



THE EFFECT OF DIFFERENT SELENIUM SOURCES ON PRODUCTIVITY AND CARCASS QUALITY OF PIGS

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KEYWORDS

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ABSTRACT

Purpose - to study the effect of feeding selenium inorganic and organic forms on productivity and quality of pigs. To achieve this goal, it was necessary to solve the following problem: to examine the effect of selenite, selenate and Sel-Plex diet on performance and quality indicators pork. Level of the selenium in ration before 0,3 mg/kg dry material to account of the selenite and selenate sodium, as well as sowed; sel-plex raises the daily average increases pig relatively with checking analogue on 6,9- 13,1%. the Advantage of the organic form of the selenium (sowed; sel-plex) on selenite and selenate sodium on daily average increase forms 6,2 and 8,3%. the Accompaniment inorganic (the selenite and selenate sodium) and organic (sowed; sel-plex) of the forms of the selenium in ration assists the improvement destructive and meat-greasy quality pig - an increase the destructive mass and destructive output, masses flourishes, increasing of the meat specific gravity in touch under simultaneous reduction of the contents of the fat in touch. Herewith the best accumulation in meat specified element is noted beside animal with organic form of the selenium in ration - sowed; sel-plex.

1. INTRODUCTION

At organizations of the mineral nursing pig necessary to pay attention to balance ration from separate mineral material. Need of the saplings in selenium increases in period its intensive growing. [3,4]. in suppressing majority of the called on studies on problem selenium feeding animal as sources of the selenium were used in the main inorganic join - a selenite and selenate sodium, and very little studied new selenium contain additives of the organic origin, in particular sowed; sel-plex companies "Olltek" (USA) [1,2]. Since this preparation gains broad spreading in Ukraine, study to efficiency its using there is actual.

The Majority literary data are indicative of that accompaniment to provender micro dose selenium stimulate the growing and development of the saplings, raise stability to diseases. the Selenium takes part in exchange ferment, nucleinic of the acids and vitamin and adjusts the assimilation and expenseses vitamin A, C, and in organism, takes part in syntheses more 100 selenoprotein, closely interacts with Sulphur and for function equals to α -tocopherol [3, 5].

2. MATERIALS AND METHODS

For the studies 'reason of the different sources influence of the selenium in ration on and meat-greasy quality of the saplings pig on nursery and fatten in condition pig-breeding farm have conducted scientifically- economic experiment on scheme (the indicator panel. 1).

Tab. 1. Scheme scientifically-economic experience on pig

Group	Amount animal, goal	nursing particularities	
		Egalitarian period (15 days)	Main period (150 days)
checking	10	Main ration(MR)	MR
1 - checking	10	MR	MR + selenitesodium
2 - checking	10	MR	MR + selenatesodium
3 - checking	10	MR	MR + sel-plex

At, the animals control checking group got the main ration, but pig 1,2 and 3-y research groups such ration, but with accompaniment to him accordingly selenite, selenate sodium and sowed; sel-plex in dose, which provided the general level of the selenium in ration 0,3 mg/kg dry material (DM).

The destructive and pig's meat-greasy quality was studied. in methods study of A.M. Polivody, R.V. Strubikinoy and M.D. Lyubeckogo [4]. the Selenium in shelters and killing products animal defined onatomic-absorption spectrophotometer With-115-M 1-PC with use mercury-hydride of the generator GRG-107 and selenious of the lamp.

3. RESULTS

The Pork is noted by high contents full-fledged squirrel, as well as irreplaceable amino acid. After slaughter animal in meat occur the complex enzymatic, biochemical and physico-chemical processes, the main measure define his quality and technological characteristic. in the first 2-3 hours after slaughter meat has a gentile consistency, high water-retaining ability and ability to turgescence. Hereinafter, these factors grow worse. However, at reasonable conditions of storage at length several day meat becomes gentile and aromatic, gains the good gustatory quality, from it stands out meat juice occurs the maturation.

