EFFECT OF BOER GOAT AGE ON MEAT QUALITY

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I. OBJECTIVES

With the growing recognition of goat meat in western countries, research needs to be prioritized on factors affecting the goat meat quality from processing conditions needs to be prioritized. The main objective of this study was to document the pH-temperature decline in postmortem *M. longissimus* of young and adult Boers slaughtered and processed under commercial processing conditions in Australia. Effects of slaughter age and aging period on tenderness and cooking loss in Boer goat meat was assessed.

II. MATERIALS AND METHODS

Twenty-four farmed Boer goats (12 young goats of 6–9 mo,12 adult goats of 2 y), sourced from Myrrhee Farm, Victoria, Australia, were transported to Cedar Meats, Brooklyn, Australia, for 2.5 h, kept in lairage overnight, and slaughtered the next morning following the standard slaughter protocol (Halal) of the commercial abattoir in Victoria, Australia, without stimulation. Both postmortem pH and temperature of *M. longissimus* muscles were recorded repeatedly from 30 min post-slaughter every 8 h and then at 24 h. Grams of fat was measured (total tissue depth over the 12th rib, 110 mm from the midline) using GR knife. The *M. longissimus thoracis et lumborum* samples designated into 2 aging periods (1 d and 14 d), cooked to internal temperature of 70°C, was used for Warner-Bratzler shear force (WBSF) and hardness. A total of 5 measurements were taken for each sample and presented as means for WBSF and hardness. Glycogen was estimated in the samples collected 5 min after slaughter using assay kit (MAC016A, Sigma-Aldrich, St. Louis, MO). Carcass and meat quality traits were analyzed using restricted maximum likelihood with GenStat using linear mixed model (16th Edition, VSN International Ltd., Hemel Hempstead, UK).

Traits	**Adult Goats**		**Young Goats**		**Age**	
Live weight (kg)	45.8 ± 1.19		29.0 ± 1.19		**	
HCW (kg)	18.9 ± 0.52		11.3 ± 0.52		**	
GR fat depth (mm)	5.5 ± 0.40		3.7 ± 0.40		**	
pH@Temp18	6.7 ± 0.04		7.1 ± 0.04		**	
pH_{24}	5.8 ± 0.06		6.13 ± 0.06		**	
Glycogen (µmol/g)	27.4 ± 2.58		11.6 ± 2.58		**	
	1 d	14 d	1 d	14 d	Age	Aging
WBSF (kg)	7.1 ± 0.29	4.1 ± 0.29	6.21 ± 0.29	4.1 ± 0.29	NS	**
Hardness (N)	47.8 ± 1.87	39.2 ± 1.87	39.2 ± 1.87	37.8 ± 1.87	*	NS

- **P < 0.01.
- *P < 0.05.
- 1 d, 1-d aged; 14 d, 14-d aged; HCW, hot carcass weight; NS non-significant.

III. RESULTS

The GR fat depth was significantly higher ($P < 0.01$) in old goats (Table 1). The pH declined rapidly in both goat groups, with a faster decline in young goats (Figure 1). The ultimate pH (pH_{24}) of young goat meat was significantly ($P < 0.01$) higher compared to adult goats. The predicted pH @Temp18 was above 6 for both groups, with significantly ($P < 0.01$) higher value in young goats (Table 1). An optimal pH-temperature window for eating quality has been defined as 18°C–35°C. Postmortem aging of meat for 14 d significantly ($P < 0.01$) reduced WBSF in both age groups. Muscle glycogen concentration at slaughter was lower than optimum concentration in both age groups, with a significantly ($P < 0.01$) lower level in young goat meat compared to that of the adults.

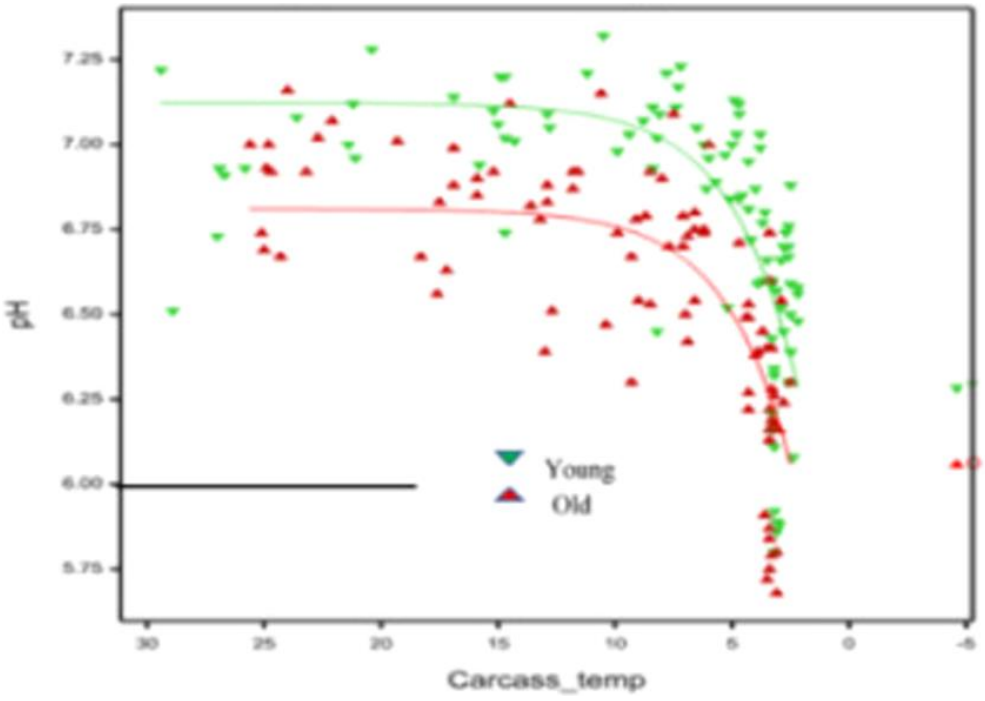

Figure 1.
Lines of best fit based on pH and temperature for young (green) versus old (red) goats with the 'ideal' pH/temperature window shown as the solid black line (pH/temperature window defined as temperature at pH 6 in the M. *longissimus* <35°C and >12°C.

IV. CONCLUSION

Results show toughness in goat meat irrespective of age. However, results highlight the potential of aging to enhance goat meat tenderness in both age groups. This reinforces the need for further research to better understand the goat meat supply chain in Australia to develop meat quality standards for goat meat similar to Meat Standards Australia.

Keywords: glycogen, goat, pH decline, toughness