

## Rumen parameters and urea kinetics in goats and sheep

### ABSTRACT

The effects of animal species and supplements on rumen fluid characteristics, plasma urea-N (PUN) concentration, plasma urea-N pool size, urea-N degradation in the gut and urea-N net flux (urea-N synthesis rate) were studied in goats and sheep, with some minor differences detected. The animals were fed either chopped rice straw ad libitum+200 g soybean meal (SBM), or chopped rice straw ad libitum+190 g soybean meal+300 g sago meal (SBM+SM) for 14 days. The supplements were isonitrogenous (80 g crude protein/animal/d). [14C]-urea was used as the marker for urea metabolism studies. Two animals from each species were fed either supplement in a cross-over design in two periods. The results showed that rumen pH was significantly ( $p<0.001$ ) lower in animals fed SBM+SM than those fed SBM supplement. The ammonia concentrations of rumen fluid were significantly ( $p<0.01$ ) higher in sheep (382.9 mg N/L) than goats (363.1 mg N/L) when fed SBM supplement but lower (282.5 mg N/L) than that of goats (311.0 mg N/L) when fed SBM+SM supplement. Total VFA concentrations were significantly ( $p<0.05$ ) higher in animals fed SBM+SM supplement than those fed SBM supplement. Goats had significantly ( $p<0.01$ ) higher molar proportions of acetate (79.1, 77.7%, respectively) than sheep (75.8, 74.0%, respectively) in both supplements. The molar proportion of acetate was significantly ( $p<0.05$ ) higher, while that of butyrate lower in animals fed SBM supplement than those fed SBM+SM supplement. In animals fed SBM supplement, the molar proportion of propionate was significantly ( $p<0.01$ ) higher in sheep (18.0%) than in goats (15.6%), but in animals fed SBM+SM, the molar proportion of butyrate was significantly ( $p<0.01$ ) higher (9.6%) in sheep than in goats (7.2%). Plasma urea-N concentration, plasma urea-N pool size, urea-N degradation in the gut, urea-N net flux and the fraction of urea-C from the blood entering the rumen were not significantly different between goats and sheep fed either supplement. However, PUN concentration was significantly ( $p<0.05$ ) lower in animals fed SBM+SM supplement (average of 13.8 mg N/100 ml) than in those fed SBM supplement (average of 16.5 mg N/100 ml). The urea net flux was significantly ( $p<0.05$ ) higher in goats (average of 14.5 g N/d) than sheep (average of 12.9 g N/d), and animals fed SBM supplement showed higher (average of 14.9 g N/d) urea net flux than animals fed SBM+SM supplement (average of 12.9 g N/d). A significant ( $p<0.05$ ) positive correlation was observed between urea-N net flux and urea-N degradation; urea-N net flux and pool size; urea-N net flux and urea excretion in the urine; and PUN and rumen ammonia in goats. While in sheep, significant ( $p<0.05$ ) positive correlation was observed between urea-N net flux and urea excretion in the urine; and PUN and rumen ammonia.

**Keyword:** Goats; Rumen parameters; Sheep; Urea kinetics