Ammonia emission is a consequence of manure decomposition. Urinary urea is broken into ammonium (liquid form of ammonia), and at high pH, is released into the atmosphere as ammonia. During live export of cattle, pneumonia is 1 of the main causes of death (Norris et al. 2003). Lack of natural ventilation, and high environmental temperatures during long haul trips to the Middle East are associated with instances of elevated atmospheric ammonia (Stacey 2001). Effluent acidification can be used to reduce ammonia volatilisation (Moore et al. 1997). Diets that are currently used for live export can result in a urinary pH around 8.0. Lime (calcium oxide), which is often used as a binder in export pellets, has the potential to form calcium hydroxide upon hydration and thus increase urinary pH. We investigated the effect of lime and gypsum on urinary pH.

Forty 18-month old Angus-cross heifers were placed in individual pens and fed hay ad libitum for 5 days, and then randomly allocated on a liveweight basis to 1 of 4 experimental diets (see Table 1). Animals were fed the diets at a rate of 2.25% of body weight on a DM basis for 19 days, when final samples were collected at approximately 6 h post feeding. Urinary pH was measured on the last day of the hay feeding period (day 0) and days 5, 14 and 19 of the pellet feeding period. Daily feed intake and weekly liveweight were also recorded. At day 19, a blood sample was taken for blood gases analysis, and faecal pH was also measured.

Differences in dietary composition did not significantly (P>0.05) affect feed intake, weight gain, faecal pH, blood pH, pO₂ or pCO₂. Blood HCO₃ in cattle fed the diet containing gypsum was significantly lower than those receiving the diet with the gypsum-lime combination (P=0.0047). Table 1 shows the results for urinary pH on day 14 of dietary treatment. At other sampling times, urinary pH followed the same trend.

Table 1. Mean urinary pH and standard errors of the mean for cattle fed 1 of 4 pelleted diets for 14 days.

| Diets                                      | Urine pH  
|--------------------------------------------|-----------
| 18% Lupins/30% Barley/ 51% Oaten Hay/1%Gypsum | 6.84 ± 0.28a |
| 18% Lupins/30% Barley/ 50% Oaten Hay/2%Lime  | 8.40 ± 0.08c |
| 18% Lupins/30% Barley/ 49% Oaten Hay/1%Gypsum/2% Lime | 8.22 ± 0.11b |
| 18% Lupins/30% Barley/ 52% Oaten Hay         | 7.99 ± 0.26b |

Means with different superscripts differ significantly (P<0.05).

The addition of 2% lime to the basal significantly increased urinary pH. Although the addition of gypsum in combination with lime significantly reduced the increase in pH, the resulting pH was still sufficiently high to promote ammonia volatilisation. Gypsum at 1% did reduce urinary pH to a significant degree. However, gypsum was not particularly effective as a binder since it reduced the rate at which pellets flowed through the pellet press.

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