

## Posters

### Improved heat tolerance of cattle by dietary supplementation with osmolytes

JB Gaughan<sup>1</sup>, DJ Cadogan<sup>2</sup>, AJ Cawdell-Smith<sup>1</sup>, IA Croft<sup>1</sup>, RJ Van Barneveld<sup>3</sup>, WL Bryden<sup>1</sup>

<sup>1</sup>School of Animal Studies, University of Queensland, Gatton Qld 4343; <sup>2</sup>Feedworks, Eagle Farm Qld 4009

<sup>3</sup>Becan Consultancy Group, South McLean Qld 4280

**Background** - When exposed to hot conditions grain-fed cattle will reduce dry matter intake (DMI) resulting in reduced average daily gain and feed:gain efficiency. Reducing the detrimental effect of heat stress is necessary for maintaining optimum cattle performance and welfare. Feeding osmolytes such as polyols, betaine, free amino acids, and combinations of urea and methylamines to cattle during summer may be beneficial. Osmolytes help maintain cellular water balance, protecting cells and tissues from dehydration and osmotic inactivation.

**Objective** - To investigate the effect of dietary supplementation with an osmolyte product (*Bos Koolus*<sup>®</sup>) on heat tolerance of cattle.

**Design** - Eight Angus steers (550 ± 25 kg) were used to test the effect of adding a mix of osmolytes (7.6 kg/t) to a feedlot finisher ration. The steers were housed in individual stalls for 11 d in a climate controlled unit and exposed to 5 d of hot conditions (HOT) (32 °C dry bulb temperature, 66 % relative humidity). Prior to HOT the steers had 4 d exposure to thermoneutral conditions (TN), and following HOT a further 2 days of TN. Rectal temperature (RT), respiration rate (RR) and individual DMI were measured.

**Outcomes** - The steers fed the osmolyte diet had lower ( $P < 0.05$ ) RT (39.5 ± 0.01 °C) compared to the control group (39.9 ± 0.01 °C). Mean RT of the osmolyte fed steers during HOT was 39.6 °C and for the control group the mean was 40.1 °C ( $P < 0.001$ ). The RR of the osmolyte fed steers was lower ( $P < 0.05$ ) compared to the control group at 77 ± 1.1 breaths per minute (bpm) and 81 ± 1.1 bpm respectively. Mean RR were lower ( $P < 0.05$ ) for the osmolyte fed steers on days 3 and 4 of HOT at 92 bpm and 102 bpm respectively. The DMI of the osmolyte fed steers was greater ( $P < 0.001$ ) than the control group at 5.74 kg/d and 4.93 kg/d respectively.

**Conclusion** - The data suggests that steers fed an osmolyte supplement were more heat tolerant than those fed the control diet.

### Methionine requirement and cell-mediated immunity in chicks

S Shini, X Li, WL Bryden

School of Animal Studies, University of Queensland, Gatton QLD, 4343, Australia

**Background** - In addition to the requirement for growth, methionine has been shown to have beneficial effects on the immune status of animals.

**Objective** - To determine the methionine requirements for growth and the cellular immune response in broiler chicks.

**Design** - One-day-old Ross broiler chicks were divided on the basis of body weight uniformity and randomly assigned to 5 groups (with 5 replicate pens of 7 birds each). Birds were housed in temperature and air controlled floor pens with free access to feed and water. From day 1 to 21 one group of chicks was fed a methionine-deficient basal diet (3mg/kg methionine), whereas the four other groups received the basal diet supplemented to a digestible methionine content of 4.5, 6.0 and 7.5 mg/kg. In addition to weekly body weight measurements, at three weeks of age, a cellular immune response was elicited by an intradermal injection of phytohemagglutinin (PHA-P) and measured after 24h.

**Outcomes** - Diets supplemented with digestible methionine (4.5, 6.0 and 7.5 mg/kg to the diet) were found to be significantly ( $P < 0.001$ ) effective in improving the cellular immune response of broiler chicks as compared with basal diet (0.30% methionine). In contrast, methionine supplementation did not significantly affect body weight gain.

**Conclusion** - It is concluded that dietary methionine content markedly influences cellular components of an immune response indicating that immune cell proliferation may be sensitive to a range of intracellular sulfhydryl compounds inter-linked to methionine metabolism, including glutathione and cysteine. It was demonstrated that the methionine requirement for cellular immune response is greater than that required for optimal growth.