

Animal welfare issues in the slaughter of cattle

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Introduction

Consumers of animal products, including beef, have become more aware and concerned about the animal welfare issues involved in its production. Consequently European supermarket chains have started auditing their meat suppliers slaughter practices (Grandin, 2000). Similarly large fast food companies have also conducted such audits on their suppliers (Grandin, 2000, 2001, Nolen and 2001). These audits, along with other studies prompted by animal welfare concerns have provided us with assessments of current methods of production and possible improvements to these. This essay will concentrate on the critical analysis and comparison of three studies on issues relating to slaughter.

Discussion

Study 1 (Grandin, 2000) aimed to assess the slaughter and handling practices through measuring three variables considered important in the welfare of cattle slaughter. These were first shot stunning efficacy, insensibility on the bleed rail and vocalisation of cattle being handled within the slaughter house. Similarly, Study 2 (Grandin, 2001) aimed to gauge the influence that several equipment issues and handling practices have on vocalisation and hence animal welfare (Grandin 2000, 2001, Stookey and Watts, 1999). Study 3 (Gregory, Parkman, Whittington and Wotton, 2000) aimed to find the minimum current required to induce an effective stun when applied for less than one second. It also aimed to study and time the stages of recovery after such a stun.

Studies 1 and 2 were audits performed on existing slaughter houses and aimed to be as objective as possible. In Study 1. this was achieved by giving a 'yes' or 'no' result for first shot stunning efficacy, insensibility on the bleed rail and vocalisation during handling and stunning. Similarly, in Study 2 a 'yes' or 'no' result was given for vocalisation. Electric prod use was graded as no electric prods, electric prods used or electric pods used on >95% of cattle. In Study 2 improvements were made and vocalisation scores remeasured in five slaughter houses that the author perceived to have potential areas to reduce vocalisation. These improvements were: reduced electric prod voltage, reduced pressure applied by head restraint and initiatives to facilitate cattle movement and hence reduce electric prod use such as improved lighting at entrance to restraint device, installing a false floor under conveyor restrainers to reduce the "visual cliff effect"² and in one plant a combination of improvements to a conveyer restrainer. Conversely, Study 3 used more subjective assessment of the onset of the tonic, clonic, rhythmic breathing and standing stages during recovery from a less than one second stun.

Study 1 found that the mean first shot stunning efficacy of audited plants was 94.3%. It found that 91% of plants rendered 100% of cattle insensible on the bleed rail. To pass the audit, plants had to have vocalisation scores of <3%. This was achieved by 86% of plants and the mean vocalisation score was 3.08%. However, in Study 2 only 67% of plants had vocalisation scores <3%. Of these, only 8% had observable equipment problems. Thirty-three percent of plants had vocalisations >3%, of these 68% had observable equipment problems. When improvements were made to the five plants, vocalisation score dropped from >7% for each plant to <2%. The average vocalisation score of these plants dropped from 12.8% to 0.8%. Vocalisation scores were significantly elevated in plants using V conveyer restrainers compared with centre track conveyers. Vocalisation was significantly elevated in plants that that used electric prods on >95% of cattle compared with those that did not use them. There was no significant difference in vocalisation scores of plants with different line speeds. Study 3

found that when applied for a mean of 0.75 seconds, a nose to yoke stun of at least 1.15A was required for an effective stun. It also found that the average time to the end of the tonic phase in an effectively stunned animal was 12 seconds, clonic phase was 43 seconds, rhythmic breathing 52 seconds and overt awareness 95 seconds.

Study 1 showed that stunning efficacy is increased and incidences of sensibility on the bleed rail are decreased by properly maintaining equipment, especially stunners, and having adequate staff numbers and training. It also showed that animal welfare in slaughter houses has been much improved since a similar study in 1996 (Grandin, 1996). Both Studies 1. and 2. showed vocalisation to be lower in plants that used minimal electric prodding with correct intensity shocks. Where the visual cliff effect was eliminated and correct lighting was used, cattle moved freely into the stunning restraints. Hence, electric prods were not as necessary even with line speeds >390 cattle/h. Consequently vocalisation was reduced. In Study 2 the comparison between conveyer restraints was biased as all but one centre track conveyer restrainer had a false floor whereas only one V conveyer restrainer did. Avoiding the use of inappropriate head restraints, stunning boxes with sharp edges and also eliminating problems such as cattle left isolated too long in stunning boxes, drafts blowing in animals' faces, sparkling reflections off wet floors, dangling chain ends and moving equipment visible to cattle can all reduce vocalisation (Grandin, 2000 and 2001). Despite Study 3's findings, one of the stuns at this current was ineffective indicating greater currents or duration are required to ensure effective stuns. This study emphasises the importance for animal welfare of minimising time between stunning and sticking as cattle regain consciousness quickly after stunning. It shows that under these conditions, this type of electrical stunning may not be appropriate.

Studies 1 and 2 were possibly compromised by the fact that the slaughter plants were given notice of the audits and conceivably altered their handling practices due to their commercial interest in a favourable result. The state of animal welfare in cattle slaughter houses may be far worse than we realise and regular audits are required to maintain standards. It has been suggested that Angus and Holstein cattle tend to vocalise more than other breeds (Gregory et al., 2000). It is also thought that some genetic types within these breeds tend to vocalise more than others (Grandin, 2000). Studies 1 and 2 made no attempt to select any of the groups of cattle being studied. Perhaps in future selecting representative groups of cattle as far as breed, strain, age and sex would provide more meaningful results and fairer audits. Also, the effects on welfare indicated by vocalisation could be confirmed with serum analysis. Study 3 studied only 25 cattle. This sample is too small to determine accurately the minimum current required and the onset of the various stages of recovery. Its relevance is also questionable as most electrical stunning is done using a 3 second head cycle (Gregory et al., 2000). Also, using an EEG to measure the recovery of cattle would more objectively have shown the effectiveness of the initial stun and assessed and timed the stages of recovery. It would be of practical benefit to perform a study to determine how amplitude and duration of current relates to time spent in the tonic phase.

Bibliography

1. Grandin, T. (1996), Factors that impede animal movement in slaughter plants, *J Am Vet Med Assoc*, 209, pp. 757-759.
2. Grandin, T. (2000), Effect of animal welfare audits of slaughter plants by a major fast food company on cattle handling and stunning practices, *J Am Vet Med Assoc*, 216(6), pp. 848-85.
3. Grandin, T. (2001), Cattle vocalisations are associated with handling and equipment problems at beef slaughter plants, *Appl Anim Behav Sci*, 71(3), pp. 191-201.

4. Gregory, N.G., Parkman, I.D. (2000), Whittington, P.E. and Wotton S.B., Electrical Stunning of cattle, *Vet Rec*, 147(24), pp. 681-684.
5. Lemmon, W.B. Patterson G.H.(1964), Depth Perception in sheep: effects of interrupting the mother neonate bond, *Science*, 145, pp. 835-836.
6. Nolen, R.S. (2001), Assessing the state of the cattle slaughter industry, *J Am Vet Med Assoc*, 218(2), pp.184-187.
7. Stookey, J.M., Watts, J.M. (2000), Vocal behaviour in cattle: the animal's commentary on its biological processes and welfare, *Appl Anim Behav Sci*, 67, pp. 15-33.