

Influence of enzymic preparations in feeds on meat productivity of pigs and meat quality

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Abstract

To choose industrially suitable diets with regards to biologically active substances in feeds, a complex evaluation of meat productivity of pigs and quality of pork has been carried out. The first group consisted of pigs with usual diets – (K), the second one – with the addition of the enzyme Rovabio (RAB) into the feeds, the third one – with multienzyme (MEK). The pigs were fattened during 4 months. The largest weight gain was observed in pigs of the second group – by 4% higher than in animals of the third group and by 14% greater, than in pigs of the control group. The highest yield was in carcasses of the second group - 62.8%, which surpassed the third one by 1.8% and the control one by 5.7%.

The experimental groups had a higher content of protein and moisture and a lower content of fat.

The best indices of meat productivity and morphological composition of carcasses had the pigs of the second and third experimental groups. The fat was more balanced by amino acid composition (the ratio ω6:ω3 is 4:1) in the same groups of animals. The obtained ratio is the best for preventing of possible diseases, associated with age.

Histological investigations of pig meat have demonstrated that the tested preparations do not lead to visible microstructure changes in muscle fibers and connective tissue of muscle frame (endomysium and perimysium), suggesting a possibility of their use for increasing the efficiency of animals fattening.

Introduction

Animal husbandry plays an important role in providing Russian population with food, and pig breeding is one of the most quickly developing branches. In addition, during pig production 1.5-2 times less feeds are spent on one animal comparing to cattle production.

Pork is notable for high content of full value protein and is digested in human body at 90-95%. Pork fat has lower melting temperature and better fatty acid composition (oleic, linoleic, linolenic, arachidonic).

According to the Russian concept of animal husbandry development approved by the Rosselkhozakademiya scientific session, it is planned to increase the volume of pork production to 3.3 million tons in 2010 comparing to 1.53 million tons in 2001. The production growth should be accompanied with the significant quality improvement. One of the ways to solve this problem is the development of new regulatory structure harmonized with the world norms of national standards.

To achieve the required pork characteristics the proper genotype selection that meets the requirements of meat processing industry is necessary. In addition, keeping and fattening technologies play a significant role. The advantages of the industrial keeping and fattening technologies are based on the automation of production processes and balanced production turnout. The increase in pork production also can be achieved by decreasing of pig rearing period.

Materials and methods

In Saratov region the study was conducted on the determination of high-productive pigs along with the development of recommendations for animal husbandry and meat processing industry. The Large White pigs were used in the experiment. The animals were divided into 3 groups: 1 – control, 2 –the “MEK-SH3”supplementation, 3 – the “Rovabio” supplementation. All animals were kept in the similar conditions except the supplementation of different enzymic preparations.

Results and discussion

As a result of the carcass/cut quality assessment the data on the productivity of the animals at the age of 8 months were obtained. The carcasses from the second group had the highest yield (62.8%) that was superior to thereof from the third group by 1.8% and from the control group by 5.7%. The carcasses from the second group had higher yield of meat and fat parts than thereof from the first and the third groups. The lean index (meat tissue:fat) calculation showed some superiority of pork from Rovabio group. This suggests that the pigs from the second group surpassed the animals from the first and the third groups in respect of lean-

ness. Using physico-chemical, microstructural and organoleptic methods the series of investigations were carried out, which confirmed the superiority of meat from the second group. Pork fat is better in terms of its biological properties. Polyunsaturated fatty acids are the most fully presented in it. In addition, it has lower melting temperature. It was found that by fat, moisture and protein content the pigs from the MEK-SH-3 group were more preferable than the pigs from the other groups, indicating the higher nutritional and dietary meat quality of the animals of this group (table 1). Assessment data on fatty acid composition of the pork from the different fattening groups confirmed this conclusion.

Table 1. Chemical composition of pork

Muscle	Moisture	Fat	Protein	Ash
m. longissimus (control)	65.96	14.88	18.3	0.86
m. longissimus (Rovabio group)	72.38	5.79	20.8	1.03
m. longissimus (MEK-SH3 group)	67.73	7.99	23.2	1.08

Histological investigations of raw pork from Rovabio group showed the following. The major part of the meat fibers had linear or wound, slightly wavy configuration. Cross striation could be expressed well or weakened as a result of the manifestation of zone muscle post mortem contraction (Fig.1).

Meat fibers in muscles of pork from the MEK SH-3 group were in the various functional-morphological states too. The major part of them was characterized by waviness; the other ones had the straightened configuration (Fig.2). Fibers with signs of meat ageing were found in some sites. The connective tissue layers were adjoining to meat fiber bundles and were developed slightly weaker than in other animal groups.

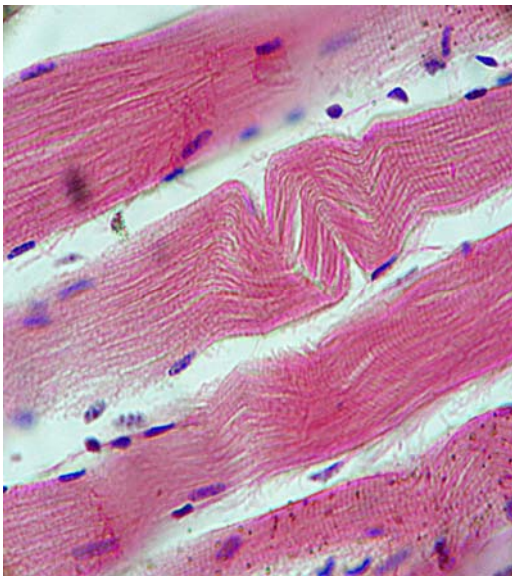


Figure 1. Pork from Rovabio group.

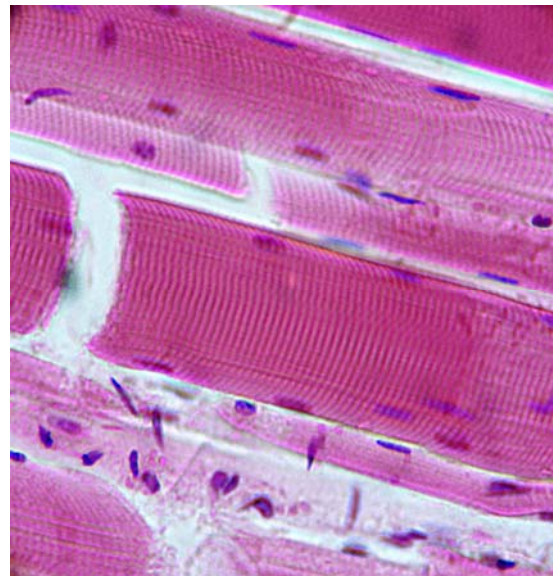


Figure 2. Pork from MEK SH-3 group.

Conclusions

The existing Russian system of pork carcass classification does not consider the raw material variety and does not ensure its rational use. The basis of quality assessment system consists mainly in the subjective principles of visual and organoleptic assessment although the standards for pigs in contrast to standards for cattle and small cattle provide for the use of measurable indices such as carcass weight and fat thickness. Moreover, the fat deposit index is considered as the basic one that does not correspond to the demands of modern consumers.

According to the findings of this work the highest indices of nutritional value had the pork from the animals fattened with the enzyme MEK CH-3 supplementation that was additionally confirmed by histological investigations. This allows us to recommend the aforementioned feed additive for the use in pig feeds during the industrial animal production.