

Effect of Dry, Vacuum, and Modified Atmosphere Ageing on Physicochemical Properties of Roe Deer Meat by *Natalia Kasalka-Czarna, Róża Biegańska-Marecik, Jędrzej Proch, Aleksandra Orłowska, Magdalena Montowska*

Supplementary Material

Table S1. The content (mg/kg) of selected minerals in muscles *longissimus thoracis et lumborum* (LTL), *biceps femoris* (BF) and *vastus lateralis* (VL) of the roe deer. Table S2. Storage loss and Warner-Bratzler shear force (WBSF) for muscles *longissimus thoracis et lumborum* (LTL), *biceps femoris* (BF) and *vastus lateralis* (VL) of roe deer during storage under modified atmosphere (MAP), dry (DRY-AGED) and vacuum (VAC) ageing. Table S3. Contents of thiobarbituric acid reactive substances (TBARS) and protein carbonyls in muscles *longissimus thoracis et lumborum* (LTL), *biceps femoris* (BF) and *vastus lateralis* (VL) of roe deer during storage under modified atmosphere (MAP), dry (DRY-AGED) and vacuum (VAC) ageing.

**Table S1.** The content (mg/kg) of selected minerals in roe deer muscles: *longissimus thoracis et lumborum* (LTL), *biceps femoris* (BF), and *vastus lateralis* (VL).

Mineral	LTL	BF	VL	
K	2,587±97	2,697±63	2,539±89	NS
Na	492.6±3.5 <sup>a</sup>	420.4±0.6 <sup>b</sup>	425.1±1.4 <sup>b</sup>	***
Mg	212.5±6.0	206.3±0.7	205.9±1.5	NS
Ca	66.5±3.0 <sup>b</sup>	72.6±1.8 <sup>a</sup>	56.4±1.0 <sup>c</sup>	***
Zn	30.0± 0.0 <sup>a</sup>	27.1±0.2 <sup>b</sup>	26.5±0.4 <sup>b</sup>	***
Fe	24.6±0.3 <sup>a</sup>	21.4±0.3 <sup>b</sup>	14.8± 0.4 <sup>c</sup>	***
Cu	3.7±0.0 <sup>a</sup>	3.5±0.0 <sup>a</sup>	2.6±0.0 <sup>b</sup>	***
Al	1.6±0.4 <sup>a</sup>	0.8±0.0 <sup>c</sup>	1.2±0.2 <sup>b</sup>	***
Pb	0.3±0.0	0.3±0.0	0.3±0.0	NS
Cd	<0.03	<0.03	<0.03	NS
Cr	<0.03	<0.03	<0.03	NS
Mn	<0.03	<0.03	<0.03	NS
Ni	<0.03	<0.03	<0.03	NS

Results are shown as mean ± standard error of mean (SEM). Means with different letters (a–c) in a row indicate significant differences between the muscles ( $p<0.05$ ). \* $p<0.05$ ; \*\* $p<0.01$ ; \*\*\* $p<0.001$ ; NS, non-significant (one-way ANOVA).

**Table S2.** Storage loss and Warner-Bratzler shear force (WBSF) determined for roe deer muscles: *longissimus thoracis et lumborum* (LTL), *biceps femoris* (BF), and *vastus lateralis* (VL) during storage under modified atmosphere (MAP), dry (DRY-AGED) and vacuum (VAC) ageing.

Parameter	Storage time (day)	LTL				BF				VL			
		MAP	DRY-AGED	VAC	<i>p</i> -Method	MAP	DRY-AGED	VAC	<i>p</i> -Method	MAP	DRY-AGED	VAC	<i>p</i> -Method
Purge losses (%)	7	4.57±0.14 <sup>by</sup>	26.12±1.19 <sup>bx</sup>	4.08±0.30 <sup>by</sup>	***	5.78±0.14 <sup>by</sup>	20.28±0.35 <sup>bx</sup>	2.75±0.19 <sup>bz</sup>	***	3.61±0.09 <sup>by</sup>	20.64±0.52 <sup>bx</sup>	2.69±0.13 <sup>by</sup>	***
	21	6.87±0.09 <sup>ay</sup>	42.04±0.9 <sup>ax</sup>	5.35±0.07 <sup>ay</sup>	***	6.49±0.12 <sup>ay</sup>	23.59±0.45 <sup>ax</sup>	3.96±0.10 <sup>az</sup>	***	5.71±0.11 <sup>ay</sup>	24.98±0.68 <sup>ax</sup>	5.23±0.15 <sup>ay</sup>	***
<i>p</i> -Time		***	***	***		***	***	***		***	***	***	
WBSF (N)	0	22.13±1.18 <sup>b</sup>	22.13±1.18 <sup>a</sup>	22.13±1.18 <sup>a</sup>	NS	26.00±1.07 <sup>b</sup>	26.00±1.07 <sup>a</sup>	26.00±1.07 <sup>a</sup>	NS	18.86±1.18 <sup>c</sup>	18.86±1.18	18.86±1.18 <sup>b</sup>	NS
	7	25.67±0.70 <sup>ax</sup>	16.91±0.54 <sup>by</sup>	16.53±0.43 <sup>cy</sup>	***	28.84±0.36 <sup>ax</sup>	21.43±0.51 <sup>by</sup>	25.83±0.84 <sup>ay</sup>	***	27.68±0.51 <sup>bx</sup>	19.10±0.29 <sup>y</sup>	22.26±0.48 <sup>ay</sup>	***
	21	27.13±0.57 <sup>ax</sup>	23.96±0.76 <sup>ay</sup>	19.21±0.43 <sup>bz</sup>	***	27.27±0.62 <sup>abx</sup>	17.83±0.62 <sup>cz</sup>	20.19±0.36 <sup>by</sup>	***	29.55±0.45 <sup>ax</sup>	19.08±0.29 <sup>y</sup>	19.86±0.32 <sup>by</sup>	***
<i>p</i> -Time		***	***	***		*	***	***		***	NS	***	