The Typical signs of the meat maturation: appearance on surfaces flourishes "dry crust", specific, mildly acidulous scent. in meat sick and skinny animal is kept little

glycogens, is not formed it is enough milk acid. it has low gustatory and culinary quality, is bad kept.

In spite of the fact that in study rations checking and research groups animal on energy and protein nutritiveness were practically alike, track record their alive mass had between-group differences. So, at introduction to ration pig 1 research group of the selenite sodium daily average increases them relatively with checking analogue increased on 34 g, or 6,9% ($R < 0,05$). Beside pig 2 research group, in ration which source of the selenium was selenate sodium, daily average increase of the alive mass exceed the checking analogues on 24 g, or 4,8% ($R < 0,01$). the Pigs 3 research group, in ration which entered the organic selenium in the manner of sowed; sel-plex, on daily average increase alive mass dominated the checking analogue on 13,1% ($R < 0,01$), but animal 1 research group - on 31 g, or 5,8% ($R < 0,05$).

Except daily average increase, the experimental live-stock pig differed on slaughter quality also. in particular, beside all animal of the research groups relatively with checking was high pres laughter living mass on 1,67-9,49 kg though under biometric processing reliable ($R < 0,05$) was a difference between 4 research group pig only and checking - 9,49 kg (the table 2).

Tab.2.Destructive and meat-greasy quality experimental pig, n =3; M±m

Factor	Group			
	Control	research		
		1	2	3
Pres laughter living mass, kg	99,75±2,50	101,42±1,72	103,48±1,56	109,24±2,31*
Slaughter-weight, kg	74,31±1,05	76,03±1,44	77,83±0,92	83,14±1,10**
Dressing percentage, %	74,50±1,12	74,97±0,92	75,21±1,38	76,11±1,25
Gutfat, kg	0,87±0,02	0,90±0,06	0,93±0,04	0,89±0,05
Thickness of the fat on 6-7 breast vertebra, sm	3,54±0,17	3,45±0,12	3,48±0,19	3,47±0,22
Mass of the head, kg	6,82±0,61	6,91±0,38	7,03±0,23	7,18±0,37
Mass of the skin, kg	9,06±0,92	9,14±0,88	9,98±1,21	10,05±1,17
Mass fresh flourishes, kg	58,17±2,12	59,29±1,23	60,77±0,98	64,38±1,06
Mass cooled flourishes, kg	55,09±1,37	56,25±1,26	57,99±1,04	61,14±0,82
Output flourishes, %	58,32±0,81	58,46±1,21	58,73±0,63	58,93±0,55
Contents in half carcass, kg:				
meat	19,26±1,10	19,67±1,30	20,29±1,01	21,46±1,55
bacon	5,03±0,62	5,20±0,43	5,27±0,15	5,59±0,20
bone	3,21±0,05	3,33±0,15	3,44±0,23	3,60±0,22
Attitude to destructive mass,%:meat	51,90	51,82	52,20	51,75
bacon	13,54	13,68	13,54	13,45
Correlation of meat and fats	1:0,262	1:0,265	1:0,260	1:0,261

A raised preslaughter mass pig research group has conditioned the difference in their destructive mass with checking relatively. in 1-y research group this difference is formed 1,72 kg, or 2,32% ($R>0,05$), 3-and - 3,52 kg, or 4,74% ($R>0,05$), and research group 8,83 kg, or 11,88% ($R< 0,01$). If compare the destructive mass a pig 3research group with 2research, which as consource of the selenium got the selenium a sodium, that possible see the possible difference in favour of animal 3research group at a rate of 5,31 kg, or 6,82% ($R<0,05$). Gilt3research group on factor of the destructive mass also realistically exceed the animal 1researchgroup, which got the selenite a sodium, on 7,11kg, or 8,55% ($R<0,05$). This fact points to positive effect sowed; sel-plex relatively with inorganic selenium.

