CHARACTERISATION OF POST-MORTEM PH EVOLUTION IN BOTUCATU RABBIT CARCASSES OF DIFFERENT CATEGORIES

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I. INTRODUCTION

Rabbit breed, age, sex and live weight at slaughter influence muscle acidification in early post-mortem stages [1]. Paradoxically, few studies have traced the muscle pH curve over the first 24 h post-mortem in the rabbit meat industry, focusing more on lab trials [2,3] and not on meat production. It is the case of Botucatu rabbits, a genetic group originated from Norfolk 2000 hybrid rabbits [4], which has been successfully implemented in Brazil's rabbit farms in recent years, showing good results in performance, but in need of new researches focusing on carcass traits and meat quality. Thus, in order to improve the standardisation of rabbit meat research and comprehend the acidification kinetics of the main cuts available in the market, the present study sought to characterize the pH evolution in the first 24h post-mortem of male and female Botucatu rabbits slaughtered under industrial conditions at different ages.

II. MATERIALS AND METHODS

A total of 80 carcasses from Botucatu rabbits of different categories were collected in commercial abattoir and assigned into four groups: fattening females and males at conventional slaughter age (90 days), bucks and does (12 mo of age) [n=20/category]. Rabbits were stunned by electronarcosis, 110V, 60Hz, 1.40A, 3 secs, meeting the recommendations of the Council Regulation [5]. Hot carcasses were stored in cold room, at 4°C. Then, pH was taken every 60 min on the left side of carcasses by using a digital pH meter (Testo - model 205), inserted in the *longissimus lumborum* (LL), at the height of the 5th lumbar vertebra, and in the *biceps femoris* (BF), through the inner thigh [6], along the 24h post-mortem.

III. RESULTS AND DISCUSSION

Significative differences were observed over the first 24h post-mortem for all evaluated categories and muscles. Initial pH (0h) ranged from 6.52 to 6.80, dropping abruptly until its stabilisation at 5h in LL of young animals and bucks ($pH_{90d\ female}$: 5.90; $pH_{90d\ male}$: 6.10; $pH_{12mo\ buck}$: 6.04) and at 6h in LL of adult females ($pH_{12mo\ doe}$: 6.18). BF pH stabilized earlier, at 4 h post-mortem, for all categories ($pH_{90d\ females}$: 6.24; $pH_{90d\ males}$: 6.29; $pH_{12mo\ does}$: 6.28; $pH_{12mo\ bucks}$: 6.38), presenting higher values than LL. From then on, although stable, pH showed subtle and continuous decline until the end of the 24h post-mortem. pH values were higher ($P<0.05$) at 0h and 1h in LL and BF for females. For males [lighter category], the highest value ($P<0.05$) was registered at 0h for both muscles and ages, as indicative that animal weight can negatively influences the energy reserve in muscle tissues. Early pH stability achieved by BF in the first 4h, demonstrates that muscle acidification occurred with less intensity in BF, once it is a muscle with slow contraction, high levels of oxidative metabolism and low glycolytic potential, therefore, less acidic [1,7]. After slaughter, consumption of glycolytic reserves continues until the ATP molecules of the muscles are depleted, which translates into pH decreasing due to the accumulation of lactic acid and H^+ resulting from the breakdown of glycogen. Results can be seen in Table 1.

Tabel 1. pH evolution during the first 24h post-mortem in *longissimus lumborum* and *biceps femoris* muscles of male and female Botucatu rabbits slaughtered at different ages.

