

Lactic acid and glycogen contents, pH and meat quality of Iberian pig: effect of rearing system

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Abstract – Forty-three Iberian pigs were raised under four rearing systems and the pH, glycogen (GLY) and lactic acid (LA) contents of *m. L. dorsi* at 45 min and 24 h were assayed. Meat quality, measured as water holding capacity (W.H.C.) and instrumental colour were analysed in *m. L. dorsi* at 24 h *post-mortem*. No significant effect of rearing system was found on the analysed parameters. In general, *m. L. dorsi* from Iberian pigs showed high values of pH_{24h} (~ 6.0, in 51% of the samples) and low CIE L* values ($L^* < 44$, in 100% of the samples). D.F.D. like condition ($pH_{24h} > 6.0$ & $WHC > 90$ & L^* -value < 44) was found in 23.3% of the samples. **Key Words** – meat acidification, W.H.C, colour, pork.

I. INTRODUCTION

Glycolysis induces the accumulation of lactate in muscle tissue in the postmortem period causing a rapid decline in muscle pH and affect ultimate pork quality. The aim of this work is to investigate the effect of four rearing systems of Iberian pigs on pH, [LA], [GLY] at 45 min and 24 h *post-mortem* of *m. L. dorsi* and the effects on meat quality.

II. MATERIALS AND METHODS

Pure Iberian pigs (n: 43) were randomly allotted in four batches corresponding to four different rearing systems: 1. Intensive and fed on concentrate 2. Intensive and fed on concentrate supplemented with 200 ppm acetate of alpha-tocopherol, 3. Free-range fed on concentrate and 4. Free-range fed on acorns and grass. Pigs were slaughtered at ~160 kg l.w. At 45 minutes and 24 h *post-mortem* *m. L. dorsi* were sampled and the pH, LA [1], GLY contents [2] were assayed. At 24 h *post-mortem*, W.H.C. [3] and instrumental colour [4] were determined. ANOVA was used to evaluate the differences between rearing systems.

III. RESULTS AND DISCUSSION

Rearing system did not affect the pH values at 45 min and 24 h *post-mortem* of the *m. L. dorsi* (Figure 1). pH decline was very small or inexistent and values at 24 h *post-mortem* were ~ 6.0. [GLY] and [LA] at 45 min and 24 h did not exhibit significant differences between groups. *M. L. dorsi* [LA] increased at the same time that [GLY] decreased from 45 min to 24 h *post-mortem* (Figure 2).

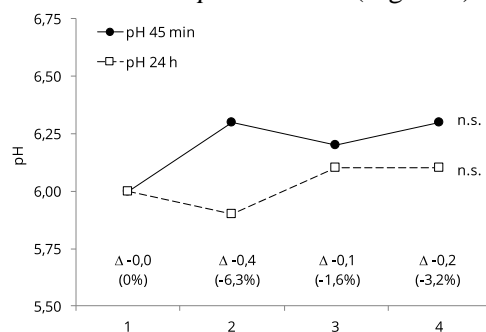


Figure 1. pH values at 45 min and 24 h *post-mortem* of the *m. L. dorsi* from pure Iberian pigs raised under four different rearing systems (1, 2, 3 and 4. See Materials and Methods section).

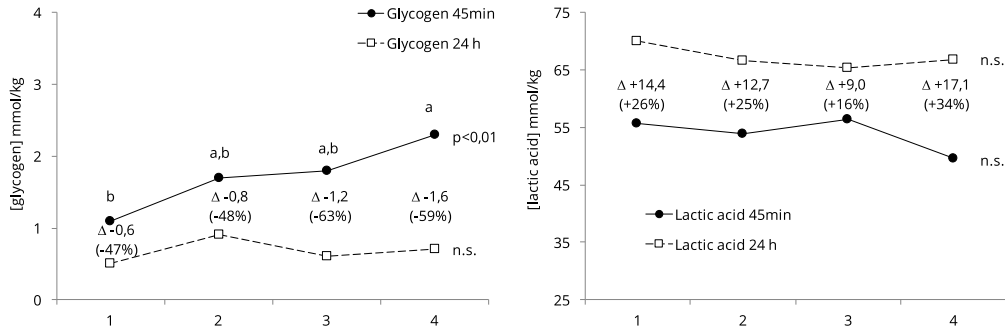


Figure 2. GLY (mmol/kg muscle) and LA (mmol/kg muscle) contents at 45 min and 24 h *post-mortem* of the *m. L. dorsi* from pure Iberian pigs raised under four different rearing systems.

Meat quality traits were not affected by rearing system, with the exception of CIE a* value that was significantly higher in free-range fed on acorns/grass than intensive+E-supp and free-range + concentrate feed (Table 1). Twenty three percent of the *m. L. dorsi* presented a D.F.D-like condition ($\text{pH}_{24\text{h}} > 6.0$ and $\text{W.H.C.} > 90$ and $\text{L}^*\text{-value} < 44$).

Table 1. $\text{pH}_{24\text{h}}$, water holding capacity and instrumental colour coordinates of the *m. L. dorsi*

	Intensive + concentrate	Intensive + E-supp (200ppm)	Free-range + concentrate	Free-range + acorn/grass	P
$\text{pH}_{24\text{h}}$	6.0 ± 0.24	5.9 ± 0.24	6.1 ± 0.26	6.1 ± 0.47	n.s.
W.H.C. (%)	88 ± 3.8	89 ± 2.6	89 ± 1.7	89 ± 2.3	n.s.
CIE L*	37.3 ± 3.44	37.1 ± 2.80	35.7 ± 2.71	37.2 ± 3.11	n.s.
CIE a*	$4.5 \text{ a,b} \pm 1.46$	$3.8 \text{ b} \pm 1.39$	$3.9 \text{ b} \pm 0.99$	$5.7 \text{ a} \pm 1.05$	**
D.F.D. like condition	27,3 %	9,1 %	27,3 %	30,0 %	Overall 23.3%

D.F.D. like condition: $\text{pH}_{24\text{h}} > 6.0$ & $\text{W.H.C.} > 90$ & $\text{L}^*\text{-value} < 44$. n.s.: not significant; **: $p < 0.01$. a,b: means with different letters indicate means are statistically different (Tukey's test, $p < 0.05$)

IV. CONCLUSION

Factors different to rearing system could have effect on *post-mortem* changes in *m. L. dorsi* from Iberian pigs that affect meat quality. In some animals, *m. L. dorsi* shows some characteristics that could be associated with problems of meat quality that could compromise the quality of fresh meat and dry-cured products.

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