LAIRAGE OVERNIGHT AT THE ABATTOIR – GOOD OR BAD?

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I. INTRODUCTION

Ongoing structural rationalizations have led to closure of Swedish abattoirs followed by prolonged journeys for slaughter livestock and a significantly increasing proportion of animals staying overnight at the abattoirs. In Sweden of today, about 25-70 % of the animals stand overnight at the medium sized and large abattoirs that slaughter a vast majority of the animals (Algers, pers. comm.). In the literature, some studies conclude that lairage time after transport potentially allows the animal to rest, renew muscle glycogen and reduce dehydration of body tissues and carcass weight loss [1]. Other authors suggest that the lairage environment itself may inhibit the ability of the animals to rest and recover from the feed and water restriction [2]. The discrepancies in these results indicate that more research is needed to further investigate the effects on slaughter animals under Swedish handling conditions. Hence, the aim of this study was to investigate whether lairage overnight at the abattoir lead to a reduction in animal welfare and meat quality compared to slaughter on the day of arrival.

II. MATERIALS AND METHODS

A total of 63 dairy steers were included. The aim was to send the animals to slaughter when they reached a live weight of 650 kg. As they varied in age, 24 animals went to slaughter before grazing while the remaining 39 went to slaughter after grazing in the autumn. However, the latter group was housed for at least four weeks before slaughter to ensure equal rumen filling. All animals were transported the same distance to the same abattoir. Once at the abattoir, half were slaughtered on the day of arrival and half the next day. In connection with bleeding, blood samples were taken for analysis of lactate, glucose and cortisol. Directly after slaughter, samples of *M. longissimus thoracis et lumborum* (LTL) were taken for measuring drip loss. Carcass pH and temperature were measured 24 h after slaughter. After cutting, samples of LTL were tenderized at 4°C for seven days and then stored at -28°C until analysis. Prior to analysis, the meat was thawed overnight at 4°C. Colour (L*, a*, b*), combined thawing and cooking loss and Warner-Bratlzer shear force (WBSF) were measured. Data were analysed with Proc Mixed in SAS [3].

III. RESULTS AND DISCUSSION

There was no difference in live weight between the groups, indicating that the groups were equivalent (Table 1). However, for the animals slaughtered in spring, the carcass weight was significantly lower for the overnight animals compared to the animals slaughtered on the day of arrival (Table 1). This led to a dressing % that was 1.2 % points lower for the overnight animals, which corresponds to about 8 kg based on the current live weights. However, a similar difference could not be seen for the animals slaughtered in the autumn (Table 1). A possible explanation for this may be that, despite higher live weight, they had a lower conformation than the animals slaughtered in the spring. They thus had a lower proportion of muscle, and a higher proportion of bone, on the carcass and consequently a lower proportion of the carcass that could potentially lose weight.

Overall, there was no difference in the concentration of lactate, glucose or cortisol between overnight animals and those slaughtered on the day of arrival (Table 1), suggesting that there was no difference in stress level between the animals that stayed overnight and those that did not. The concentrations of the stress parmeters were in parity with what has been seen in previous studies in connection with

slaughter [4]. Further, there was no difference in pH between the groups slaughtered in the spring, however, we could see a difference between the groups slaughtered in the autumn (Table 1) but both groups were within the desired range. We also could not see any difference in the colour of the meat between the groups (Table 1). The total fluid loss was the same for both groups slaughtered in the spring but higher for the overnight group among the animals slaughtered in the autumn. The higher fluid loss in the autumn overnight group may be due to physiological changes in protein structure. Despite no, or very small, differences in pH between the groups, we saw a significantly higher WBSF in meat from overnight animals regardless of whether they were slaughtered in spring or autumn. The fact that we saw such a large difference in tenderness despite no direct difference in pH is unexplained. A higher fluid loss also leads to a less tender meat, but the differences we saw here are not large enough to explain the large difference in tenderness.

Table 1 – Live weight, carcass characteristics and technological meat quality parameters of steers either slaughtered on the day of arrival or after one night in lairage.

	Spring slaughter			Autumn slaughter		
	No lairage	Lairage	Sign.	No lairage	Lairage	Sign.
n	*12*	*12*		*19*	*20*	
Live weight (kg)	644	635	ns	663	669	ns
Carcass weight (kg)	320	308	**	330	334	ns
Dressing (%)	49.6	48.4	*	49.8	49.9	ns
Confimation[2]	5.0	4.6	ns	4.3	4.1	ns
Fatness[3]	6.6	6.7	ns	7.4	7.3	ns
Lactate (mmol/L)	3.35	3.37	ns	3.74	4.11	ns
Glucose (mmol/L)	4.75	4.93	ns	4.02	4.88	***
Cortisol (nmol/L)	134	118	ns	128	111	ns
pH	5.76	5.61	ns	5.74	5.55	**
Drip loss (%)	1.86	1.26	**	1.75	1.60	ns
Lightness (L*)	26.2	25.6	ns	25.6	25.1	ns
Redness (a*)	14.2	14.1	ns	15.6	15.4	ns
Yellowness (b*)	14.1	14.6	ns	15.7	15.3	ns
Fluid loss (%)	26.5	26.6	ns	28.1	31.0	*
WBSF (N/cm^2)	59.7	91.2	**	44.5	76.6	***

IV. CONCLUSION

There were no differences in stress parameters between animals slaughtered on the day of arrival compared to those staying in lariage overnight. However, lairage led to a lower drip loss and significantly tougher meat.

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