Time post-mortem	pH							
	Longissimus lumborum				*Biceps femoris*			
	3 months old		12 months old		3 months old		12 months old	
	Female	Male	Female	Male	Female	Male	Female	Male
0h	6.52^{A}	6.74^{A}	6.70^{A}	6.63^{A}	6.74^{A}	6.80^{A}	6.76^{A}	6.74^{A}
1h	6.48^{A}	6.43^{B}	6.68^{A}	6.33^{AB}	6.61^{A}	6.62^{AB}	6.67^{A}	6.54^{AB}
2h	6.32^{ABC}	6.34^{BC}	6.51^{AB}	6.17^{BC}	6.43^{B}	6.41^{BC}	6.51^{B}	6.45^{BC}
3h	6.20^{BC}	6.30^{BCD}	6.39^{BC}	6.13^{BC}	6.32^{BC}	6.32^{BC}	6.33^{C}	6.41^{BC}
4h	6.00^{CD}	6.15^{BCDE}	6.31^{BCD}	6.07^{BC}	6.24^{CD}	6.29^{C}	6.28^{CD}	6.38^{BCD}
5h	5.90^{DE}	6.10^{CDE}	6.25^{BCD}	6.04^{C}	6.24^{CD}	6.28^{C}	6.28^{CD}	6.35^{BCD}
6h	5.89^{DE}	6.09^{CDE}	6.18^{CD}	6.05^{C}	6.23^{CDE}	6.21^{C}	6.27^{CD}	6.29^{BCD}
7h	5.89^{DE}	6.08^{CDE}	6.18^{CD}	6.02^{C}	6.17^{DEFG}	6.21^{C}	6.27^{CD}	6.28^{CD}
8h	5.89^{DE}	6.07^{CDE}	6.17^{CD}	6.01^{C}	6.13^{DEFG}	6.19^{C}	6.27^{CD}	6.25^{CD}
9h	5.89^{DE}	6.05^{CDE}	6.18^{CD}	6.01^{C}	6.10^{FG}	6.19^{C}	6.27^{CD}	6.25^{CD}
10h	5.89^{DE}	6.04^{DE}	6.17^{CD}	5.98^{C}	6.10^{FG}	6.19^{C}	6.27^{CD}	6.25^{CD}
11h	5.88^{DE}	6.04^{DE}	6.16^{CD}	5.98^{C}	6.09^{G}	6.19^{C}	6.24^{CD}	6.25^{CD}
12h	5.88^{DE}	6.04^{DE}	6.17^{CD}	5.98^{C}	6.09^{G}	6.19^{C}	6.24^{CD}	6.25^{CD}
13h	5.88^{DE}	6.04^{DE}	6.17^{CD}	5.98^{C}	6.09^{G}	6.19^{C}	6.24^{CD}	6.25^{CD}
14h	5.89^{DE}	6.03^{DE}	6.16^{D}	5.97^{C}	6.09^{G}	6.18^{C}	6.24^{CD}	6.24^{CD}
15h	5.88^{DE}	6.03^{DE}	6.16^{D}	5.93^{C}	6.08^{G}	6.18^{C}	6.28^{CD}	6.24^{CD}
16h	5.88^{DE}	6.03^{DE}	6.12^{D}	5.92^{C}	6.08^{G}	6.18^{C}	6.23^{CD}	6.24^{CD}
17h	5.89^{DE}	6.01^{DE}	6.12^{D}	5.92^{C}	6.07^{G}	6.18^{C}	6.21^{CD}	6.24^{CD}
18h	5.88^{DE}	6.01^{DE}	6.12^{D}	5.91^{C}	6.06^{G}	6.17^{C}	6.20^{CD}	6.23^{CD}
19h	5.88^{DE}	5.99^{E}	6.11^{D}	5.92^{C}	6.07^{G}	6.14^{C}	6.20^{CD}	6.19^{D}
20h	5.87^{DE}	5.98^{E}	6.10^{D}	5.92^{C}	6.06^{G}	6.14^{C}	6.20^{CD}	6.19^{D}
21h	5.84^{DE}	5.98^{E}	6.10^{D}	5.91^{C}	6.06^{G}	6.14^{C}	6.16^{D}	6.19^{D}
22h	5.80^{DE}	5.98^{E}	6.10^{D}	5.91^{C}	6.06^{G}	6.13^{C}	6.16^{D}	6.17^{D}
23h	5.80^{DE}	5.98^{E}	6.10^{D}	5.90^{C}	6.06^{G}	6.13^{C}	6.16^{D}	6.17^{D}
24h	5.77^{E}	5.97^{E}	6.10^{D}	5.93^{C}	6.06^{G}	6.13^{C}	6.17^{D}	6.17^{D}
SEM	0.02	0.03	0.02	0.03	0.01	0.04	0.01	0.02
P - value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

$^{A-G}$ Means followed by distinct letters within a column differ significantly at $P < 0.05$; SEM: standard error of the mean

IV. CONCLUSION

The muscle pH stabilisation in Botucatu rabbit carcasses entirely occurs at 5h post-mortem for young rabbits and bucks and at 6h post-mortem for does, under a storage temperature of 4ºC, so the transformation of muscle into meat may proceed efficiently throughout the whole carcass.

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