Results are shown as mean ± standard error of mean (SEM). Means with different superscripts a–c in a column for a given parameter differ significantly within storage time ( $p < 0.05$ ). Means with different superscripts x–z in a row for a given muscle differ significantly within storage methods ( $p < 0.05$ ). *p*-Time, effect of time within method; *p*-Method, effect of method within time; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ; NS, non-significant (one-way ANOVA).

**Table S3.** Contents of thiobarbituric acid reactive substances (TBARS) and protein carbonyls in muscles *longissimus thoracis et lumborum* (LTL), *biceps femoris* (BF) and *vastus lateralis* (VL) of roe deer during storage under modified atmosphere (MAP), dry (DRY-AGED) and vacuum (VAC) ageing.

Parameter	Storage time (day)	LTL				BF				VL			
		MAP	DRY-AGED	VAC	<i>p</i> -Method	MAP	DRY-AGED	VAC	<i>p</i> -Method	MAP	DRY-AGED	VAC	<i>p</i> -Method
TBARS content (mg MDA/kg)	0	0.44±0.01 <sup>c</sup>	0.44±0.01 <sup>c</sup>	0.44±0.01 <sup>b</sup>	NS	0.47±0.01 <sup>c</sup>	0.47±0.01 <sup>c</sup>	0.47±0.01 <sup>b</sup>	NS	0.46±0.01 <sup>c</sup>	0.46±0.01 <sup>b</sup>	0.46±0.01 <sup>b</sup>	NS
	7	1.38±0.06 <sup>bx</sup>	0.68±0.02 <sup>by</sup>	0.64±0.03 <sup>ay</sup>	***	1.69±0.05 <sup>bx</sup>	0.74±0.01 <sup>by</sup>	0.68±0.02 <sup>ay</sup>	***	1.44±0.06 <sup>bx</sup>	0.65±0.01 <sup>by</sup>	0.68±0.01 <sup>ay</sup>	***
	21	6.07±0.13 <sup>ax</sup>	1.06±0.04 <sup>ay</sup>	0.56±0.03 <sup>az</sup>	***	7.07±0.15 <sup>ax</sup>	1.30±0.03 <sup>ay</sup>	0.52±0.03 <sup>bz</sup>	***	5.54±0.12 <sup>ax</sup>	1.14±0.09 <sup>ay</sup>	0.52±0.03 <sup>bz</sup>	***
<i>p</i> -Time		***	***	***		***	***	***		***	***	***	
Protein carbonyl content (nmol/mg protein)	0	0.42±0.02 <sup>c</sup>	0.42±0.02 <sup>b</sup>	0.42±0.02 <sup>a</sup>	NS	0.39±0.01 <sup>c</sup>	0.39 <sup>c</sup> ± 0.01	0.39±0.01 <sup>a</sup>	NS	0.46±0.01 <sup>c</sup>	0.46±0.01 <sup>b</sup>	0.46±0.01 <sup>a</sup>	NS
	7	0.49±0.01 <sup>by</sup>	0.67±0.02 <sup>ax</sup>	0.34±0.01 <sup>bz</sup>	***	0.59±0.01 <sup>by</sup>	0.69 <sup>bx</sup> ± 0.01	0.34±0.01 <sup>bz</sup>	***	0.57±0.01 <sup>by</sup>	0.67±0.01 <sup>ax</sup>	0.33±0.01 <sup>bz</sup>	***
	21	0.93±0.02 <sup>ax</sup>	0.69±0.01 <sup>ay</sup>	0.26±0.02 <sup>cz</sup>	***	0.94±0.02 <sup>ax</sup>	0.77 <sup>ay</sup> ± 0.01	0.21±0.02 <sup>cz</sup>	***	0.82±0.03 <sup>ax</sup>	0.70±0.01 <sup>ay</sup>	0.24±0.02 <sup>cz</sup>	***
<i>p</i> -Time		***	***	***		***	***	***		***	***	***	

Results are shown as mean ± standard error of mean (SEM). Means with different superscripts a–c in a column for a given parameter differ significantly within storage time ( $p < 0.05$ ). Means with different superscripts x–z in a row for a given muscle differ significantly within storage methods ( $p < 0.05$ ). *p*-Time, effect of time within method; *p*-Method, effect of method within time; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ; NS, non-significant (one-way ANOVA). MDA, malonic dialdehyde.