

INDUCED RESPONSE OF SOME WELFARE INDICATORS IN SLAUGHTERED SHEEP

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SUMMARY

Our research has monitored how stressful inside slaughter handling, stunning and immediate slaughtering proves to be to the sheep in comparison to their transport as such.

Sheep within slaughterhouse environment have responded to stressful factors such as new spaces, unfamiliar handling personnel, other animals' presence and unknown smells by exhibiting an increase to the maximum in metabolic activity, attention alert and a change in behaviour. The physiological responses induced by these factors have been emphasized by an increase in the respiratory rate as well as variations in plasmatic cortisol, haematocrit and glucose levels in different moments of the study. The results revealed the fact that electric stunning and slaughtering were more stressful than their manhandling in the slaughterhouse.

Keywords: sheep welfare, stress, slaughter

INTRODUCTION

According to the valid legislation, the conditions that must be provided for animals, which are to be slaughtered in the period previous to their slaughtering touch, transport means: loading and unloading, transport, feeding and watering before slaughtering, animal handling in the slaughterhouse and stunning. Sheep handling during transport is widely acknowledged as a stressful manoeuvre especially at loading and unloading times onto and out of transport means. Animal movement down the handling lanes may be just as stressful as it is not conducted gently. The manner in which animals to be slaughtered is handled during transport and the waiting period prior to their slaughtering is characteristic of the ethical standards men display in connection with animals.

An appropriate stunning method and bleeding time in the slaughterhouse decrease animal stress. This fact was underlined by Gregory et al. (1984), who, followed research states that electric stunning at head level in sheep is reversible if slaughtering does not happen immediately and their welfare is poor. Sheep stress prior to stunning is also emphasized by Anil et al. that following his research in 1996 states: sheep that witness other animals' stunned are much more stressed than the latter, data confirmed by our research.

MATERIALS AND METHODS

Research was conducted on 18 adult sheep (n: 18, of Țurcană and Țigaie breed), male and female with an average weight of 47 kg, divided into groups A and B which were moved from the waiting paddock to slaughterhouse on the handling lane in order to be stunned and then slaughtered. The slaughtering interval between the groups was 30 minutes during which the group B sheep were stationed in the waiting paddock.

The sheep included in the study were identified, clinically examined, and each had an intravenous catheter inserted, which was kept until after stunning. All manoeuvres were completed two hours prior to the stunning and measurements were taken in the waiting box, handling lane, immediately after stunning and after slaughtering. Blood samples were taken in the waiting box, on the handling lane prior to stunning, immediately after that and 3 minutes after bleeding. The blood samples were then analyzed in the laboratory and the variation in plasmatic cortisol level (by means of RIA method), haematocrit (by means of the electronically method ABCVet) glucose (by means of a portable glucometer).

Sheep were introduced in the waiting box by ten and then were weighed and handled one by one towards the stunning area. The stunning was carried out by means of an electric stunner placed behind the sheep's ears, after which the animals were hooked and bled for 15 –20 seconds. The heart rate was measured with a Polar monitor in the waiting box, prior to stunning and immediately after bleeding.

RESULTS AND DISCUSSION

The fact that metabolic stress during transport is lengthy was also confirmed by Knowles et al. (1995) and stated in our previous research. This is due to the emotional stress, deprivation of fodder and water and last but not least animal movement. Man-handling of lambs during the first 10 days of their life studied by Markowitz et al. (1998), resulted in their getting used to the people as they grew up. Moreover, sheep are able to distinguish between their caretakers, who have a calming effect on them at stressful times, and strangers, aspect shown by Boivin et al. (1997).

The abnormal reactivity of the heart rate is characteristic of the chronic stress responses, by autonomous nervous system stimulation (Wiepkema and Koolhaas 1993).

In the sheep studied, the heart rate values showed a variable evolution (figure 1) from the waiting box until after the bleeding period with the first group monitored (A). Since these animals had already been used to handling during transport, this manoeuvre was no longer regarded as stressful inside the slaughterhouse. The stress was signalled only prior to stunning time on the handling lane towards the stunning box. As far as the second group (B) was concerned, where the time until stunned was 30 minutes, the heart rate recorded higher values only in the waiting box due to the sheep agitation on the handling lane, moment after which the values were similar to those of the first group until after the slaughtering. There was no obvious tachycardia recorded such as the case of their transport, especially when loading and unloading.

