

EFFECT OF GROUND LINSEED IN PIG DIET ON ORGANOLEPTIC QUALITIES AND OXIDATIVE STABILITY OF PORK

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Abstract

Organoleptic qualities (odour, flavour, texture and juiciness) of pork from pigs fed with ground linseed were investigated in the experiment. The experiment was carried out from 37 to 98 kg live weight in 4 groups (control group-L0, L1-6,7 % of ground linseed, L2- 13,4 % of ground linseed and L3 -13,4% of linseed and 103 mg of α -tocopherol in the diet) of 10 fattening crossbreed gilts each. The characteristics were evaluated by trained taste panelists and maximum 7 points were assigned to meat samples. There were not differences between the control group and experimental groups. The oxidative stability of muscle lipids was higher in L3 group (α -tocopherol supplementation) compared with other groups.

Introduction

The consumer interest in health useful foodstuff is rising recently. Some animal products with higher amount of fatty acids can be included in this group. The essential influence on fatty acid profile in meat and fat of carcass pigs is accredited to fats contained in feed. The interest in study of fatty acid content in meat results from the need of finding the way how to produce foods with favourable n-6/n-3 polyunsaturated fatty acid ratio. Application of feed ingredients (e. g. linseed, rapeseed, sunflower, olive soya-been oils) can lead to higher n-3 polyunsaturated fatty acid amount and affect the profile of fatty acids in pork (Rey et al., 2001; Wood et al., 2004; Bourre et al., 2005; Morel et al., 2006). Dietary fat affects (in dependence on type and quantity) fatty acid composition in body fat. The quality traits in pork (oxidative stability, fat consistency) are closely associated with polyunsaturated fatty acid content. Addition of this fatty acids can affect sensorial characteristics of meat (Bee et al., 1991). Enhanced sensitivity to oxidation appears with rising polyunsaturated fatty acid content. The oxidation expresses as conversion of myoglobin to metmyoglobin and smell occurs. Addition of vitamin E in feed decreases oxidation and increases meat storability (Wood et al., 1997)

Material and methods

40 gilts of (CLWxCL) x (HxPN) hybrid combination was included in our experiment. Gilts were divided in 4 groups according different linseed content in feed – L0 group control (without linseed), L1 with 6,7% linseed, L2 with 13,4% linseed and L3 with 13,4%linseed with 103 mg of vitamin E. Water and feed intake was ad libitum. Average weight of gilts was 37 kg at the beginning and 98 kg at the end of the experiment. Meat samples (about 500 g each) were collected after the slaughtering from *M. longissimus dorsi*.

The samples were marked, packed in PE bags and stored in 1-3°C.

After thermic adjustment the basic criteria were evaluated- odour, flavour, texture, juiciness. Professional classification was performed by 10 member commission. Particular criteria were evaluated according following design-1 point – meat is unsuitable, 2 and 3 points – meat is acceptable, 4 and 5 points – meat is standard, 6 and 7 points – meat is excellent. Thiobarbituric acid-reacting substances (TBARS) test was used to assess lipid oxidation in muscle (method by Piette and Raymond, 1999) and the results were reported as mg of malonaldehyde/kg of muscle. The statistical evaluation was performed using the computer program QCExpert.

Results and discussion

Basic criteria evaluated during meat organoleptic qualities sensorial test are given in Table 1.

The control group achieved lower score then experimental groups in all monitored criteria. Assessed samples were identified as meat with clean and typical odour, delicate, good chewable and juicy. All groups valuation was equal, with profile from 4,92 to 5,33, i.e. standard meat. There was no negative influence of linseed addition in pig diet on organoleptic characteristics. Also Kouba et al. (2003) studied the effect of linseed in pig diet on sensorial traits of meat. There were no changes of odour, texture, juiciness in case of modified diet.

The addition of vitamin E in feeding mixture increased oxidative stability of fat. The lowest content of malonaldehyde ($1,48 \pm 0,26$ mg/kg) was found out 6th day in L3 group. (Figure1). Differences in malonaldehyde concentration were statistical significant 1st ($P < 0,01$) and 6th day of observation. Larick et al. (1992), D'Arrigo et al. (2002), Waylan et al. (2002), Lahucky et al. (2005) also examined the effect of vitamin E on fat oxidative stability improvement. Fat tissue of pigs fed with vitamin E diet showed lower level of oxidation and better meat shelf life.

Table1.: Basic traits evaluated in sensorial test

Group	Evaluated criteria				Profile
	odour	flavour	texture	juiciness	
L0	5,37	5,17	4,60	4,53	4,92
L1	5,67	5,43	5,40	4,83	5,33
L2	5,67	5,47	4,87	4,90	5,23
L3	5,63	5,53	5,33	4,83	5,33

Conclusion

The consumer interest in pork with modified fatty acid profile seems to be rising. Affection of fatty acid content via linseed addition or via feeding components with high n-3 polyunsaturated fatty acid content could be connected with unfavourable effect on meat organoleptic characteristics. The sensorial evaluation was carried out in our experiment. There was no negative influence of 13,4% linseed in pig diet on odour, flavour, texture and juiciness of pork. The addition of vitamin E in feeding mixture increased oxidative stability of fat.

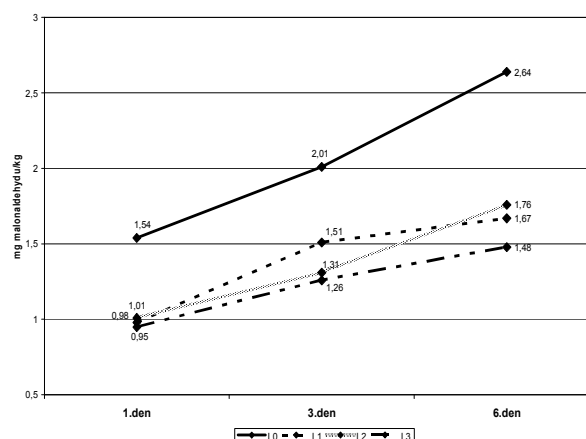
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Figure 1.: Oxidative stability – mg of malonaldehyde/kg

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