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INFLUENCE OF GROWTH PROMOTORS ON SWINE CARCASS TRAITS

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Background:

Salinomycin-Na is added as growth promotor in the diets for pigs. The preparation shows ist full activity in the digestive system where it inhibits the development of pathogenous microflora, enhances the digestability of nutrients and energy as well as their absorption. It reduces the occurence of dhieareas and enhances overall health. The degree of stimulative effect depends on the age of an animal, the hygiene of the environment and overall health state of the animal. Thaler & Wheaves (1993) stated that efficiency of Salinomycin-Na is higher in young animals. The researches of De Wilde (1984), Salobir et al. (1994, 1996) and Kralik et al. (1998) showed positive influence of this preparation on fattening characteristics of pigs. Gains were increased for 5-8%, feed consumption for 2-3%, while feed conversion was decreased for 2-12% in groups of pigs fed different concentrations of Salinomycin-Na (25, 40, 60 ppm) in the diet comparing to control groups. These authors also found statistically higher ($P<0.05$) carcass weight of the pigs in experimental groups comparing to controls. Salobir et al.(1996) observed in experimental groups tendency of lowered fat deposition in the (2-7%), and higher deposition of fatty tissue a (3-4%) in pigs fed Salinomycin-Na in the diets although those differences were not statistically significant; which is in accordance with researches of De Wilde (1984). The aim of this paper is to investigate the effect of Salinomycin-Na on the carcass traits and qualitative indicators of muscle tissue.

Material and methods

Research was conducted on 30 pigs (LW x SL) divided in 3 groups. The first group was control, without growth promotor in the diet. In second group Salinomycin-Na was added; 30 ppm in first period (28-60 kg), and 15 ppm in finishing period of fattening (60-100 kg). Third group of pigs was added 50 ppm and 25 ppm of Salinomycin-Na in the first and last period of fattening, respectively. Pigs were fed ad libitum with ST_1 diet (16.5% crude proteins) during the first period and with ST_2 diet (14.5% crude proteins) in the finishing period of fattening. On carcass were investigated: carcass weight, carcass length as (a) from os pubis to the 1st rib and (b) from os pubis to atlas, and ham index. Right sides of the carcasses were dissected by method of Weniger et al. (1963). The main parts of the carcasses (ham, shoulder, loin, belly-rib part, neck) were precisely divided on muscle, fatty tissue with skin and bones. The weight of the double chin and kidney fat were added to the total weight of the fatty tissue. As less valuable parts were counted: head, glands, feet, tail and kidneys. For muscle tissue quality determination, the samples of m.longissimus dorsi (MLD) taken at 13th and 14th rib were analysed. The areas of muscle and belonging fat on MLD were measured by planimeter (Comberg, 1978). Quality indicators measures of musle tissue were: pH_1 i pH_2, water holding capacity (w.h.c.) and color (Göfo). Statistical analysis was performed by STATISTICA 5.0 for Windows programm.

Results and discussions

On tables 1 and 2 shares of individual parts, shares of musle, fatty tissue and bones in the carcass and qualitative traits of muscle tissue are shown. Carcass weight in 1st group were 70.75 kg, 72.88 kg in 2nd and 74.20 kg in 3rd group. Slaughter weight of pigs from 2nd group (30/15 ppm Salinomycin-Na) and 3rd group (50/25 ppm Salinomycin-Na) was very significantly higher ($P<0.01$) than one found in control group. Higher slaughter weight was followed by longer carcass length (measures "a" and "b"); where 3rd group had highly significantly longer carcasses than those from 1st group. Ham index as well as length/circumference ratio of ham were more favourable in experimental than in control group of pigs. Indicators of carcass traits found in this research are in accordance with foundings of Salobir et al.(1996). Namely, tendency of increase in lean meat percentage in swine carcasses for 2.35% ($P<0.05$) and 2.80% ($P<0.01$) was observed in groups fed Salinomycin-Na in diets. Higher concentration of Salinomycin-Na (50/25 ppm) was proved to be more efficient in muscle tissue formation than lower dose (30/15 ppm) although the efficiency of this growth promotor was established in both cases. Indirect indicator of lean meat content in swine carcasses such as area of MLD and belonging fat as well as their ratio also point out the positive effect of Salinomycin-Na in feeding of fattening pigs. Third group had statistically highly significant ($P<0.01$) higher relative percentage of the neck in the carcass than control group, and lower relative share of shoulder. It is interesting that relative share of back was the highest and share of belly-rib part the lowest in 2nd group of pigs. These differences were also highly significant ($P<0,01$) compared to control group. Relative share of less valuable parts was more favourable in experimental groups of pigs compared to control. Mean values of pH_1 and pH_2 in muscle tissue were within the boudaries characteristical for the normal quality of meat. The value of pH after slaughter has specific impact on sensory traits and technological quality of meat. Average values of pH in the muscle, 45 minutes post mortem (pH_1) were within common boundaries, although faster decrease of pH was found in experimental groups of pigs. Measurement of pH value of meat after 24 hours of cooling (pH_2) showed "normal" characteristics of meat. The color of mucle tissue was significantly different ($P<0.05$) only between 1st and 2nd group. Water holding capacity of muscle, determined by method of compression was the lowest in 2nd group, and the best in the 1st group ($P<0.01$). It can be generally stated that muscle quality of the pigs from experimental groups fed diets with Salinomycin-Na, as well as of those from control group was satisfactory. Quality indicators were within the boundaries characteristical for crossbred pigs of meaty breeds reported by Petricevic et al. (1990), Zivkovic et al.(1992) and Sencic et al.(1995).

