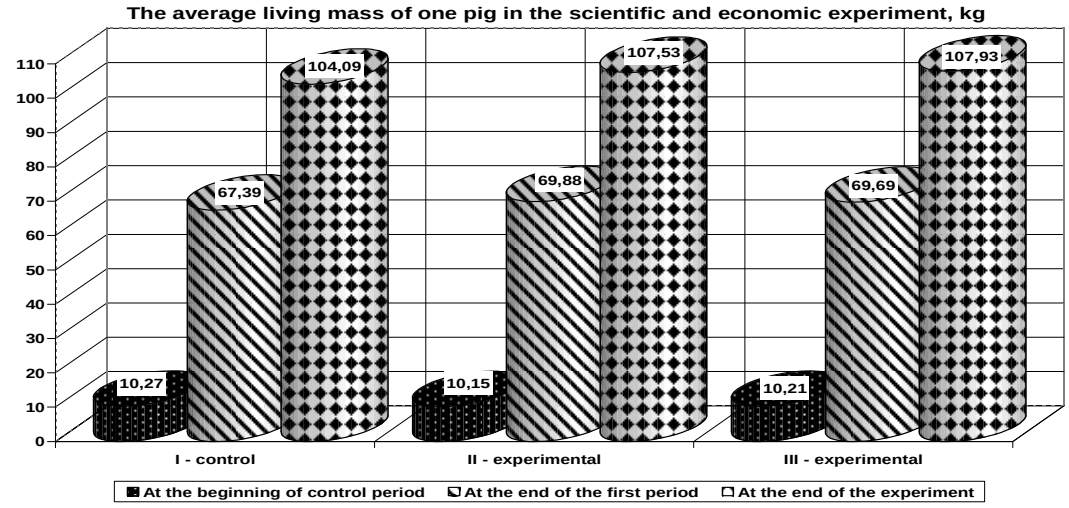


Table 4

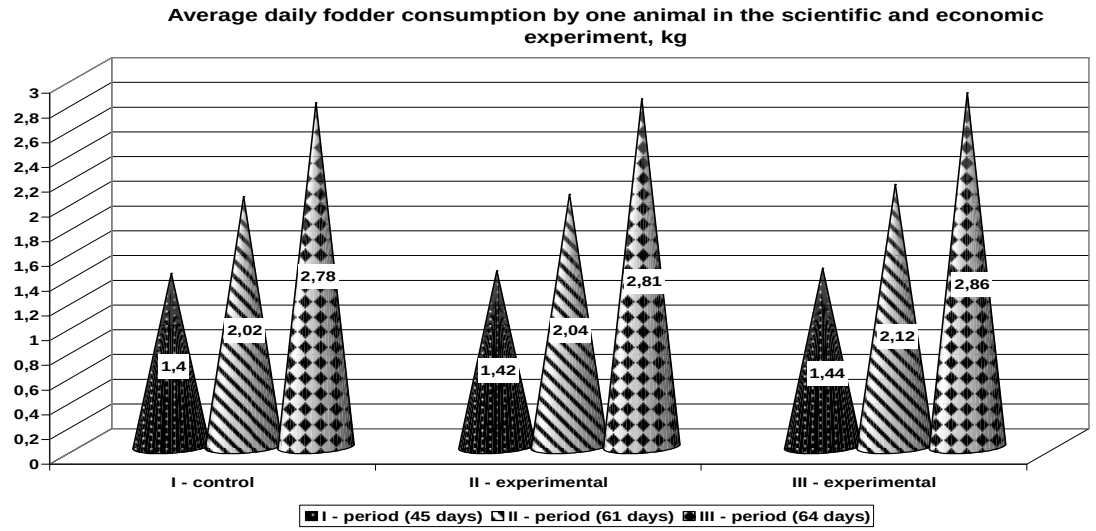
The Living Mass and the Daily Average Accretion in Pigs in the Scientific and Economic Experiment

Groups	Indices	Live mass of one animal, kg			Daily mass accretion, kg		
		At the beginning of control period	At the end of the first period	At the end of the experiment	During the first period	During the second period	During the whole experiment
I control	$X \pm S_x$	10.27±0.24	67.39±0.83	104.09±1.35	0.53±0.007	0.57±0.024	0.552±0.007
	$S \pm S_s$	0.08±0.02	2.62 ±0.59	4.26 ± 0.95	0.024±0.005	0.077±0.017	0.021±0.004
	V, % ± S_v, %	0.75 ±0.17	3.89 ±0.87	4.097±0.92	4.58±1.03	13.46±3.01	3.801±0.85
II experimental	$X \pm S_x$	10.15±0.04	69.88±1.38	107.53±2.27	0.56±0.01	0.589±0.034	0.570±0.013
	$S \pm S_s$	0.13±0.03	4.37±0.98	7.186±1.61	0.04±0.01	0.107±0.02	0.042±0.01
	V, % ± S_v, %	1.27±0.28	6.25±1.4	6.68±1.49	7.4±1.65	18.29±4.09	7.43±1.66
III experimental	$X \pm S_x$	10.21±0.04	69.69±1.40	107.93±1.94	0.56±0.013	0.598±0.02	0.575±0.01
	$S \pm S_s$	0.12±0.03	4.44±0.99	6.123±1.37	0.042±0.009	0.051±0.01	0.036±0.01
	V, % ± S_v, %	1.18±0.27	6.37±1.43	5.674±1.27	7.52±1.68	8.54±1.91	6.287±1.41
	t_d I – II						
	t_d I - III						x

