

Utilization of steam-treated oil palm fronds in growing goats: 1. supplementation with dietary urea

ABSTRACT

Five male dairy goats (Saanen), 4.6 month old with a body weight of 21.4 (SD±1.6) kg, were used to examine 5 dietary urea treatments in a 5×5 Latin Square experimental design. The five levels of urea were 10, 20, 30, 40 and 50 g urea/kg DM of steam-treated oil palm fronds (OPF) and dry matter intake tended ($p>0.05$) to increase with increasing urea supplementation up to 30 g/kg OPF (77.7 g/kg BW 0.75), but decreased ($p<0.05$) with 40 and 50 g urea/kg OPF (67.4 and 63.7 g/kg BW 0.75, respectively) supplementation. Similarly, dry matter, organic matter, crude protein, neutral detergent fiber and hemicellulose digestibilities increased ($p<0.05$) with the addition of urea to 30 g/kg OPF but thereafter decreased ($p<0.05$) with 40 and 50 g/kg OPF. Ruminal pH, ruminal NH₃-N concentration and plasma urea concentration increased linearly ($p<0.01$) and quadratically ($p<0.01$) as a consequence of addition of urea to the diet. Excretion of total purine derivatives (PD) by goats fed 30 g of urea/kg OPF was highest ($p<0.05$) followed by goats fed 20, 40, 10 and 50 g of urea/kg OPF. Microbial N (g N/day) and efficiency of microbial N supply expressed as g N/kg organic matter apparently digested in the rumen were higher ($p<0.05$) in goats fed 30 g of urea/kg OPF (5.5 g N/day and 22.0 g N/kg DOMR, respectively) than in goats on 10 and 50 g of urea/kg OPF treatments. However, the former did not differ from goats fed 20 g of urea/kg OPF (3.9 g N/day and 16.6 g N/kg DMOR, respectively). Ruminal VFA concentration, protein/energy ratio, N absorption and N retention increased ($p<0.05$) with the addition of urea to the diet up to 30 g/kg OPF but decreased ($p<0.05$) with 40 and 50 g/kg OPF. This implies that the optimal level of urea supplementation in an OPF based diet was about 30 g urea/kg OPF.

Keyword: Dairy goats; Fermentable protein; Oil palm fronds; Urea