Conclusions

The research of Salinomycin-Na effect as growth promotor was performed on 3 groups of pigs: 1st (control) group fed diet without Salinomycin-Na, 2nd group fed diet with 30/15 ppm Salinomycin-Na, and 3rd group with 15/25 ppm Salinomycin-Na in the diet. On the basis of the results, following conclusions can be drown:

Carcass weights were as follows: 1st group 70.75 kg, 2nd group 72.88 kg, and 3rd group 74.20 kg. Differences in carcass weights between control and 2nd and between control and 3rd group were statistically highly significant ($P<0.01$).

Third group of pigs had significantly higher ($P<0.01$) relative share of ham (30.41%) than the 1st group (29.34%), but also lower share of shulder (16.17% i.e. 17.35%). Difference in relative share of neck between 3rd and the 1st group was also highly significant ($P<0.01$) regarding the established indicators (7.34% i.e. 7.08%).

Dissection showed that lean meat percentage in pigs from 2nd group (54.92%) was significantly higher ($P<0.05$) and very significantly higher ($P<0.01$) in pigs from 3rd group (55.37%) compared to pigs from 1st group of pigs (52.57%).

Indicators of meat quality: pH_1, pH_2 and w.h.c differed statistically significant ($P<0.05$) i.e. highly significant ($P<0.01$) only between 2nd and the 1st group of pigs; all indicators were within the boudaries characteristical for the meat of satisfactory quality.

Results of the research show that Salinomycin-Na can be used as growth promotor in the fattening of pigs because it enhances yields and formation of muscle tissue

Pertinent literature

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Table 1. Carcass characteristics

Trait	1st group	2nd group	3rd group
Carcass weight, kg	70.75 ±2.86	72.88**±5.64	74.20**±6.01
Carcass length (a), cm	77.92±2.27	78.13±2.03	80.13**±2.03
Carcass length (b), cm	92.63±0.72	94.13±2.64	96.63**±3.50
MLD cut, cm^2	32.54±5,10	36.51±4,35	38.58±4,38
Fat, cm^2	21.95±4,20	22.05±6,31	22.45±4,32
Fat/MLD ratio	0.67±0,20	0.60±0,22	0.58±0,18
Ham index	44.60±2.04	43.07±2.17	43.07±1.88
Ham, %	29.43±1.45	30.05±1.60	30.41**±1.62
Shoulder, %	17.06±0.64	16.72±0.77	16.17**±0.85
Back, %	16.43±0.82	16.92**±0.90	16.65±0.65
Belly-rib part, %	17.35±1.25	16.84**±1.05	17.50±1.18
Neck, %	7.08±0.40	7.37±0.32	7.34**±0.42
Less valuable parts, %	12.74±0.63	12.10±0.84	11.95±0.32

Table 2. Tissue shares in carcass and muscle tisue traits

Share - Trait	1st group	2nd group	3rd group
Muscle tissue, %	52.57 ±3.43	54.92*±3.25	55.37**±3.45
Fatty tissue with skin, %	29.77±4.22	27.97±4.15	27.07±4.30
Bones, %	9.57±0.38	9.49±0.54	9.54±0.60
pH_1 value	6.60±0.20	6.34**±0.11	6.46*±0.27
pH_2 value	5.87±0.25	5.68*±0.20	5.81±0.15
Color (Göfo-value)	63.25±2.96	60.13**±5.38	62.13±2.95
W.h.c., cm^2	8.05±0.65	8.62*±0.70	8.35±0.68

*P<0.05 **P<0.01