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Sensory and microbiological parameters of stored wild boar meat

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Abstract

The influence of temperature on microbiological and sensory parameters of wild boar meat kept for 21 days was studied. Total viable count was higher in meat stored at 15°C than at lower temperatures on day 21. Colour saturation and hue did not differ at any temperature, but odor differences occurred in meat at 15°C. Redness (a*) in meat at 0°C was higher than at 15°C. Meat stored at 0 or 15°C differed in b* after 21 days, and in L* after 7 days. Observance of National and European legislation concerning handling of wild game is important in providing health-friendly meat.

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1. Introduction

Venison has always been a traditional part of human diet in the region of Central Europe. In the Czech Republic, venison consumption currently varies around 1 kg per head per year, which is comparable to venison consumption in other European countries (Austria, Switzerland, Germany)¹.

According to the national legislation, unskinned wild game in the Czech Republic can be sold directly to the final

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consumer under two temperature regimes: storage at 0-1°C for no more than 15 days or storage at 0-7°C for no more than 7 days (Decree No. 289/2007 Coll.)². Sensory parameters of venison which are important for the consumers depend on many factors. Sensory quality is affected by meat composition (morphological, physical, chemical) and by processes ongoing during storage³. Temperature is definitely a significant factor affecting these post-mortal processes. The most important factors influencing quality of venison are health condition of the wild animals, correct procedures in obtaining the venison (e.g. hunting method) and manipulation with carcasses. If these proper conditions and procedures are not kept, it can lead to decreased quality and safety of meat.

The aim of this study was to evaluate the influence of storage conditions on sensory and microbiological parameters of venison obtained through legal means of hunting.

2. Materials and methods

In total, 21 carcasses of wild boars weighting from 18 to 39 kg and of the age of 12 months or less were examined in this study. Wild boars were killed through legal means of hunting and the carcasses were transported to the laboratory in less than 24 hours after killing. Sensory and microbiological analyses were performed on samples from hind leg and shoulder. Three carcasses were examined immediately after their arrival, the rest of meat samples ($n = 18$) were stored under three temperature regimes (0°C, 7°C and 15°C) for 21 days. Those samples were analysed on 7th, 14th and 21st day of storage.

The microbiological analysis included: total viable count (TVC) according to EN ISO 4833⁴, lactic acid bacteria (LAB) according to EN ISO 15214⁵ and psychrotrophic microorganisms (PSY) according to EN ISO 17410⁶.

The sensory analysis was performed by a panel of 6 trained assessors using a 5-point scale according to Daskiewicz et al.⁷. Following parameters were included: colour hue, saturation of colour, odour (see Table 1).

Table 1. Sensory evaluation scale.

Specification	Rating				
Colour hue	Brown	Reddish brown	Red	Pink-red	Pink
Saturation of colour	Very dark	Darker	Optimum	Paler	Very pale
Odor	Excellent	Suitable	Acceptable	Poor	Very poor
Numerical transformation	5	4	3	2	1

Colour and texture were evaluated using instrumental methods, always from six repeat readings. Colour was measured by a Konica Minolta Spectrophotometer CM-5 in the system CIELab on a fresh cut perpendicularly to the muscle fibres. Texture was measured using Instron Universal Testing Machine 5544. First, the samples were frozen for a week (-18°C), then defrosted at 4°C and thermally processed at 70°C/60 min.

All the results (the bacterial counts after log transformation) were analysed by a statistical programme (Statistica v. 7.0, Statsoft, CZ) using Kruskal-Wallis ANOVA with multiple comparisons of mean ranks.

3. Result and discussion

The results of the microbiological analysis show an increasing trend in bacterial counts during storage. The highest increase was observed after 7 days of storage. A statistically significant ($p < 0.001$) difference between the boar meat stored at lower temperatures (0°C and 7°C) and the meat stored at 15°C was detected on the 21st day of storage. Even in the meat stored at 15°C, at the end of storage, lactic acid bacteria and psychrotrophic microorganisms were present in low numbers ($2 \log_{10}$ cfu/g and $2.5 \log_{10}$ cfu/g, respectively) and TVC ($5 \log_{10}$ cfu/g) was satisfactory when compared to recommendations laid down by standard (CSN 56 9609)⁸. Attanasova et al.¹ reported mean TVC values in meat of wild boars up to 48 hours after killing as $3.0 \log_{10}$ cfu/cm² for the expertly shot animals and $3.9 \log_{10}$ cfu/cm² for not expertly shot animals (e.g. shot in the abdomen).

Colour stability of meat during storage is determined by metabolic and composition characteristics of muscle tissue related to oxidative and glycolytic activity. Content of myoglobin in the individual muscles plays an important

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