x – B = 0.90; xx – B = 0.95; xxx – B = 0.99; xxxx – B = 0.999

During the realization of the scientific and economic experiment the calculation of fodder consumption by the pigs was carried on by the use of the fodder weighing before the distribution and in an hour after the feeding. The analysis of the data on the average daily fodder consumption (diagram 2) showed, that during the growth periods the differences in fodder consumption by animals between the groups were insignificant, but a higher consumption was observed in the third experimental group according to the feeding periods – 1.44, 2.12, and 2.86 kg.

Diagram 2



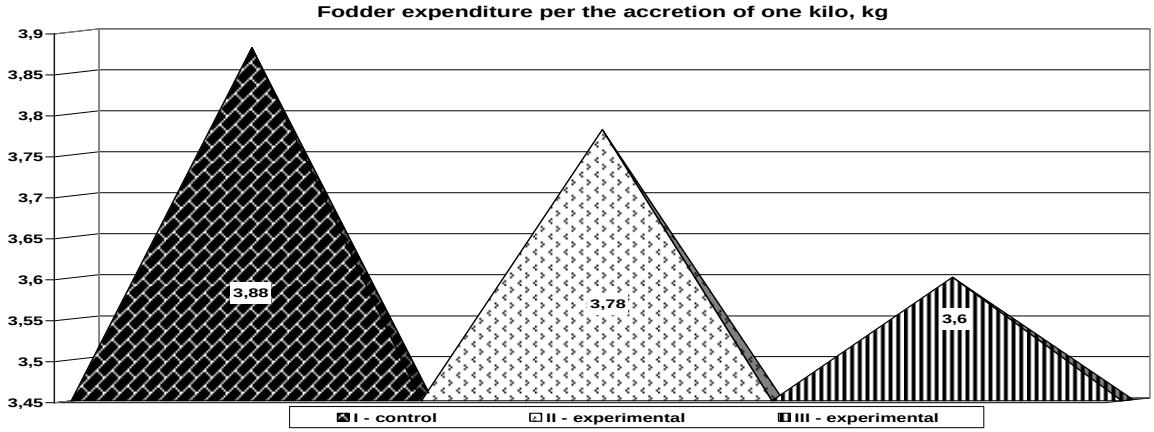
The fodder expenditure for one kilo of living mass accretion (table 6, diagram 3) was lower in the experimental groups (which received the ferment addition) in comparison with the control group by 0.1 and 0.28 kg or by 97.42 and 91.7 % accordingly.

Table 6

Fodder Expenditure per Living Mass Accretion of One Kilo

Indices	Groups		
	I - control	II - experimental	III - experimental
Fodder expenditure per the accretion of one kg			
kg	3.88	3.78	3.6
%	100	97.42	91.7

Diagram 3



At the beginning and at the end of the scientific and economic experiment blood was taken from the ears of three pigs from each group in order to study the exchange processes, which took place in the organisms of the experimental pigs under the influence of the ferment Farmazyme 2575 addition at different levels. The realization of the hematological researches (table 7, 8, 9) did not show essential differences in blood picture at the pigs under the influence of ferment addition in the experimental groups in comparison with the control

group. The obtained results corresponded to the existed researches described in literature that the addition of different ferments does not have any influence on blood indices.

Table 7

Hematological Indices for the Experimental Pigs in the First Control Group at the End of the Scientific and Economic Experiment

Indices	1	2	3	X	S	V,%	Sx	Ss
Erythrocytes x 10^{12}	5,7	5,4	6	5,7	0,3	5,26316	0,1732	0,12250
Hemoglobin g/l	110	112	109	110,33	1,5275	1,3844	0,8819	0,6237
Leucocytes, 10^{9}/ l	21,9	22,3	21	21,73	0,6658	3,0636	0,3844	0,2719
Lymphocytes, mkl/l	63	67	65	65	2	3,0769	1,1547	0,8167
Hematocrit, %	0,39	0,42	0,35	0,386	0,0351	9,0825	0,0203	0,0143
Average volume of erythrocytes, ft/l	67,7	63,4	69,8	66,97	3,2624	4,8717	1,8836	1,3321
Calcium, (MMOLI/E)	2,64	2,6	2,36	2,53	0,1514	5,9778	0,0874	0,0618
Phosphorus, (MMOLI/E)	3,2	3,98	5,19	4,12	1,0027	24,3180	0,5789	0,4094
Alkaline phosphatase, e/l	446,9	563,9	709,7	573,5	131,6627	22,9578	76,0178	53,7618
Aspartato aminotransferasa, u/e	55	50	38	47,67	8,7369	18,3292	5,0444	3,5675
Alanine aminotransferasa, u/e	48	41	54	47,67	6,5064	13,6498	3,7566	2,6568
General protein, g/l	59,7	60,5	59,9	60,03	0,4163	0,6935	0,2404	0,1700
Albumin, g/l	29,4	28,6	26,7	28,23	1,3868	4,91208	0,80072	0,5662

