

SHORT REPORT

## **Total fat, cholesterol and fatty acids of meat of grey nandu (*Rhea americana*)**

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The mean lipid and cholesterol contents of *m. gastrocnemius* were 3.87 g and 75 mg/100 g tissue, respectively. The overall profile of fatty acids of the muscle was found similar to ostrich meat. From dietetic and nutritive point of view fatty acids profile of nandu meat seems more desirable than those of the traditional avian species.

**KEY WORDS:** cholesterol / fat /fatty acids / meat / nandu / slaughter

Over the recent years *Ratitae* farming is a growing enterprise throughout the world, and ostriches, emus and rheas are becoming an important source of meat for humans. Although some research has already been carried out on the quality of ostrich meat [Sales

*et al.* 1996, Sales and Hayes 1996, Sales 1998, Horbańczuk *et al.* 1998, Horbańczuk and Sales 1998, Sales and Horbańczuk 1998, Paleari *et al.* 1998, Hoffman and Fisher 2001], scientific data regarding the meat of rheas are still limited [Sales *et al.* 1999, Horbańczuk 2002, Sales 2002].

An attempt is presented at providing information on the lipid and cholesterol content and fatty acid composition of meat of grey nandu (*Rhea americana*) slaughtered at the age of 12 months.

### Material and methods

Eight grey nandu (*Rhea americana*) males were reared on a commercial farm at Dąbki, near Zielona Góra, Poland, according to the EU standards [Horbańczuk 2002]. Up to the end of month 4 of age the birds were offered the pelleted diet (2% of body weight) containing 16% crude protein and 9.7 MJ/kg ME, and then 14.5% crude protein and 9.5 MJ/kg ME from month 5. Grass in summer and hay in winter were offered once a week – 0.5 and 0.2 kg/bird, respectively.

At the age of 12 months the birds were fasted for 24 hours, electrically stunned with Schermer stunner and slaughtered in a commercial abattoir in Western Poland. Carcasses were allowed to chill for six hours at 2°C and the *m. gastrocnemius* was excised from the left leg of each carcass. External fat and epimysial connective tissue were removed and steak samples (2 × 2 × 2 cm) were cut from the bottom of each muscle on a repeatable basis. Each sample was ground, homogenized, vacuum-packed in plastic bag and stored at -20°C for about 10 days until analysed. Analytical procedures were identical with those applied earlier for breast fat depot analyses of culled ostrich females slaughtered at the age of 5 years [Horbańczuk *et al.* 2003].

Cholesterol content was presented in mg/100g meat, while individual fatty acids as per cent of their sum. Both were expressed as means and standard deviations.

### Results and discussion

Means for total fat, cholesterol content and fatty acid composition of *m. gastrocnemius* of grey nandu are shown in Table 1.

Fat content of a muscle, *i.e.* 3.87 g/100 g tissue, was markedly higher than 1.42 g/100 g reported for ostrich *gastrocnemius* muscle by Horbańczuk and Sales [1998]. Similar relation was observed in case of mean total cholesterol content which in this study was 75.22 mg/100 g, whereas in the same muscle values of 57, 65 and 68 mg/100 g tissue were found in African Black [Sales and Oliver-Lyons 1996], Red Neck, and Blue Neck [Horbańczuk *et al.* 1998] ostriches, respectively.

Although the level of saturated fatty acids (SFA) in nandu meat (Tab. 1) was similar to that found by Sales *et al.* [1999], the per cent of monounsaturated acids (MUFA) was lower. Lower was also the share of polyunsaturated fatty acids (PUFA) – by 16 and 10 per cent points than in grey nandu and Lesser nandu meat (39.7 and 33.6%,

Total fat, cholesterol and fatty acids of grey nandu meat

Table 1. Means and their standard deviations (SD) for total lipid, cholesterol and fatty acid composition of grey nandu meat (n=8)

	Mean	SD
Total lipid (g/100 g)	3.87	1.82
Cholesterol (mg/100 g)	25.22	2.74
Fatty acids (% of total fatty acids)		
saturated (SFA)		
3:0	0.07	0.01
4:0	0.02	0.00
6:0	0.07	0.01
8:0	0.11	0.03
10:0	0.05	0.02
15:0	4.56	0.79
16:0	27.06	1.87
17:0	0.01	0.00
18:0	2.34	0.45
total SFA	34.38	1.55
monounsaturated (MUFA)		
10:1	0.02	0.00
12:1	0.02	0.02
14:1	0.02	0.01
16:1	11.77	1.12
18:1 <sup>1</sup>	29.56	1.67
18:1 <sup>2</sup>	0.27	0.06
total MUFA	41.78	1.76
polyunsaturated (PUFA)		
18:2	13.59	2.29
18:3	7.51	1.73
20:3 <sup>3</sup>	0.42	0.21
20:3 <sup>4</sup>	0.06	0.01
20:4	1.44	0.32
20:5	0.05	0.00
total PUFA	23.82	3.18
PUFA/SFA	0.68	0.12

<sup>1</sup>Oleic acid

<sup>2</sup>Elaidic acid

<sup>3</sup>Arachidonic acid

<sup>4</sup>Stearidonic acid

respectively) as reported by Sales *et al.* [1999] who, however, quoted four PUFAs, and a total of eight fatty acids only.

The share of PUFAs in the sum of fatty acids (23.82%) was similar to that found in ostrich meat (from 23.65 to 23.78%) by Horbańczuk *et al.* [1998], but higher than in chicken meat (14.9%) reported by Paul and Southgate [1978].

It is interesting that levels of arachidonic (20:4) and linoleic (18:2) acids given

in Table 1 of the present report (1.44 and 13.59 %) were seven- and two-fold lower, respectively, than in the meat of grey nandu farmed in Argentina (10.0 and 28.0%) as reported by Sales *et al.* [1999]. This is also in contrast with a mean value determined for ostrich meat by Horbańczuk *et al.* [1998] and Horbańczuk and Sales [1998] – 5.7 and 5.4%, respectively. It seems, that less attractive the dietary parameters of nandu meat presented in this report may be due to the birds' diet. It should be noted, that the nandus farmed in South America were fed mainly with maize meal and fresh alfalfa, while those kept in Poland had drastically limited access to forage offered only once a week.

This preliminary report points to the necessity of further studies on composition and nutritive value of meat of farmed nandu. Its fatty acids profile is similar to that of ostrich meat and can be considered dietetically desirable as compared with meat of another avian species. The observations presented here should be expanded to evaluate the fatty acid composition as related to the management and feeding regimen.

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### Zawartość tłuszczu i cholesterolu oraz skład kwasów tłuszczowych w mięsie nandu

#### Streszczenie

Średni poziom tłuszczu i cholesterolu w 100 g tkanki *m. gastrocnemius* nandu rzeźnych wyniósł odpowiednio 3,87 g i 75 mg. Profil kwasów tłuszczowych okazał się podobny do stwierdzanego w mięsie strusi. Z punktu widzenia wartości pokarmowej i dietetycznej profil kwasów tłuszczowych w badanym mięśni nandu kształtuje się korzystniej niż w mięsie drobiu gatunków „tradycyjnych”.

