The effects of road transportation on cattle and calves

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Throughout the life of a farm animal transport is almost inevitable. For this reason road transport has been the subject of much research over the past few years from a welfare and commercial view. Studies have been performed to measure the effect of transportation and ways to minimise the stress put on cattle and calves when travelling. Parameters for measuring the stressful effects in these animals include cortisol levels, body temperature, liveweight and blood composition. The wide range of studies carried out have identified several variables that can be manipulated to reduce these effects including travel distance and time, stocking density, age of animals and handling.

A study carried out recently by Palme, Robia, Baumgartner and MØ stl (2000) investigated the usefulness of faecal cortisol metabolite concentrations as a reflection of stress in transported cattle. It is recognised widely that cortisol values in the blood are a valid physiological parameter of stress, but levels must be considered along with other physiological and behavioural parameters for an overall assessment of stress and discomfort. As blood sampling of cattle imposes an added stress to transported cattle another method of measuring cortisol levels was needed, providing the basis of the study.

The study compared faecal cortisol metabolite concentrations of sixteen cows which all had had a similar history of transportations and handling. Three different groups were formed. The first group was the control group which stayed in their familiar environment for the entire experiment. The second group was the transportation group. These cows were transported by cattle truck for two hours then returned to their familiar environment and bedded beside cows that had not travelled. The third group were the stationary group. These cows went through the same loading and handling procedures as the transportation group but the cattle truck remained stationary for three hours. Faecal samples were taken immediately before loading and every spontaneous defecation for 48 hours afterwards.

Results of the study showed that the concentrations of cortisol metabolites in faecal samples taken from both the stationary and transportation groups peaked around 12 hours after the start of the experiment (Palme et al. 2000). Concentrations returned to the pre transportation levels between 26 and 48 hours of the start of the experiment. These results were validated by comparing patterns and concentrations to results of previous studies where cows were stimulated with ACTH to produce cortisol. The confinement of the stationary group produced a mild rise in cortisol levels, but the rise of cortisol levels in the transported group was significantly higher. From this experiment researchers where able to conclude that confinement within the moving cattle truck is the most stressful part of transportation. This non invasive method of measuring stress proved to be a useful tool. It could be used in further large scale studies into welfare aspects of transportation such as stocking densities.

Another study carried out by Knowles, Brown, Edwards, Phillips and Warriss (1999) examined the effects of transporting calves less than four weeks of age on a journey of the maximum time laid down by the EU legislation. There were 45 calves transported by road for 19 hours, a trip that included a one hour stop during which calves were given water, electrolytes or nothing at all. There was also a control group of 15 calves that remained on farm and were fed normally. The experiment took place in winter and in summer and results of each were compared. Parameters considered as a measure of the effects of transportation in the calves were behaviour, body temperature, liveweight and blood composition.

Calves that were transported rested less, lost body weight and had decreased body temperatures at the conclusion of travel when compared with the control group. Videos taken of calves during the travel and of the control group allowed analysers to compare time standing and time resting of each group, and it was concluded that while travelling calves stood for a longer period of time. The travelling calves also had a marked decrease in liveweight not seen in the control group, mainly due to the time without food (Knowles et al, 1999). Transport effects on calves was greater in the winter. While in summer most variables had returned to pre transport levels within 24 hours of the journey ending, in winter the calves' liveweights and creatine kinase levels in the blood took up to seven days to return to normal.

The benefits of feeding midway through the journey were also considered. Feeding electrolytes seems to reduce dehydration but the additional stress caused by handling and feeding may outweigh any benefits. The recommendation from this study would be to feed calves as soon as the journey is over, not part way through. The overall results of this experiment could be best utilised if further information was gathered on the effects of transportation on young calves. By comparing a large amount of data it may be possible to calculate optimal travelling distances, times and ages for calves that minimises their stress and maintains a high level of welfare.

The two studies discussed highlight the need for further research into the welfare of animals when being transported but they have both also increased our understanding of this topic. While Palme and others (2000) were trying to develop a new non invasive method of measuring the effect of transportation on cattle they also identified that the most stressful part of transportation is being confined in a moving truck. So events before and after travelling is not the primary concern for the cattle, its what goes on during the journey. Therefore to increase their welfare research needs to concentrate on what happens during the journey to cause stress to the animals. This may include the stress of not having room to lie down on the truck on a long journey, or not being able to get up again if an animal falls down, all relating to stocking densities. This may not be an issue for short travelling distances but for long journeys considering changing the stocking densities may be in the animals' best interest.

Knowles and others also tackled an issue that related to stresses during the journey, the time animals were without food and water. While at present there are maximum travel times in place we need to research travel times and look at recovery times both from the welfare and economical view. There will be economical loss if we transport cattle, be they juvenile or adult animals, for long journeys to abattoirs if they lose weight and do not have enough time to recover before slaughter. Further research into travel time and distances in conjunction with feeding and recovery times may allow us to give better treatment to our animals and benefit economically also.

So while road transport for farm animals is almost inevitable steps can be taken to reduce the effects of transportation. Current research has shown that variables such as stocking densities, travel distance and journey time can be manipulated to enhance animal welfare. Further research into these areas is needed but hopefully new methods used to measure the stress induced by transporting cattle, for example monitoring faecal cortisol metabolite concentrations, will allow for future larger scale studies that will increase our understanding of this subject.

References

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