However on factor of the destructive output beside pig of the research groups is noted only trend to increase. If in checking this factor formed 74,50% then beside pig 1, 2 and 3research groups it was big only on 0,47; 0,71 and 1,61% ($R>0,05$).

The research group pigs truly did not differ from checking analogue on internal fat amount (0,89-0,93 kg against 0,87 kg) and thicknesses of the secret agent on 6-7 breast

vertebra - 3,45-3,48 against 3,54 sm. Beside research groups pig relatively with checking was more heavy on 0,90-0,36 kg head ($R>0,05$) that, obviously, is connected with more high their alive mass before slaughter. This, probably, possible explain the difference in factor of the skin pig mass research groups, which also was more heavy on 0,08-0,99 kg ($R>0,05$).

The Important factor of pig plumpness there is mass their flourishes. Beside pig of the research groups mass cooled flourishes exceed checking on 1,16-0,65 kg ($R>0,05$). Herewith 3research group animal on mass cooled flourishes exceed checking on 6,05 kg, or 10,98% ($R>0,05$). Relatively with animal 2researchgroup, 3 research group dominated on mass cooled flourishes on 3,15 kg, or 5,43%. However as to relative factor - an output fresh flourishes, that he essential image beside research and checking animal did not differ (58,46- 58,93 against 58,32%).

In half carcasses pig 1 groups was kept 19,26 kg meat, but in half carcasses animal 1, 2 and 3researchgroups on 0,41 kg accordingly, 1,03 kg and 2,20 kg ($R>0,05$) more.

On contents of the fat half carcasses research animal differed from checking aside increase him only on 0,17-0,56 kg ($R>0,05$).

The bones' contents in half carcasses pig all experimental groups were practically on one level - 3,21-3,60 kg.

The Objective comparative estimation meat-greasy quality can be an attitude of the meat mass to destructive mass pig. the Specific meat gravity in flourish pig research groups formed 51,75-52,20 against 51,90% in checking.

For specific fat gravity, he was undermost from checking on 0,09% only in flourish animals 3researchgroup. the Correlation between meat and fat was favorable in flourish research and checking animal - 1:0,260-0,265.

Under investigation factors have not rendered the unambiguous influence on contents in meat moisture and protein (tab.3).

However, it decreased the concentration oxyproline. in meat pig 1researchgroup contents this amino acid, has formed 0,08%. in meat pig 2 and 3researchgroups contents oxyproline were else smaller, than in checking, - on 0,09 and 0,12% accordingly. Unlike oxyproline, the introduction selenic preparation in ration pig research groups conditioned though and not more observable, but unambiguous increasing to concentrations in meat of the contents tryptophan, which was positively reflected on quality of meat.

Tab. 3.Chemical composition of meat experimental pig, %

Factor	Group			
	Control	research		
		1	2	3
Total moisture	75,2 ± 0,53	74,9 ± 0,37	75,5 ± 0,62	74,7 ± 0,49
Protein	21,5 ± 0,38	21,8 ± 0,49	21,7 ± 0,29	22,1 ± 0,71
Fat	2,15 ± 0,20	2,10 ± 0,15	2,05 ± 0,23	1,760 ± 0,17
Oxyproline	0,223 ± 0,012	0,215 ± 0,010	0,214 ± 0,016	0,211 ± 0,012
Tryptophan	1,343 ± 0,014	1,358 ± 0,033	1,357 ± 0,021	1,368 ± 0,057
Leach	1,15 ± 0,04	1,20 ± 0,05	1,06 ± 0,03	1,15 ± 0,04
Calcium	0,028 ± 0,001	0,031 ± 0,003	0,032 ± 0,001	0,033 ± 0,002
Phosphorus	0,23 ± 0,008	0,25 ± 0,010	0,27 ± 0,006	0,29 ± 0,003**
Copper, mg/kg	0,79 ± 0,01	0,99 ± 0,02**	0,98 ± 0,01**	1,02 ± 0,03**
Zincum, mg/kg	16,8 ± 0,30	20,9 ± 0,01**	20,7 ± 0,04**	20,8 ± 0,02**
Manganese, mg/kg	0,22 ± 0,01	0,29 ± 0,04**	0,28 ± 0,04**	0,32 ± 0,03**
Selenium, mg/kg	98 ± 4,2	136 ± 5,6***	139 ± 6,1***	148 ± 5,7***

