

DEVELOPMENT OF A HAPTOGLOBIN ASSAY TO ASSESS THE STRESS RESPONSE IN CATTLE

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Livestock production practices expose animals to a number of stressors. The response of livestock to stressors can lead to reduced disease resistance, due to immunosuppression, and reduced growth, due to altered priorities for utilisation of nutrients. Hormones and mediators released from the hypothalamic-pituitary-adrenal axis, the sympathetic nervous system and pro-inflammatory cytokines such as IL-6 initiate the adaptive response in the host. During this response, acute phase proteins, most notably serum amyloid A, C-reactive protein and haptoglobin are produced. In pigs, haptoglobin levels have been found to be inversely related to growth rates (Eurell *et al.* 1992). Selective production of acute phase proteins differs between species. Haptoglobin is a major acute phase protein in cattle and is considered a good candidate for monitoring stress responses in this species. The aim of this study was to evaluate the utility of haptoglobin as an indicator of the host response to production stressors including weaning, transport and feedlot finishing.

In response to a stressful stimulus, plasma haptoglobin can increase 100 fold in cattle. Haptoglobin binds free haemoglobin and removes it from circulation. It is this affinity that allows haptoglobin to be measured in plasma using a modification of the peroxidase method described by Jones and Mould (1984). The method is based on the oxidation and reduction reaction that occurs when haptoglobin combines with methaemoglobin when placed in an acidic environment, causing a chromogen to change colour. A haptoglobin assay was established and shown to be highly repeatable (94.8%). Multiple freeze thawing cycles of the plasma samples had no significant effect on the haptoglobin level ($P>0.05$, $F=0.03$). However, the assay was sensitive to interference from free haemoglobin, released by haemolysis at the time of sampling, which has an absorbance close to that of the chromogen. Modifications to the assay have been made to correct for the effects of free haemoglobin.

Several production stressors are currently being analysed (weaning, transport, mixing unfamiliar cattle and the feedlot environment) to evaluate haptoglobin as a potential tool for the determination of their impact on cattle performance.

EURELL, T.E., BANE, D.P., HALL, W.F. and SCHAEFFER, D.J. (1992). *Can. J. Vet. Res.* **56**, 6-9.
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