

# Some nutritive-value features of venison from red deer stags and hinds

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## Objectives

To compare the nutritive value of venison from red deer stags and hinds, in terms of:

1. Total iron and % haem iron
2. The bioactive compounds coenzyme Q<sub>10</sub>, taurine and carnosine
3. Fatty acid proportions in intramuscular fat.



Red deer hind

## Conclusions

1. Relative to venison from stags, that from hinds had more intramuscular fat, vitamin E, coenzyme Q10, taurine, and anserine.
2. Relative to beef and lamb from other studies, venison contained more iron, less fat, but similar amounts of several bioactive compounds.

## Introduction

- Some data is available on the nutritive value of venison from red deer [1], but there is limited information on differences between venison from red deer stags and hinds.
- There is also a lack of information on the concentrations of certain bioactive compounds in venison (i.e. non-nutritional compounds that are beneficial to the health or well-being of consumers).
- This poster presents data in both these areas.

## Methods

- Twenty red deer (*Cervus elaphus*) made up of 10 stags (males) and 10 hinds (females) were slaughtered on the same day.
- The hinds and stags were from different farms, but all were finished on pastures of mainly perennial ryegrass and white clover.
- At ca 24 h post mortem the longissimus muscle from the last rib to the pelvic bone was collected from both sides and chilled at 1-2°C for 7d before being frozen.
- Analytical procedures for analysing intramuscular fat (Soxhlet), vitamin E (HPLC), fatty acids (GLC), and certain bioactive compounds (HPLC) were as reported for previous studies [2].
- Data was analysed by means of a one-way ANOVA model.

## Results

- Mean carcass weight was 3.4 kg heavier for the stags (55.8 vs 52.4 kg; P = 0.04 \*), but the hind carcasses were non-significantly fatter (GR of 5.4 vs 4.9 mm; P = 0.21).
- Short-loin sample weights were similar (~1200 g) for the two groups, but the hind samples had more intramuscular fat (Fig. 1).
- Muscle iron content at > 3.0 mg/100g (Table 1) was similar between groups, but higher than published values for beef and lamb [2],

