

DIFFERENCES BETWEEN SEXES IN NUTRITIONAL AND TECHNOLOGICAL QUALITY OF MEAT FROM FREE-LIVING FALLOW DEER

Jozef Mojto, Vladimír Kartusek, Oľga Palanská

Research institute of Animal Production,
Hlohovská 2, SK-949 92 Nitra, SLOVAK REPUBLIC

Keywords: fallow deer, free-living, sex, meat quality

INTRODUCTION

Although the offer of meat from animals kept in farms is rising, the game from animals shot in nature represents the decisive amount in the market. Fallow deer belongs to the hoofed game with meat of high quality (Mojto et al., 1992) which is manifested also in high price in shops and restaurants. Many gourmets look for game because of its low fat content and specific taste. Game is also used more often in production of special meat products (Brittin et al., 1992) lately. The variability in game quality is caused by many factors. One of the important factors can also be the sex of animals.

The aim of this work was to compare the meat quality (nutritional, physical and technological, sensorial) of male and female sex in free-living fallow deer (*Dama dama*).

MATERIAL AND METHODS

We used males ($n = 15$) and females ($n = 18$) from hunting grounds in western Slovakia. All age categories were adequately represented. The day, hour and locality where the animal was shot were known as well as the weight of the gralloched body after cooling off. The average weight of unskinned carcasses were 44.2 kg males, and 33.8 kg in females. The carcasses were stored in cold-storage room at the temperature $+2$ to $+4$ °C. Samples for meat quality determination were taken from *m.longissimus dorsi* and *m. semimebranosus*. We determined the content of total water, fat, proteins and ash according to the norm STN 570 185. The content of connective tissue proteins were determined on the basis of hydroxyproline method after Wyler (1972), and cholesterol content by the CHOL 150 test (Firm Lachema). Representation of fatty acids was determined by gas chromatography analysis of methyl esters in the apparatus Packard 419. We expressed also the indices I_1 (index of unsaturatedness of fat) and I_2 (index of nutritional value of fat) in numbers. We measured the pH value and colour of meat (% remission), and we determined the water holding capacity 48 hrs post mortem. The weight losses in meat samples after cooking and baking, as well as the shear force (WB) of muscle were studied on the sixth day. A commission evaluated the baked meat samples sensorially according to a 5 point scale.

RESULTS AND DISCUSSION

Detailed results are in tables 1 - 3. The meat of female fallow deer is noted for higher content of intramuscular fat in *m.long.dorsi*, and on the contrary, the male fallow deer has higher share of connective tissue proteins. It manifested itself in the shear force of cooked and baked samples of meat in which we noticed less tender meat in male fallow deer as well as during the panel evaluation of the baked meat in which the slightly higher number

of points for female animals show that their meat is more tender and juicy. There were not found significant differences in the content of cholesterol between sexes. However, the average values from 120 - 130 mg. 100 g^{-1} are higher than the values usually found in various kinds of farm animals (Seuss, 1989). There were more saturated fatty acids in the meat of males, and more essential fatty acids (linoleic and linolenic acids) were in the meat of female animals. The more favourable indices I_1 and I_2 in female fallow deer follow from this fact. Higher final pH value in the physical and technological parameters was observed in the meat of male fallow deer, the values being within the norm. We did not observe the occurrence of DFD meat in the whole set of studied free-living animals, this type of meat occurs in fallow deer kept and killed in various ways in farms (Freudenreich and Fischer, 1989; Mojto et al., 1994).

We can state, in conclusion, that the evaluation of the studied quality parameters of fallow deer meat showed that the meat of female animals is of better nutritional and sensorial quality compared with the meat of male fallow deer.

LITERATURE

- BRITTIN, H.C.- ARMES, CH.L.- RAMSEY, C.B.- SIMPSON, C.D.: Consumer acceptability of ground venison. *J.Amer.Dietet.Ass* 80, 1992, p.557-560
- FREUDENREICH, P.- FISCHER, K.: Untersuchungen zur Fleischqualität von Damtieren. *Wildtiere in Gehegen* 6, 1989, s.87-89
- MOJTO, J.- KARTUSEK, V.- SLAMEČKA, J.: Einfluss zweier verschiedener Schlachtmethoden auf die Fleischqualität von in landwirtschaftlichen Gehegen gehaltenen Damhirschen. In: *Wildhaltung in landwirtschaftlichen Betrieben-Chancen, Perspektiven*, 1994, Bonn, s. 160-167
- MOJTO, J.- KARTUSEK, V.- PALANSKÁ, O.- LAHUČKÝ, R.: Carcass and meat Quality of Fallow Deer. *Proceedings (Vol.2)* 38th ICoMSTm 1992, Clermont-Ferrand, p.97-100
- SEUSS, J.: Nährwert und Bewertung. In: *Fleisch und Wurst-Bedeutung in der Ernährung des Menschen*, Kulmbacher Reihe 9, Kulmbach, 1989, s.47-61
- WYLER, O.: Ermittlung des Hydroxyprolinegehaltes. *Fleischwirtschaft* 52, 1972, s.42-44

Tab.1 Nutritional quality of meat and fat

Parameters		Male $\bar{x} \pm s$	Female $\bar{x} \pm s$	t-test
Water	g.100 g ⁻¹	74.16 ± 0.79	73.67 ± 0.99	NS
Fat	g.100 g ⁻¹	1.02 ± 0.38	1.41 ± 0.55	P<0.05
Proteins	g.100 g ⁻¹	23.87 ± 0.86	23.90 ± 0.96	NS
Connective tissue proteins	g.100 g ⁻¹	0.32 ± 0.07	0.26 ± 0.07	P<0.05
Cholesterol	mg.100 g ⁻¹	127.11 ± 0.12	120.41 ± 0.13	NS
SFA	%	55.29 ± 2.32	52.75 ± 4.18	P<0.05
EFA	%	20.52 ± 1.85	21.82 ± 2.53	NS
Index I ₁		0.81 ± 0.33	0.90 ± 0.29	NS
Index I ₂		0.37 ± 0.04	0.40 ± 0.06	P<0.05

SFA = saturated fatty acids; EFA = essential fatty acids

Tab.2 Physical and technological parameters

Parameters		Male $\bar{x} \pm s$	Female $\bar{x} \pm s$	t-test
pH ₄₈		5.58 ± 0.06	5.49 ± 0.16	P<0.05
Colour	% rem.	5.83 ± 0.83	5.80 ± 1.21	NS
Water holding capacity	g.100 g ⁻¹	32.52 ± 2.12	33.37 ± 3.02	NS
Cooking losses	g.100 g ⁻¹	44.23 ± 2.42	42.33 ± 1.55	NS
Baking losses	g.100 g ⁻¹	42.53 ± 5.02	40.74 ± 3.13	NS
Shear force of cooked meat	kg	4.78 ± 2.03	3.02 ± 0.68	P<0.01
Shear force of baked meat	kg	6.07 ± 3.35	3.95 ± 0.68	P<0.01

Tab.3 Sensorial quality

Parameters	Male $\bar{x} \pm s$	Female $\bar{x} \pm s$	t-test
Smell	4.17 ± 0.39	4.20 ± 0.41	NS
Flavour	3.92 ± 0.29	4.00 ± 0.11	NS
Juiciness	3.67 ± 0.65	4.00 ± 0.38	NS
Tenderness	3.83 ± 0.83	4.00 ± 0.38	NS

1 - 5 points scale