the Note. Validity to differences: * R<0,05; **R<0,01; *** R<0,001

In meat pig 2, 3, 4 exploratory groups, with checking relatively, increased the contents calcium on 0,03-0,05% and phosphorus - on 0,02-0,06%. Herewith more whole calcium and phosphorus was kept in meat pig 3researchgroup with organic form of the selenium in ration.

The contents' increase of the selenium in ration pig research groups before 0,3 mg/kg DM rendered the assistance to the best accumulation in meat honeys, zinc and manganese. If checking sample of meat contained these microelements accordingly 0,79; 16,8 and 24,4 and 31,8% (R<0,01), 2 exploratory - 24,0; 23,2 and 27,3% (R<0,01) and 3researchon 29,1; 23,8 and 45,4.

What have shown the analyses, meat pig 1, 2, and 3research groups relatively with checking contained realistically (R<0,001) more selenium. So if in checking sample it was kept 98 mkg/kg then in exploratory - 136-148 mg/kg. Moreover, follows to note that accumulation of the selenium in meat pig exploratory groups very noticeably depended on the selenium source. For instance, difference in contents' factor of the selenium in meat between animal 1 and 2research groups, got in ration selenite and selenate sodium, and checking has formed accordingly 38 and 41mkg/kg, or 38,8 and 41,8%.

Introduction to ration pig 3research group of the organic form of the selenium in the manner of sowed; sel-plex provided the growing of the contents of the selenium in their

meat relatively with meat animals 1 and 2 research groups on 12,9 mg/kg accordingly, ($R < 0,001$) that is indicative of higher absorption of the organic selenium in pig organism.

Tab. 4. The contents of the selenium in organ and cloth experimental pig, mg/kgs damp material, (n=3; M m)

Factor	Group				
	Control	research			
		1	2	3	
Liver	0,168±0,003	0,217±0,004***	0,263±0,005***	0,296±0,003***	0,284±0,004***
Nephros	0,144±0,002	0,189±0,005***	0,249±0,005***	0,278±0,006***	0,263±0,003***
Lungs	0,050±0,001	0,072±0,004***	0,097±0,002***	0,122±0,003***	0,119±0,002***
Lien	0,087±0,004	0,107±0,001***	0,131±0,003***	0,158±0,007***	0,158±0,002***
Heart	0,048±0,001	0,064±0,004***	0,076±0,004***	0,087±0,002***	0,072±0,001***
Pancreaticgland	0,054±0,003	0,068±0,005***	0,072±0,001***	0,081±0,003***	0,078±0,004***
Seedplants	0,045±0,002	0,060±0,001***	0,089±0,007***	0,101±0,005***	0,093±0,004***
The most Long muscle of the back	0,038±0,003	0,058±0,004***	0,072±0,007***	0,088±0,003***	0,076±0,004***

So, in liver checking animal was kept 0,168 mg selenium then beside analogue 1 research group his contents in liver exceed checking on 29,2 %, 3 research group - on 56,5 and 3 research - on 76,2 %. Moreover, brought difference there is high authentic - $R < 0,001$.

Relatively with liver, high concentration of the selenium is noted in bud experimental animal also. Moreover, in spite of deficit this microelement in ration pig checking group, his contents in bud it was enough high and formed 0,144 mg/kg.

Analysing contents of the selenium in heart experimental animal, we came to conclusion that beside pig research with checking relatively, it was more on 0,016 - 0,039 mg/kg, or 33,3-81,3 % ($R < 0,001$).