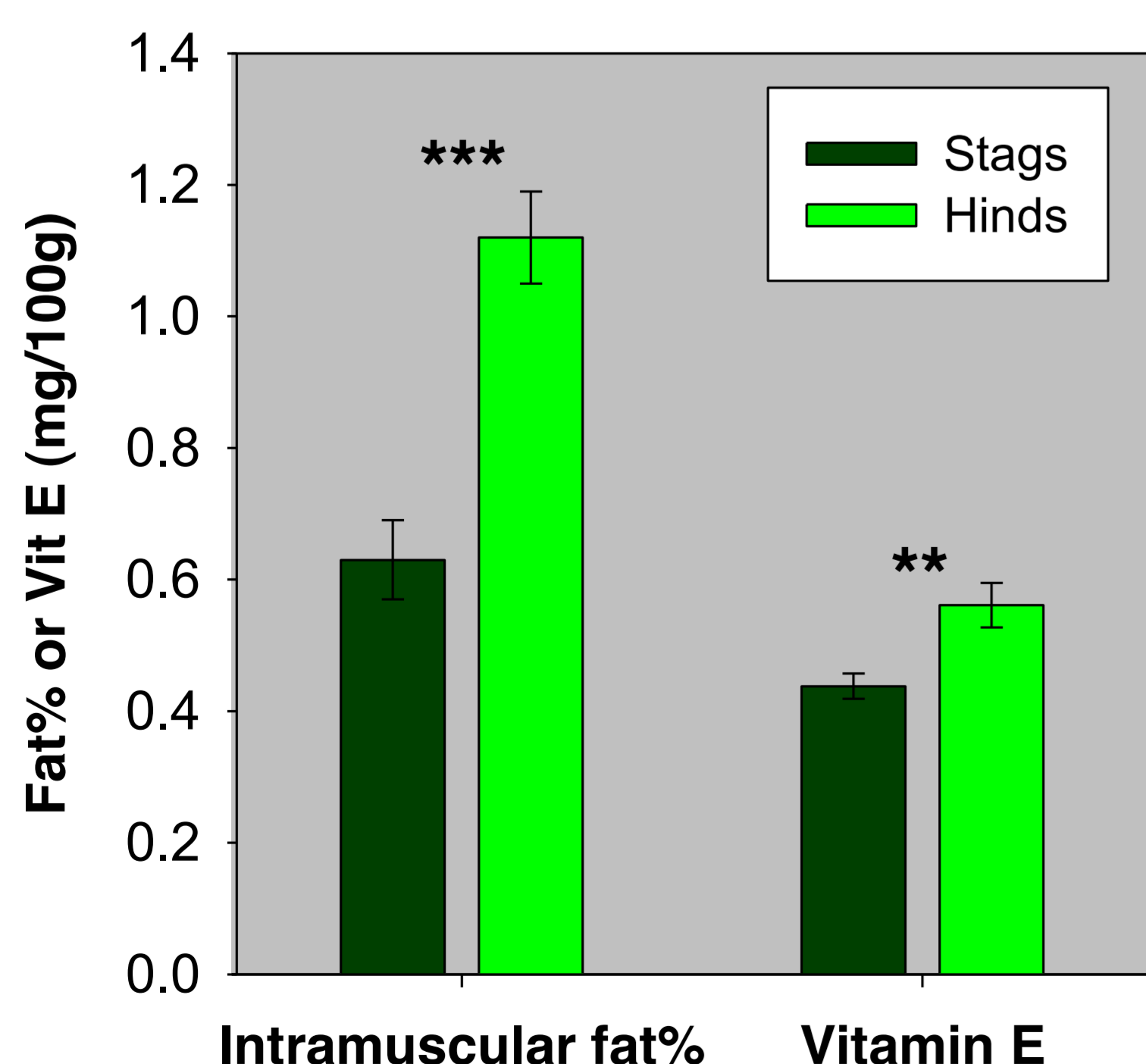


Fig. 1: Means (±se) for intramuscular fat and vitamin E levels in longissimus samples from red deer stags and hinds

Table 1: Means for concentrations of selected nutrients in the longissimus muscle of red deer

	Stags	Hinds	Sign	RSD
Total iron (mg/100g)	3.07	3.34	NS	0.31
Haem iron (% total)	83.4	83.4	NS	1.06
CoQ <sup>3</sup> (mg/100g)	2.82	6.29	***	0.98
Taurine (mg/100g)	18.1	37.1	***	9.4
Carnosine (mg/100g)	290.6	329.7	NS	46.5
Anserine (mg/100g)	188.2	251.4	***	31.3

