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Short communication

The effects of soybean selenium proteinate on tissue selenium and meat quality traits in finishing pigs

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Abstract

The purpose of the present study was to evaluate the effects of soybean selenium proteinate on Se tissue retention and meat quality in pigs. In group A (n=11) the mixtures were supplemented with soybean selenium proteinate, in group B (n=11) with sodium selenite and in group C (n=11) with Se-enriched yeast (0.3 mg Se per kg in all groups). The use of soybean selenium proteinate resulted in lower retention of Se in tissues (liver, heart, muscle) compared to Se-enriched yeast. Selenium concentrations in tissues achieved by soybean selenium proteinate and sodium selenite were comparable. No differences in serum Se, serum GSH-Px and meat quality traits were found among the groups.

Key words: sodium selenite, Se-enriched yeast, pork, gluthation peroxidase

Introduction

As pork is consumed in large quantities throughout the world it could be an important selenium source.

The most commonly used form of selenium for finisher pigs is inorganic sodium selenite. The sodium selenite has prooxidative potential (Spallholz 1994) and its use has been associated with impaired meat quality (Mahan 1999). Therefore we look for alternative organic selenium sources.

Materials and Methods

The experiment started at the beginning of the grower phase of the production and continued till the slaughter. It means that the experimental mixtures were fed for a period of 3 month before the slaughter. The group A (n=11) had diet supplemented with soybean selenium proteinate from enzymatically hydrolysed soya protein-B-Traxim® Selenium*. In group B (n=11) the feed mixtures were supplemented with inorganic sodium selenite (0.3 mg Se per kg). The Se-enriched yeast (Sel-Plex, Alltechnology CZ, s.r.o.) was used as a selenium supplement in group C (n=11) at the dose 0.3 mg Se per kg.

Results and Discussion

The results are summarized in Table 1. The high tissue retention of Se from Se-enriched yeast can be

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Table 1. Muscle characteristics (n = 33).

	Group A Mean ± SD	Group B Mean ± SD	Group C Mean ± SD
pH 24	5.69 ± 0.22	5.53 ± 0.16	5.68 ± 0.25
Cooking loss (%)	32.21 ± 2.72	31.48 ± 1.66	30.12 ± 2.15
Drip loss (%)	2.23 ± 0.70	2.52 ± 0.60	1.73 ± 0.57
Dry matter (%)	24.49 ± 0.46	24.93 ± 0.51	25.31 ± 0.57
Collagen (%)	0.54 ± 0.11	0.51 ± 0.09	0.55 ± 0.16
Fat (%)	1.60 ± 0.60	1.60 ± 0.49	1.95 ± 0.73
TBARS- value (mg · kg^{-1})	2.78 ± 0.37	2.23 ± 0.57	2.29 ± 0.97
TBARS value (mg · kg^{-1})	2.11 ± 0.50	2.33 ± 0.67	2.34 ± 0.53
Pure protein (%)	20.13 ± 0.87	20.69 ± 0.89	20.74 ± 0.61
Non collagen muscle protein (%)	19.59 ± 0.87	20.18 ± 0.95	20.19 ± 0.67
Tenderness	65.44 ± 12.77	61.08 ± 13.34	55.53 ± 10.43
Cohesiveness	1.29 ± 0.02	1.29 ± 0.01	1.28 ± 0.03
L*24	48.93 ± 3.22	49.51 ± 2.86	49.40 ± 2.53
a*24	5.11 ± 2.61	4.84 ± 1.48	3.87 ± 1.54
b*24	11.57 ± 2.13	11.65 ± 1.22	11.12 ± 1.17

explained by high bioavailabilty of selenomethionine which represents the major part of seleno-amino acid analogues in the yeast (Kelly and Power 1995). Absorbed selenomethionine is converted to selenocysteine which is degradated to selenide. The selenide is used for selenoprotein syntesis. It is incorporated non-specifically to body proteins in place of methionine (McConnel and Hoffman 1972).

The results of our study indicate lower proportion of selenomethionine in soybean selenium proteinate. Higher proportion of selenocystein or its derivates is to be expected. Moreover the percentage of non-incorporated selenite can also play a role.

The serum Se and serum GSH-Px did not differ between our experimental groups. It is consistent with findings of Mahan and Parret (1996) and Mahan et al. (1999). This indicates that both organic and inorganic selenium sources are adequate for GSH-Px synthesis.

No differences in meat quality traits between the experimental groups were found in our study. This is contradictory to Mahan et al. (1999) and Mateo et al. (2007) who reported higher drip loss and paler color of meat in group of pigs fed inorganic sodium selenite. On the other hand our results are in agreement with Wolter et al. (1999) and Zhan et al. (2007) who also did not confirm the negative effect of sodium selenite on the indices of meat quality. We have not found any literature data concerning the effects of soybean selenium proteinate on meat quality traits. It is concluded that soybean selenium proteinate can be used as an alternative selenium source for finisher pigs. It has comparable selenium retention in tissues as sodium selenite and it does not affect the meat quality.

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