



# (PSV-26) Effect of feeding regime on meat quality of elk deer (venison) loin during aging

Jinwook Lee<sup>1</sup>, Aera Jang<sup>2</sup>, Hye-Jin Kim<sup>2</sup>, Hee-Jin Kim<sup>2</sup>, Kwan-Woo Kim<sup>1</sup>, Sang Hoon Lee<sup>1</sup>

<sup>1</sup> Animal Genetic Resources Research Center, National Institute of Animal Science, RDA, Gyeongnam, 50000, Korea

<sup>2</sup> Department of Applied Animal Science (BK21 plus), College of Animal Life Science, Kangwon National University, Chuncheon, 24341, Korea



## ABSTRACT

- The objective of this study was to investigate the effects of feeding regimes on chemical composition, meat quality, and fatty acids composition of elk deer loin (EDL) during aging at 4°C. Sixteen 3-year-old elk hinds were randomly assigned to one of two dietary treatments, grazing pasture (GR) and barn feeding (BF). Eight elks were grazed on pasture with supplementary feed of 1.0% of body weight and the other eight elks were fed 1.0% of concentrate with ad libitum hay for 5 months. After slaughtering, EDL was dissected and aged for 56 days at 4°C in vacuum packaging. Proximate composition, physicochemical characteristics, and fatty acid composition of EDL were determined. Proximate composition of EDL showed no significant difference between feeding regime and ageing period. The pH values of EDL increased with increase of storage days ( $p < 0.05$ ). Shear force was decreased during aging ( $p < 0.05$ ). Water holding capacity (WHC) and cooking loss were not significantly affected by feeding regime or aging period. Lightness ( $L^*$ ) and redness ( $a^*$ ) were decreased on day 56 compared to initial day. Yellowness ( $b^*$ ) of EDL decreased with increase of ageing time ( $p < 0.05$ ). The  $\alpha$ -linolenic acid, eicosapentaenoic acid and docosahexaenoic acid were higher in GR treatment and increased with ageing duration ( $p < 0.05$ ). The feeding regimes and ageing affected on meat quality and fatty acids profiles.

## RESULTS

Table 1. Effect of feeding regime on the physicochemical characteristics, meat color and fatty acid profiles of venison loin during ageing

Item	Treatment										SEM <sup>1</sup>	Significance <sup>2</sup>		
	Concentrates					Pasture						F	A	F x A
	Day 0	Day 14	Day 28	Day 42	Day 56	Day 0	Day 14	Day 28	Day 42	Day 56				
<b>Physicochemical characteristics</b>														
pH	5.39 <sup>a</sup>	5.55 <sup>bc</sup>	5.56 <sup>bc</sup>	5.57 <sup>bc</sup>	5.59 <sup>bc</sup>	5.36 <sup>a</sup>	5.51 <sup>b</sup>	5.54 <sup>bc</sup>	5.57 <sup>bc</sup>	5.61 <sup>c</sup>	0.017	0.515	<0.05	0.824
Shear force (kgf)	9.37 <sup>e</sup>	7.44 <sup>cd</sup>	6.24 <sup>bc</sup>	5.14 <sup>ab</sup>	4.59 <sup>a</sup>	10.8 <sup>f</sup>	8.64 <sup>de</sup>	7.31 <sup>cd</sup>	5.41 <sup>ab</sup>	4.52 <sup>a</sup>	0.398	<0.05	<0.05	0.426
<b>Meat color</b>														
CIE L*	30.6 <sup>bc</sup>	30.8 <sup>c</sup>	30.9 <sup>c</sup>	30.6 <sup>bc</sup>	29.8 <sup>a</sup>	30.7 <sup>c</sup>	30.7 <sup>c</sup>	30.7 <sup>c</sup>	30.1 <sup>ab</sup>	29.7 <sup>a</sup>	0.087	0.215	<0.05	0.528
CIE a*	16.2 <sup>c</sup>	15.9 <sup>bc</sup>	15.5 <sup>ab</sup>	15.3 <sup>a</sup>	15.5 <sup>ab</sup>	15.8 <sup>abc</sup>	15.7 <sup>abc</sup>	15.6 <sup>ab</sup>	15.4 <sup>a</sup>	15.4 <sup>ab</sup>	0.069	0.153	<0.05	0.567
CIE b*	6.68 <sup>a</sup>	7.51 <sup>b</sup>	8.16 <sup>c</sup>	8.68 <sup>d</sup>	8.95 <sup>d</sup>	6.80 <sup>a</sup>	7.33 <sup>b</sup>	8.04 <sup>c</sup>	8.78 <sup>d</sup>	8.87 <sup>d</sup>	0.154	0.635	<0.05	0.576
<b>Fatty acid profiles</b>														
C18:3n3 ( $\alpha$ -Linolenic acid)	1.39 <sup>bc</sup>	1.36 <sup>bc</sup>	1.49 <sup>abc</sup>	1.33 <sup>b</sup>	1.02 <sup>a</sup>	1.80 <sup>e</sup>	1.70 <sup>de</sup>	1.5 <sup>abc</sup>	1.63 <sup>cde</sup>	1.30 <sup>b</sup>	0.046	<0.05	<0.05	0.234
C20:5n3 (Eicosapentaenoic acid)	0.68 <sup>ab</sup>	0.63 <sup>ab</sup>	0.63 <sup>ab</sup>	0.64 <sup>ab</sup>	0.54 <sup>a</sup>	1.01 <sup>d</sup>	0.89 <sup>cd</sup>	0.94 <sup>d</sup>	0.92 <sup>cd</sup>	0.78 <sup>bc</sup>	0.031	<0.05	<0.05	0.881
C22:6n3 (Docosahexaenoic acid)	1.89 <sup>abc</sup>	1.73 <sup>ab</sup>	1.85 <sup>ab</sup>	1.94 <sup>abc</sup>	1.61 <sup>a</sup>	2.38 <sup>de</sup>	2.26 <sup>cde</sup>	2.45 <sup>de</sup>	2.61 <sup>e</sup>	2.13 <sup>bcd</sup>	0.067	<0.05	<0.05	0.957

<sup>a-f</sup> Means within the same row with different letters are significantly different ( $p < 0.05$ ).

<sup>1</sup>SEM; Standard error of the means.

<sup>2</sup>Significance: F, feeding system; A, aging time (weeks); F x A, interaction.

## CONCLUSION

- The venison contained higher proportion of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) than other ruminants, which has a protective effect against cardiovascular disease. This results suggested that venison is more beneficial meat than other ruminants since venison meat contains higher poly-unsaturated fatty acid rather than saturated fatty acid. Moreover, feeding regimes and ageing affected on meat quality and fatty acids profiles. Further study needed to investigate the correlation between the rumen microbiome and meat fatty acid profiles using NGS techniques