For contents of the selenium in light, that pigs 1, 2 and 3 research groups on this factor dominated the checking analogues, accordingly, on 0,022; 0,047 and 0,072 mg/kg, or 44,0; 94,0 and 144 %. the checking group Animals transferred the animal of the research groups on factor of the selenium concentrations and in spleen (on 0,020 - 0,071 mg/kg, or 23,0-81,6 %) ($R < 0,001$).

Considering important functions of the pancreas in digestion, we also defined contents of the selenium in it. as a result, we noted that in pancreas animal checking group selenium level formed 0,054 mg/kg, but in research more on 0,014 - 0,027 mg/kg, or 25,9-50,0 %.

The Studies of the selenium contents in the longest muscle of the back experimental animal is noted increase it beside animal of the research groups, relatively with checking on 0,020 - 0,050 mg/kg, or 52,6 - 131,6 % ($R < 0,001$). in our experiment on feeding saplings contents of the selenium in the longest muscle of the back varied within 0,038 (checking) - 0,088 mg/kg that is absolutely acceptable and safe. Coming thereof, possible draw a conclusion that pork can be one of the renewing sources of shortage of the selenium in people ration.

The meat quality and stability to damage during keeping, to a considerable extent hang from his acidity, which define in size pH through 1-2 ch after slaughter. in our study is noted only trend to reduction pH on 0,09-0,14 in research sample of meat that possible to value as positive phenomena. in general, as it was judged under the investigation factor, meat (the longest muscle of the back) and search, and checking pig had a high food quality. in checking group factor pH was noticeably undermost in comparison with research group.

Tab.5.Results tasting

Factor	Group			
	Control	research		
		1	2	3
Meat:				
fried	40	41	41	43
boiled	37	36	40	43
Broth	28	36	37	39

The highest estimations on tastings has got meat an animal fourth group.

Thereby if intensity of the growing characterizes meat productivity with standpoint amount, that intramuscula radipopex is characterizes it with quality positions. Such association exists beside animal of the fourth group.

on factor slaughter animals of search groups prevail over checking that points to positive action of the selenium of the different sources on shaping meat quality beside pig.

4. CONCLUSIONS

1. Balancing diets of young pigs for rearing and fattening for selenium by introducing selenite and sodium selenate and organic drug Sel-Plex causes an increase in the meat content of calcium, phosphorus, copper, zinc, manganese, selenium and tryptophan. and better accumulation in the flesh of the elements were observed in animals with a forage organic selenium Sel-Plex diet.
2. Coming thereof, possible draw a conclusion that pork can be one of the renewing sources of selenium shortage in ration of the people

REFERENCES

1. Diachenko L.S., Prilipko T.N. Digestible nutritives, exchange of nitrogen and mineral elements at the different sources of selenium in the ration of //Tavriyskiy a scientific announcer is Vip. 39, Ch. 1.
2. Diachenko L.S., Prilipko T.N. More efficient use of feed for fattening bullocks by balancing rations for selenium // Feed and fodder interdepartmental thematic scientific collection – Vol. 54. –Vinnytsia, 2004.
3. Dil'bazi G.I. 1981. Prophylaxis of belomyshechnoy illness of buyvolyat //Selen in biology (Materials of 3th nauchn. konf.) is Baku: Elm, T.–Ç. – pp. 233 – 234.
4. Hutsol Taras.: Analysis of circuit solutions of radiometric receivers. Bulletin of the Kharkiv National Technical University of Agriculture named after Petr Vasilenko. Technical sciences. Issue 187 "Problems of energy supply and energy saving in the agroindustrial complex of Ukraine". – Kharkiv: KhNTUSG, 107-108, (2017).
5. Prilipko T.N. the New aspects of the use of selenium in the ration livestock//agrarnivisti, Bila Tserkva, 2001.
6. Surai P. F. Selenium in ponetry nutrition: antioxidant properties, deficiency and toxicity. Worlds PoultryScienceJournal.–v. 58., 2002.