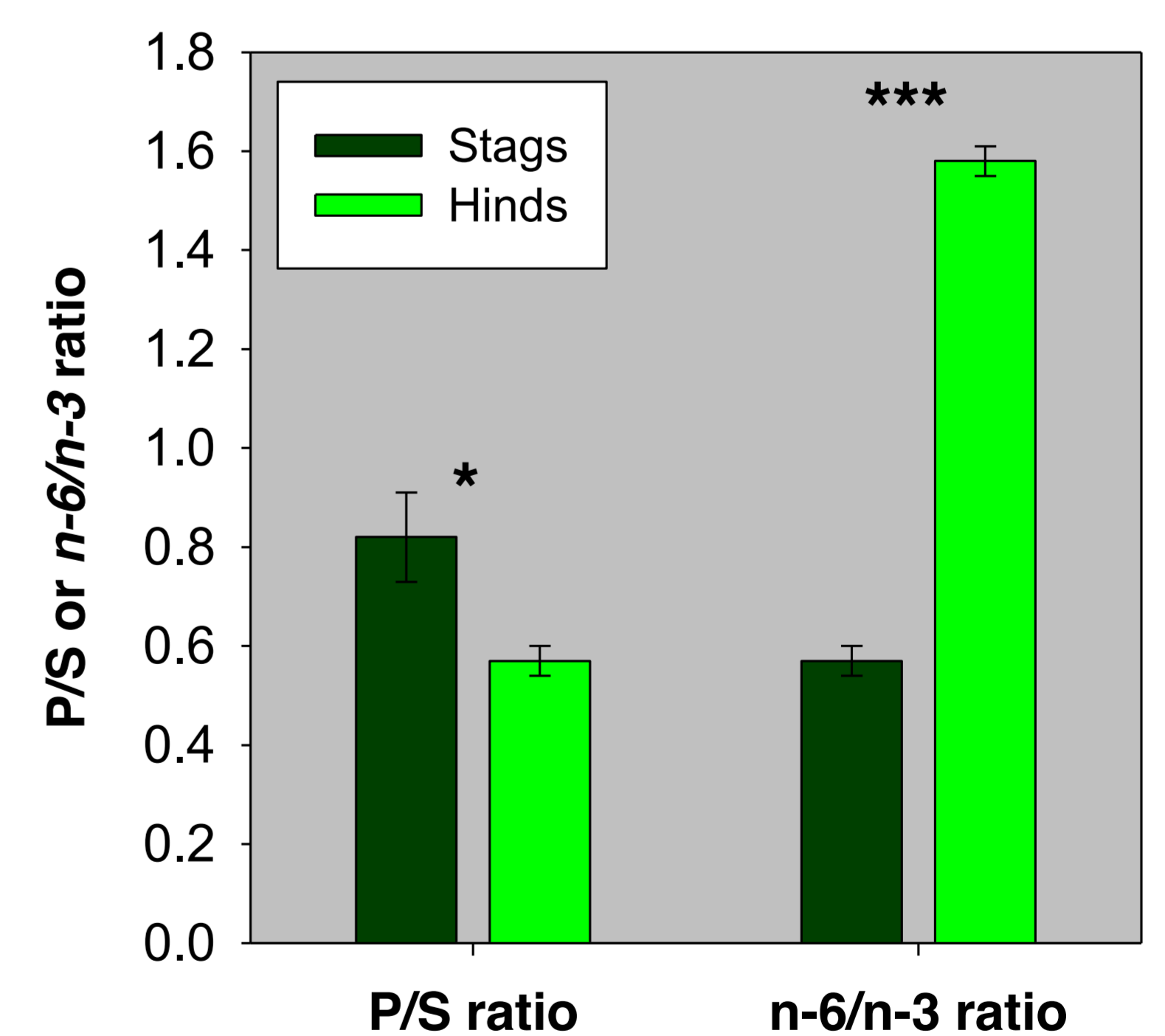
<sup>1</sup> NS, P > 0.05; \*, P < 0.05; \*\*, P < 0.01; \*\*\*, P < 0.001. <sup>2</sup> RSD = residual standard deviation; <sup>3</sup> CoQ = coenzyme Q<sub>10</sub>

- Coenzyme Q<sub>10</sub> as well as taurine were at higher concentrations in the hind group (Table 1). Both of these compounds, which have antioxidant properties [3], [4], are associated with mitochondria and therefore “red” type muscles.
- Carnosine did not differ between the groups, but venison from hinds contained more anserine (Table 1). Both these compounds play a buffering role in muscle as well as acting as antioxidants. Carnosine has also been attributed with anti-ageing effects [5].
- Group differences in fatty-acid levels largely reflected differences in fat levels and the pasture diet that led to low n-6/n-3 ratios (Table 2, Fig. 2).
- Thus, stag intramuscular fat had a higher P/S ratio and a lower n-6/n-3 ratio (Fig. 2), but the latter ratio was low for both groups compared to published data for grain-fed beef and lamb.

Table 2: Means for concentrations of selected fatty acids in the longissimus muscle of red deer (% total FAs)

	Stags	Hinds	Sign	RSD
C18:2 (linoleic, n-6)	12.39	10.67	NS	2.44
C18:3 (α-linolenic, n-3)	4.28	2.70	***	0.66
C20:5 (EPA, n-3)	3.97	2.85	**	0.82
C22:5 (DPA, n-3)	5.04	3.46	***	0.75
C22:6 (DHA, n-3)	0.91	0.66	NS	0.32

Fig. 2: Differences between longissimus samples from red deer stags and hinds for the P/S ratio and n-6/n-3 ratio of intramuscular fat (means ±se)



## References

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