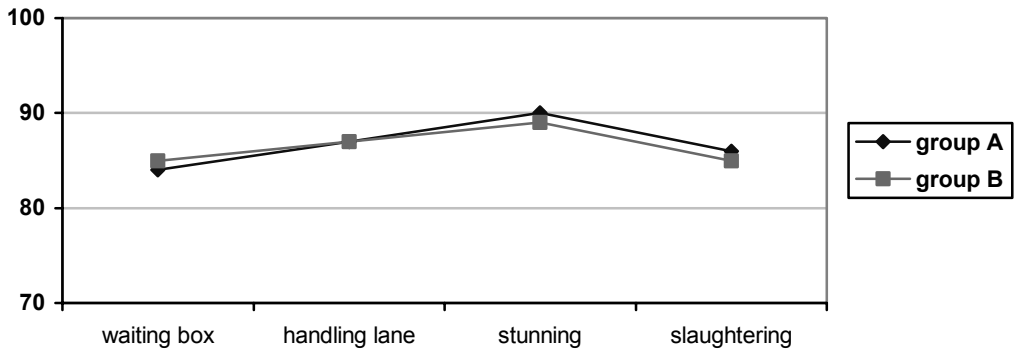


Figure 1. Heart rate evolution (bpm) recorded in sheep (n: 18) during their handling inside the slaughterhouse

The level of biochemical indicators in animal welfare varied at analyzed times, enabling us to evaluate sheep stress inside the slaughterhouse.

By studying the responses to various stress factors in adult sheep we were able to point out that if we take a sheep out of the flock, the emotional condition created will lead to a slight increase in the haematocrit. In the case at hand the haematocrit recorded a higher increase during stunning and bleeding than the sheep handling moment (figure 2) for group A, whereas for those in group B the level was lower during waiting time after which had a significant rise during stunning and slaughtering. This was due to the effect the catecholamine induce on the spleen under stress. There is a rise in sympathetic – adrenergic activity that stimulates the spleen contraction.

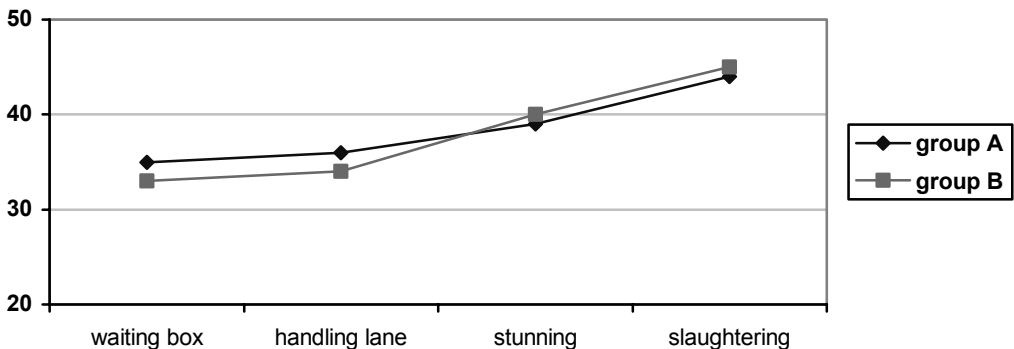


Figure 2. The hematocrit level (%) recorded in sheep (n: 18) monitored by this study

Propionate is one of the volatile fatty acids produced in the rumen and it is transported to the liver and turned into glucose and oxaloacetate; part of the metabolic energy will be obtained by oxidation of the acetate while another part will be deposited in glucose. This will be later used as an energy source until the existing hepatic glycogen stock is exhausted.

The level of glucose in our research recorded slight variations (figure 3) while staying within the species limits in the waiting box and the handling lane, both for sheep in group A, and those in group B. During stunning and slaughtering, the sheep exposed to stress factor responded by an increase in plasmatic glucose levels as a result of the catecholamine action.

