

TPP 29 ¿La duración del ayuno pre-faena es determinante de la deshidratación en ganado para carne?

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Does the pre-slaughter fasting duration determine dehydration in beef cattle?

Introduction

Pre-slaughter stress evokes biochemical and physiological changes in cattle. One of these changes is dehydration, which magnitude depends on the intensity and duration of the fasting. Although cattle have free access to water in the waiting yards at the abattoir, not all of them would drink. The aim of this study was to evaluate the effect of different fasting durations (3h vs. 24h) on water consumption, blood parameters, liver and skin dry matter content, and urine pH in beef cattle.

Materials and Methods

Two-hundred and fifty Hereford by Angus cross steers, from INIA La Estanzuela/Uruguay, weighing $\sim 530 \pm 36.9$ kg and aged between 24 and 30 months, were evaluated. On the day before slaughter, cattle were weighed, and randomly allocated to one of two fasting duration (FD) treatment: long (FD24; n=25) and short (FD3; n=25) fasting time. The overall period of fasting for FD24 was 24h (9h at the farm + 1h of transport + 14h at the lairage) and for FD3 was 3h (1h of transport + 2h at the lairage). At the farm and during the 9 hours before transport, FD3 had access to food and water whereas FD24 steers only had access to water. This experiment was replicated five times between November 2018 and February 2019.

Water consumption was measured at the farm, using a tank with meter, and at the abattoir, using a plastic drinking bowl with scale. In both, the water supply was manual. Individual blood samples were collected immediately after throat cutting to measure haematocrit, as well as ions (Na^+ , K^+ , P^{3-} , and Cl^-) and metabolites (albumin, globulin, total proteins, and lactate dehydrogenase (LDH)) concentrations. Individual skin samples from the jaw and sub-samples from the papillary process of the liver were dried for 96h at 60°C to estimate dry matter percentage. Liver volume, using the Archimedes' principle (Vurdem et al., 2012), was measured using the other liver sub-sample. Urine pH was measured from individual urine aliquots taken directly from the bladder.

Each slaughter day, which was conducted in the same abattoir, was considered a block, and the animal group as an experimental unit, i.e. in total it was evaluated five slaughters (five blocks), each one with two treatments (FD3 and FD24) and 25 animals per experimental unit. The data were evaluated as a completely block randomized with two treatments using the General Lineal Model procedure of SAS 9.4 (SAS Institute Inc., Cary, NC, USA).

Results and Discussion

Steers from FD24 treatment had less ($p < 0.01$) total water consumption than FD3. Haematocrit, LDH, total protein, albumin, and globulin were higher ($p < 0.05$) in FD24 than FD3

steers (Table 1). Pre-slaughter management at the abattoir, characterised by novel and unfamiliar environment and noise, impaired the rehydration of the animals, which affected haematological parameters (Jarvis et al., 1996; Ferguson & Warner, 2008).

Table 1. Effect of fasting duration on physiological variables at the time of slaughter

Parameter	FD24	FD3	P value
Water consumption (liters)	8.79 \pm 1.63	35.2 \pm 1.63	<0.01
Haematocrit (%)	40.72 \pm 0.21	38.30 \pm 0.21	<0.01
LDH (U/l)	1,643.80 \pm 7.66	1,612.20 \pm 7.66	0.04
Total protein (g/dl)	8.38 \pm 0.04	7.82 \pm 0.04	<0.01
Albumin (g/dl)	1.26 \pm 0.01	1.19 \pm 0.01	0.02
Globulin (g/dl)	7.10 \pm 0.02	6.64 \pm 0.02	<0.01

FD24: long fasting duration; FD3: short fasting duration; LDH: lactate dehydrogenase

There was no effect ($p > 0.05$) of fasting duration on liver and skin measurements, as well as in urine pH. In agreement, Jones et al. (1990) highlighted that only following 48 h of fasting time can be observed some impact in body components.

Conclusions

Although the steers were not dehydrated, they failed to drink enough water during lairage, resulting in poorer haematological indicators. From this evidence, we can suggest that 24 h of fasting may be detrimental for animal welfare as the steers cannot recover at all.

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