Table 8

Hematological Indices for the Experimental Pigs in the Second Experimental Group at the End of the Scientific and Economic Experiment

Indices	1	2	3	X	V,%	Sx	Ss
Erythrocytes x 10^{12}	7,6	7,7	7,1	7,4667	4,3052	0,1856	0,13126
Hemoglobin g/l	122	133	113	122,667	8,1658	5,7833	4,0901
Leucocytes, 10^{9}/ l	18,6	12,2	18,4	16,4	22,1871	2,1009	1,4859
Lymphocytes, mkl/l	59	42	58	53	17,9988	5,5077	3,8952
Hematocrit, %	0,425	0,463	0,4	0,4293	7,3888	0,0183	0,0129
Average volume of erythrocytes, ft/l	55,4	60	55,9	57,1	4,4201	1,4572	1,0306
Calcium, (MMOLI/E)	3,12	2,86	2,72	2,9	6,9992	0,1172	0,0829
Phosphorus, (MMOLI/E)	3,81	4,11	3,89	3,9367	3,9462	0,0897	0,0634
Alkaline phosphatase, e/l	432,7	40,5	499,3	324,167	76,4759	143,1346	101,2287
Aspartato aminotransferasa, u/e	42	152	52	82	74,1800	35,1199	24,8377
Alanine aminotransferasa, u/e	71	41	52	54,6667	27,7623	8,7626	6,1971
General protein, g/l	63,6	67	59,3	63,3	6,0960	2,2279	1,5756
Albumin, g/l	36,8	36,5	29,4	34,2333	12,2351	2,4183	1,7103

Table 9

Hematological Indices for the Experimental Pigs in the Third Experimental Group at the End of the Scientific and Economic Experiment

Indices	1	2	3	X	S	V,%	Sx
Erythrocytes x 10^{12}	7,3	7,2	7	7,1667	0,1527	2,1314	0,0882
Hemoglobin g/l	127	130	125	127,3333	2,5166	1,9763	1,4531
Leucocytes, 10^{9}/ l	17,2	19	18,6	18,2667	0,9452	5,1742	0,5457
Lymphocytes, mkl/l	85	47	78	70	20,2238	28,8911	11,6765
Hematocrit, %	0,436	0,444	0,444	0,4413	0,0046	1,04656	0,00268
Average volume of erythrocytes, ft/l	59,1	60,9	68,2	62,7333	4,8191	7,6818	2,7824
Calcium, (MMOLI/E)	2,72	3	2,86	2,86	0,14	4,8951	0,0808
Phosphorus, (MMOLI/E)	0,23	3,41	1,15	1,5967	1,6364	102,4871	0,9448
Alkaline phosphatase, e/l	467,7	468,4	468,5	468,2	0,4359	0,0931	0,2517
Aspartato aminotransferasa, u/e	48	67	89	68	20,5183	30,1740	11,8466
Alanine aminotransferasa, u/e	44	49	44	45,6667	2,8868	6,3214	1,6667
General protein, g/l	59,8	60,5	69,5	63,2667	5,4096	8,5504	3,1233
Albumin, g/l	35,7	38,3	35,9	36,6333	1,4468	3,94951	0,8354

CONCLUSIONS

1. The addition of ferment Farmazyme 2575 at different level into the mixed fodders for young pigs favorably influences their growth and development.
2. Under the influence of the ferment Farmazyme 2575 addition into the mixed fodders for young pigs their living mass in the second and third groups was higher in comparison with the control group during the whole experiment with 3.56 kg and 3.89 kg accordingly or by 3.8% and 4.14 %.
3. The addition of the ferment Farmazyme 2575 at different level into the mixed fodders for pigs did not influence the biochemical blood picture of the experimental animals.

BIBLIOGRAPHY

1. Cucu I., V. Maciuc, Domnica Maciuc, 2004, Cercetarea ştiinţifică şi elemente de tehnică experimentală în zootehnie, ed. Alifa, Iaşi, paj. 1-386;
2. Ezdakov N, 1978, Prilojenie fermentnîh preparatov v jivotnovodstve, izd. Kolos, Moskva, str. 40-70;
3. Kalaşnikov A., 2003, Normî i raţionî kormlenia seliscohozeaistvennîh jivotnîh, izd. Rosselihozizdat, Moskva, str. 1-455;
4. Ovseanikov A., 1976, Osnovî opitnogo dela v jivotnovodstve, izd. Kolos, Moskva, str. 1-302
5. http://www.abercade.ru/analystics/biotech/sfermenta06
6. http://betafin.narod.ru/articles/srb.htm
7. http://www.referats/net./pages/referats/rkr/page.php.id=25911