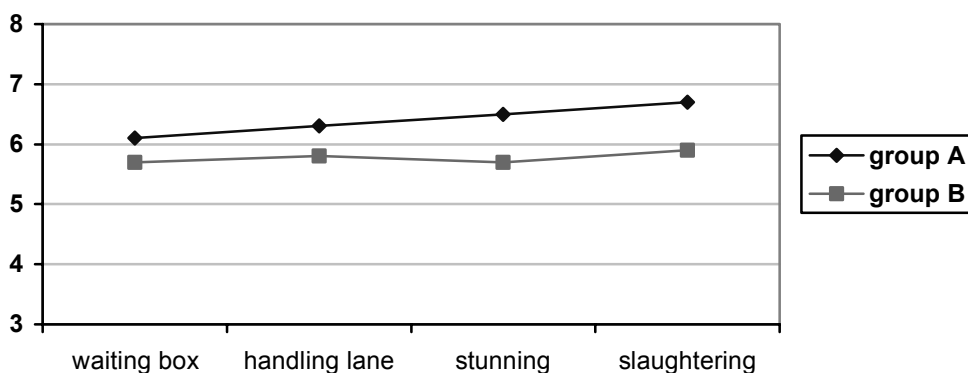


Figure 3. The glucose level (mmol/l) recorded in sheep (n: 18) monitored by this study

Another welfare indicator monitored in our study was the plasmatic cortisol whose level was higher than normal for this species during the three monitored moments for both groups (picture 4). There was a significant increase in the sheep that were first stunned and then bled. This was due to the response to the stress stimulus during electric stunning as a result of the direct stimulation of the neuroendocrine nervous system.

The stress increases the adrenal glands' ability to produce glucocorticoids which results in a stronger response to acute stressful factors in chronically stressed animals (Jensen et al.1996; Terlouw et al. 1997). HPA axis responds to long-term stress in sheep, which involves changes in control systems such as plasmatic cortisol level. This may recover or drop below pre-stress levels simultaneously with an increased pituitary-corticoadrenal response to additional physiological stress factors.

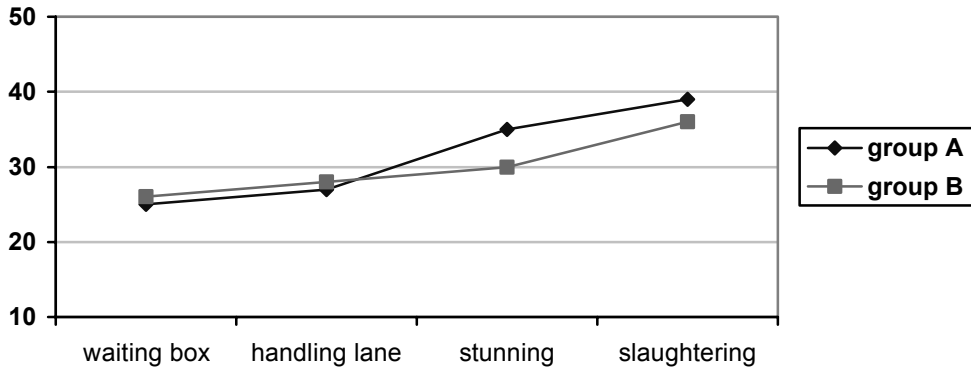


Figure 4. The plasmatic cortisol level ($\mu\text{g/dl}$) recorded in sheep (n: 18) monitored by this study

CONCLUSIONS

The increase in some welfare indicators monitored during certain situations was due to the sheep's vocal communication through alarm calling destined to alert the congeners. Thus the increase of the heart rate in sheep that spent longer in the waiting box could be due to these alert callings but also to the agitation following the handling and weighing manoeuvres of the animals destined to be stunned.

Although we did not set out to monitor the sheep's conduct, they reacted vocally both in the waiting box and on the handling lane and some of the animals even showed fear before stunning.

Our research has also shown that sheep handling inside the slaughterhouse is a manoeuvre less stressful than their transport, once the animals are already used to these operations. The most important stressful factor consisted of the sheep electrical stunning and slaughtering, which was indicated by the constant rise in biochemical indicators and plasmatic cortisol levels.

The time spent by the sheep in the waiting box until stunning did not influence the variation in indicators monitored at the stunning and slaughtering time. In addition, sheep that were stunned at a 30-minute interval did not display different responses to stress factors from the former even if they witnessed some of the manoeuvres.

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