SATURATED AND UNSATURATED FATTY ACID CONTENT IN WILD BOAR MEAT

CONȚINUTUL DE ACIZI GRAŞI SATURAȚI ŞI NESATURAȚI ÎN CARNEA DE PORC MISTREȚ

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Abstract: *The aim of the study was to examine the main fatty acid components of wild boar meat that is important from the nutritional point of view. The samles were collected in three wild boar parks of which were significantly different from geographic, climatic and edaphic point of view. The PUFA ratio changed between 14.16% and 15.93%, with the highest value in the meat of the wild boars from Csibrák, which can be explained with the higher arachidonic acid (C20:4n-6) ratio. Significant differences were found by age groups concerning MUFA. In the samples of the 1-3-year-old a higher ratio of fatty acid was observe (45.72%), at the same time the polyunsaturated ratio was rather low (13.26%).*

Key words*: wild boar, meat, fatty acid, game park*

INTRODUCTION

The wild boar is one of the main big game species in Hungary. Intensive crop farming provides easily available food for them. This environmental resource, which seems to be available without any limits, had a positive impact on population size. Due to the increase in the number of wild boars the damage they caused in the arable crop cultures have considerably increased as well. In order to reduce the harm caused by the wild animals game-managers established several confined wild boar parks for hunting purposes. Today, however, there are many accusations against

farmers breeding and utilizing wild species under confined conditions in private game parks. Many explain the degradation of the soil surface and vegetation with confined animal keeping, while others question the ethics of the hunting in these areas as well as the "wild nature" of the meat from such farms.

The aim of the study was to provide knowledge about the main fatty acid components of wild boar meat that is important from the nutritional point of view. The regulations concerning venison treatment and processing have become stricter, however the end consumers often do not realise the real „value" of the meat they purchase. Our examinations are supposed to provide help for wildlife managers and farmers to produce good quality animal products and contribute to reform the opinion of those who still refuse to consume red meat.

MATERIAL AND METHODS

The examinations were carried out in three confined wild boar parks of Hungary (in Sárkeszi, Ásotthalom, Csibrák), the location of which was significantly different from geographic, climatic and edaphic point of view. In addition to the population of the parks we involved the data of wild boars shot in open areas of Csongrád County into our examinations as a control group. We determined the nutrition conditions of the wild boars; the most part of the food in the park of Sárkeszi was composed of reed stems and roots, fish and snails, while in the park in Ásotthalom the food of the animals was seasonal, the by-products of the horticultural and plough land production, supplemented with corncobs. In the intensive system park in Csibrák a feed mix made especially for wild boar nutrition was consumed by the animals. In the last two parks the animals were feeding *ad libitum.*

After evisceration a sample of 500 g was taken from the *m. serratus anterior* and it was stored cooled for 24 hours at 4°C than frozen. The samples wee stored in a freezer until they were used in the laboratory. The applied meat examination method: fatty acid composition determination as specified in AOAC Official Method 996.06 (DEVRIES et al., 1999). The data obtained during the examinations were analysed with the method of ANOVA. Homogeneity was examined with Levene-test. When comparing

the group-pairs Tamhane-test was used in case of homogeneity, while LSD –test in case of heterogeneity.

RESULTS AND DISCUSSION

The results of fatty acid composition of our samples were almost the same as the outcomes of PALEARI et al. (2003) study on wild boar meat. The quantity of oleic acid (C18:1), palmitic acid (C16:0), linoleic acid (C18:2n6), stearic acid (C18:0) and palmitoleic acid (C16:1) was high by our examinations. BRAGNOLO and RODRIGUEZ-AMAYA (2002) had similar result in the fatty acid composition of pork meat, but they found different levels for the different fatty acids.

On examining the fatty acid content of the meat samples **by territories** it was found that the saturated fatty acid (SFA) content of the meat of the animals from Sárkeszi and Csibrák was smaller. The high miristic acid (C14:0) and palmitic acid (C16:0) content was unfavourable from nutrition biological point of view, therefore the examination results showed that the food basis of the reedy swamp habitat as well as the feed mixes provided better development. The ratio of the monounsaturated fatty acids (MUFA) was higher in the samples of the animals from Sárkeszi and Csibrák than that of the animals from Ásotthalom and the open areas. The ratio of polyunsaturated fatty acids (PUFA) was the highest in the samples of the animals from Ásotthalom, (16.15%), the smallest in that of Sárkeszi (13.88%), which can be due to the lower linoleic (C18:2n-6) and linolenic acid (C18:3n-3) content of the samples.

It is favourable for production since the oxidation and rancidity disposition of such products is smaller. The analysis of the results of PUFA by territory showed a statistically proven difference in case of all fatty acids between the groups with various nutrition backgrounds. The most linoleic acid (13.58%) and linolenic acid (0.83%) was contained by the meat of the animals from Ásotthalom, while the arachidonic acid (C20:4n-6) content of the samples from Csibrák was outstanding. Significant difference was found between the arachidonic acid (C20:4 n-6) content of the wild boar meat and domestic pig meat. This fatty acid content of the wild boar meat significantly exceeded that of the domestic pigs as described in the professional literature.

