

Post Mortem Observations on Beef pH and Temperature in Timor-Lesté

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Cattle are slaughtered in Timor-Lesté between 2:00 am and 4:00 am in simple local abattoirs with minimal facilities and beef is sold in traditional wet markets within 12 hours. Hygiene during the slaughtering process and marketing chain is poor (Copland, pers com). Cattle that have been well cared for prior to slaughter have adequate muscle glycogen which is converted to lactic acid after slaughter, causing a gradual decline in pH to a desirable level of less than 5.7. However, Cattle that are stressed prior to slaughter have a high muscle pH, resulting in poor quality meat (Meat and Livestock Corporation 2003). This paper reports on the post mortem measurements of pH and temperature as indicators of beef quality.

Observations on muscle pH and temperature were made on samples collected from 30 cattle slaughtered at each of the district centers of Baucau, Maliana, and Dili, Timor-Lesté between May and July 2005. Measurements were made at 0, 1, 2, 3, 4, 6, 9 and 12 hours after slaughter using standard techniques with an Ionode IJ48F® pH meter electrode and digital meat thermometer. Results are presented in Table 1.

Table 1. Mean pH and temperature (C) of beef samples at various times post slaughter. N = 30 for each district.

District	Baucau				Maliana				Dili			
Hours after slaughter	Mean pH	SD	Mean Temp. (C)	SD	Mean pH	SD	Mean Temp. (C)	SD	Mean pH	SD	Mean Temp. (C)	SD
0.00	6.73	0.17	28.00	1.98	6.74	0.19	28.20	1.77	7.00	0.09	28.27	2.02
1.00	6.63	0.15	26.37	1.92	6.67	0.16	26.90	1.88	6.86	0.17	28.10	0.96
2.00	6.56	0.15	27.87	2.37	6.57	0.16	27.90	1.47	6.72	0.20	28.07	1.05
3.00	6.46	0.13	26.40	2.36	6.45	0.18	26.73	2.72	6.54	0.20	28.77	1.17
4.00	6.39	0.12	27.80	2.23	6.33	0.18	29.03	1.99	6.34	0.27	30.07	1.17
6.00	5.73	0.16	28.33	1.49	5.78	0.09	29.23	1.65	5.80	0.20	30.00	1.55
9.00	5.62	0.15	27.40	2.59	5.61	0.11	28.87	2.54	5.60	0.21	29.80	2.54
12.00	5.52	0.23	26.73	2.30	5.43	0.09	26.70	2.05	5.24	0.14	27.23	1.38

The regressions of pH on time (h) for Baucau, Maliana, and Dili were $\text{pH} = 6.833 - h \times 0.114$; $\text{pH} = 6.757 - h \times 0.121$; and $\text{pH} = 6.971 - h \times 0.153$ respectively. In each case $p < 0.0001$, and the R^2 was > 0.91 . Those for meat temperatures (C^0) after slaughter (h) for Baucau, Maliana, and Dili were $C^0 = 27.5 \times -0.0021h$, $C^0 = 27.92 + 0.005 h$, and $C^0 = 28.7 + .006 h$ respectively. Temperatures after slaughter were not significantly related to time ($p > 0.58$) at any site, possibly due to the high ambient temperature.

These results indicate that muscle glycogen was adequate at the time of slaughter and the pH declined to a satisfactory level post mortem (Warriss 1990). It is therefore concluded that animal treatment prior to slaughter was not the major factor contributing to poor quality meat sold in Timor-Lesté. Meat quality may be improved by slaughtering younger animals, preventing contamination during slaughtering process and refrigeration. This project was funded by the Australian Centre for International Agricultural Research, project LPS/2003/004 .

Meat and Livestock Australia (2003) "The effect of pH on beef eating quality" in Meat Standards Australia beef information kit, Published by Meat & Livestock Australia Limited ,ISBN: 1 74036 505 4.

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