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Cholesterol content and fatty acids composition of Mangalitsa pork meat

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Abstract

The aim of this study was to examine variability in cholesterol content and fatty acid composition in *musculuslongissimus (MLLT)* of various genotypes of pigs.Out of 30 male castrated animals used in the trial, 20 were Mangalitsa pigs (Swallow Belly - SBM and White - WM) while 10 were of the Swedish Landrace breed – SL. The representative of pig meat breeds, SL had significantly less cholesterol in *MLLT* compared to SBM and WM pigs. The total monounsaturated fatty acids (MUFA) and unsaturated fatty acids (USFA) content was higher in SBM and WM than in SL pigs ($p< 0.001$).

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*Keywords:*Mangalitsa; meat quality; cholesterol; fatty acids; various genotypes

1. Introduction

In recent years, much information has been published in connection with the fatty acid composition and cholesterol content of the meat and back fat of the Mangalitsa pig[1,2,3]. Cholesterol content in *m. longissimus*of pigs varies from 58 to 73 mg/100 g of fresh tissue. However, lipid fraction of muscle content varies from 37 to 43% of

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saturated fatty acids, as well as from 59 to 63% of unsaturated fatty acids, including 9 to 12% polyunsaturated fatty acids[4,5].Hungarian researchers studied the fatty acid and cholesterol content of fatty tissues in Mangalitsa and Mangalitsa crosses with other breeds. They established that the unsaturated fatty acids content surpassed 60% in the Mangalitsa pig fat and almost reached the same percentage in the crosses[6,7]. Differences in cholesterol content, detected in different breeds, were insignificant[6].

The aim of this study was to examine variability in cholesterol content and fatty acid composition in *musculuslongissimus (MLLT)* of various genotypes of pigs.

2. Materials and methods

2.1. Animals and samples

Out of thirty male castrated animals used in the trial, twenty (2x10) were Mangalitsa pigs (Swallow Belly - SBM and White - WM) while ten were of the Swedish Landrace breed - SL. The experimental pigs were reared in late spring and early summer. Animals were kept in their natural habitat within the same area. Throughout the investigation, both the Mangalitsa and SL pigs were fed ad libitum diets of identical composition, provided from self-feeders. When the livestock weighed between 60 and 120 kg, they were fed an animal feed, created according to the following recipe: maize 70%, meal 14%, soybean meal 9%, sunflower meal 4%, chalk 1%, dicalcium phosphate 1%, salt 1%.

At the end of the trial, pigs were transported to a nearby commercial abattoir. Animals were conventionally slaughtered according to standard commercial procedures after electrical stunning (250 V AC, ear to ear for 3-5 s) and sticking within 30 s. During routine carcass splitting and cutting, samples of *MLLT* were taken between the 13th and 14th thoracic vertebra and stored in a freezer for further analyses. Prior to laboratory analysis, all the samples were vacuum packaged and kept frozen at approximately – 20ºC.

2.2. *Analytical measurements*

Cholesterol content was determined using HPLC/PDA, on the apparatus HPLC Waters 2695 Separation module, with Waters 2996 Photodiode array detector, as defined by the method of Maraschielloet al.[8].

Fatty acids as methyl esters were detected by capillary gas chromatography with a flame ionization detector. A predetermined quantity of lipid extracts, obtained by the rapid extraction method, was dissolved in tert-butyl methyl ether. Fatty acids were converted to fatty acids methyl esters (FAME) with trimethylsulfonium hydroxide, according to the SRPS EN ISO 5509:2007 method. FAMEs were analysed with GC-FID Shimadzu 2010 device (Kyoto, Japan) on cyanopropyl-aryl column HP-88 (column length 100, internal diameter 0.25 mm, film thickness 0.20 μm)[9].

2.3. Statistical analysis

The experimental data was statistically processed and analyzed by ANOVA and the least squares method (LSM) by applying the GLM procedure of the SAS 9.1.3 program package (SAS Inst. Inc. 2002-2003). The breed was introduced into the model as an independent variable while the mass of freshly slaughtered pig carcass sides was a dependent variable. When means were significantly different, Tukey's test was applied to compare the mean values of the genotypes.

3. Results and discussion

3.1. Cholesterol content

In our research, the type of genotype had a significant effect ($p < 0.001$) on cholesterol content in *MLLT* of examined pigs (Table 1). Cholesterol content in *MLLT* was the lowest in SL pigs. The total cholesterol concentration in *MLLT* of SBM and WM pigs ranged from a minimum of 52.54 mg/100 g to a maximum of 76.93 mg/100 g, while