The results of the examinations **by age groups** pointed out that the SFA ratio of the samples of animals younger then one year was almost equal in the samples from Ásotthalom and the open areas (38.8% és 37.53%), while their ratio is smaller in the samples from Csibrák (35.82%) and Sárkeszi (33.42%), but bigger than the results which were published by MARSICO et al. (2004) about wild boars of similar age. Concerning the stearic acid (C18:0) content of the meat samples from Sárkeszi and from open areas it was observed they were smaller (11.32%, 11.82%), than that of the wild boars from Ásotthalom and Csibrák (12.8%, 12.7%). The ratio of MUFA was 44.59% in the samples from Sárkeszi, while it was 41.55% in the samples from the open territories. The PUFA content was the highest in the samples from Csibrák (19.68%) and Ásotthalom (17.43%), while the lowest in the samples from Sárkeszi (13.73%).

Significant difference demonstrated in the samples of this age group with regard to linolenic acid (C18:3n-3) content. As for the samples from Ásotthalom and the open areas, they considerably surpassed the linolenic acid content of the meat samples taken from the other two parks. The arachidonic acid (C20:4n-6) content of the meat did not differ between the samples from Sárkeszi, Ásotthalom and the open areas (1.18%-1.80%), however the arachidonic acid content (3.06%) of the sample from Csibrák showed a considerable deviation. Analysing the SFA content of the 1-3-year-old age group it was found that the lowest value (32.99%) was found in the meat samples of the animals (consuming feed mixture) from Csibrák, which can be explained by the low amount of palmitic acid (C16:0) and stearic acid (C18:0). A MUFA ratio of over 40% was characteristic of the samples from the parks of Csibrák and Sárkeszi, as well as the open areas. Concerning PUFA in this age group, no significant differences were demonstrated between the territories as for linoleic acid (C18:2n-6) and arachidonic acid (C20:4n-6) contents. Regarding the SFA ratio of the meat from wild boars older than three years it was found that owing to the large amount of palmitic acid (C16:0) and stearic acid (C18:0) it was the highest in the samples from Sárkeszi (41.2%), and the most favourable value in the samples of the animals from Csibrák (33.21%). The MUFA ratio was the least different in this age group. Considering the territorial ratios, the largest difference was 5.29%, while in the samples of animals younger than one year it was 7.58%, and that of the 1-3-year-old wild boars was 6.07%. The

PUFA ratio changed between 14.16% and 15.93%, with the highest value in the meat of the wild boars from Csibrák, which can be explained with the higher arachidonic acid (C20:4n-6) ratio.

The results of the data processing **between the age groups within a certain territory** of the samples from wild boars in Sárkeszi showed that the saturated fatty acid ratio of the 1-3-year-old age group was only by 2.2% higher than that of the animals younger than one year. The fatty acid profile of the meat of the animals older than three years typically contained more miristic (C14:0), palmitic (C16:0), stearic (C18:0) and oleic (C18:1) acids than that of the younger age groups, the differences between the average values, however, were not proved mathematical-statistically. The SFA ratio in the meat of the Ásotthalom wild boars younger than a year was 38.78%, in the 1-3-year-old age group 39.65%, both values were higher than that of the samples taken in Sárkeszi (33.42% and 35.66%). The MUFA ratio is lower, while the PUFA ratio was higher than in the samples from Sárkeszi. The SFA ratio of the meat from animals in the young age group, due to the higher palmitic acid, heptadecanoic acid and stearic acid ratio, proved to be higher (35.82%), than that of the animals older than one year (32.99%, 33.21%). Significant differences were found by age groups concerning MUFA. In the samples of the 1-3-year-old a higher ratio of fatty acid was observe (45.72%), at the same time the polyunsaturated ratio was rather low (13.26%). The average quantity of PUFA in the meat of the boars younger than one year was higher than that of the older animals. The SFA content of the meat of boars younger than one year shot in open areas was the same, their MUFA content was almost the same as that of the meat from animals belonging to 1-3-year-old age group. In the meat of the boars older than three years the lowest saturated fatty acid (34.63%) and the highest MUFA ratio (43.69%) was found. The meat samples of animals younger than a year had more favourable linolenic acid (C18:3n-3) content (0.76%) than that of the older age groups (0.54%, 0.39%), however the deviance was not proved statistically.

Based on the results of the examination **by sexes** it was observed that no differences showed in the saturated and polyunsaturated fatty acid ratio; the statistical probe indicated significant difference between the two sexes only in case of oleic acid (C18:1) and arachidonic acid (C20:4n-6).

CONCLUSIONS

The myristic acid (C14:0), palmitic acid (C16:0) and heptadecan acid (C17:0) content of the meat of the wild boars feeding on natural food sources corresponding to their species characteristics (Sárkeszi) and the intensively fed ones (Csibrák) is lower than that published in professional literature on different genotype farm pigs. The high myristic acid (C14:0) and palmitic acid (C16:0) content is considered unfavourable from nutrition-physiological aspects therefore applying feed mixtures the wild boars produce meat with a more favourable fatty acid content than the farm pigs. At the same time the linolenic acid content of the meat of the wild boars from the Sárkeszi and from the Csibrák farms is very low. This is the reason why the meat of these animals is of good quality, suitable for producing long shelf-life, marinated smoked ham. From nutrition-physiological point of view the increase of the n-3 fatty acids would be desirable; however, it would adversely affect the shelf life of the meat and reduce its oxidative stability. The fatty acid composition of meat from boars fed with feed mixture is more favourable considering human diet.

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