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USE OF NEW PROTEIN-MINERAL ADDITIVE IN THE DIETS FOR FATTENING PIGS

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Background

When processing the grain for food purposes (dehulling) a great amount of the wastes of groats production (hulls) is accumulated, not having food applications. Here we speak about rice, buckwheat and millet hulls.

Purpose

The hulls are rich in easily or hard hydrolyzed polysaccharides that are the raw materials for obtaining simple sugars that are well digested by animals. The varied chemical composition of the hulls - presence of crude protein and fat, fibers, macro- and microelements, etc. – makes this type of the wastes the promising raw material for the production of feed protein-mineral additives [1].
A scientific and production experiment on three groups of growing young pigs being fattened was carried out with the purpose of studying the possibility and effectiveness of use of a new protein-mineral additive, manufactured on the basis of meat-bone meal with the incorporation of previously thermally hydrolyzed rice hulls in the compound feeds.

Methods

The investigations carried out have shown high efficiency of use of 12 and 23% protein additives in the compound feeds in fattening pigs. A control slaughter of the animals was carried out to evaluate the influence of the additives on fattening and meat – fat features of pigs.
To evaluate the quality of slaughter products a chemical composition and quality attributes of M. longissimus dorsi were determined. In meat there were determined pH, moisture-holding capacity, the content of tryptophane, oxyprolin and a protein quality index (Table 1). It was found that the use of a new feed additive did not have a noticeable effect on chemical composition of M. longissimus dorsi. One can only mark a trend to reduction of moisture and increase of protein in pig meat of experimental groups. Judged from such indices as moisture-holding capacity, content of tryptophane, oxyprolin and protein quality index (Table 2), the meat of the pigs of control and experimental groups had a good quality, was juicy and tender /2/.

Results and discussion

From the Table 2 it can be seen that all meat samples have a full amino acid content. However, as far as the sum of essential and non-essential amino acids are concerned, the meat sample from the animals fed the rations with the 12% protein-mineral additive was the best. This sample exceeds the control one by 4.49% and the experimental one with 23% of the protein-mineral additive by 1.11%.
Studies of the determination of the influence of incorporation of previously thermally treated rice hulls into compound feeds on biological value of meat were of interest. Digestibility of proteins "in vitro" by acid (pepsin) and alkaline (trypsin) proteases of gastro-intestinal tract characterized this relationship. The results obtained have shown a higher digestibility of protein of the meat from pigs grown on compound feeds with the incorporation of 12% of protein-mineral additive with previously thermally treated rice hulls.
Study of the mineral content of the compound feed and of the compound feed with 12 and 23% rice hulls has shown that in all the samples there were no mercury; there were traces of cadmium and arsenic, there was a minimum level of plumbum 0.4-0.5, manganese 0.00-4.15, copper 0.57-0.69 (mg/kg). These results can lead to conclusion that the samples of compound feed are not toxic.

Conclusions

Based on the results of these comprehensive investigations we can consider that the developed protein-mineral additive will allow to extend the feed base of animal husbandry, save a large amount of grain raw materials and reduce the first cost of feed mixes.

Reference

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2. Snitsar A. I., Ustinova A. V., Baryshnikova E. V., Masloboyev O. A., Timoshenko N. V. Development of products of group "Zdorovye" from pig meat, grown on new feed additives. International scientific conference "Products of 21st century", 1998, Moscow.

Table 1

Chemical composition and physico-chemical characteristics of M. longissimus dorsi.

Characteristics	Units of measurement	Groups of animals		
		Control group	1st experimental group (12% of additive)	2nd experimental group (23% of additive)
Content of:				
moisture	%	71.76	71.43	71.23
protein	%	17.99	19.00	18.72
fat	%	9.13	8.59	8.97
ash	%	1.12	0.98	1.08
Active reaction of medium, pH		5.50	5.60	5.60
Intensity of coloring (coefficient of extintion*1000)		164.4	163.9	164.7
Moisture-holding capacity	%	51.04	51.36	43.23

Table 2

Amino acid composition of pork, g per 100 g of product

Amino acids	Groups of animals		
	Control group	1st experimental group (12% of additive)	2nd experimental group (23% of additive)
Essential acids			
Valine	0.94	0.93	0.93
Isoleucine	0.96	1.11	1.11
Leucine	1.45	1.62	1.54
Lysine	1.55	1.80	1.75
Methionine + cystine	0.49	0.49	0.49
Threonine	0.92	0.93	0.93
Tryptophane	0.355	0.366	0.361
Phenilalanine	1.03	1.07	1.07
Total	7.695	8.316	8.181
Non-essential acids			
Arginine	0.81	0.85	0.82
Alanine	0.88	0.89	0.92
Aspartic acid	1.46	1.46	1.43
Histidine	0.95	0.94	0.95
Glutamic acid	1.76	1.79	1.78
Proline	0.57	0.61	0.61
Serine	0.91	0.93	0.91
Tyrosine	0.59	0.58	0.58
Oxyproline	0.065	0.061	0.065
Glycine	0.92	0.93	0.92
Total	8.92	9.04	8.99
Sum	16.61	17.36	17.17
Protein quality index	5.46	6.00	5.55