



Tropentag, September 14-16, 2010, Zurich

“World Food System —  
A Contribution from Europe”

## Effects of Urea Supplements on *in vitro* Microbial Protein Synthesis and Fermentation of two Tropical Grasses

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### Abstract

In diets based on low digestible forages and grasses the primary limitation for microbial protein synthesis in the rumen probably is ammonia-N. A study was conducted to evaluate the effect of two urea sources on microbial crude protein (CPM) synthesis and fermentation of *Panicum maximum* cv. Tobiata and *Saccharum officinarum* (sugarcane) with the Rumen Simulation Technique (RUSITEC) apparatus. Sugarcane and Tobiata (2.6 and 9.3 % CP on dry matter basis) were supplemented with a slow-release urea (SRU) or untreated urea (UU) to reach 16 % CP on dry matter basis. In total 6 treatments with four replications per treatment were considered, including non-supplemented urea (controls). Fifteen g of each diet were filled in nylon bags and incubated in the RUSITEC. Feed residues after 48 h incubation were sampled and microbes were isolated from the effluents from day 7 to 13. <sup>15</sup>N was used as marker to quantify microbial protein synthesis. Fermentation of organic matter (OMfer) was corrected for OM originating from solid associated microbes which were isolated from feed residues at the last day of incubation. The results were subjected to two factorial ANOVA and significant differences were declared at  $p < 0.05$ . OMfer was higher for sugarcane than Tobiata. Among sugarcane treatments, OMfer was higher for UU than SRU and control (51.8, 49.8, and 48.5 %, respectively). OMfer of Tobiata was similar for both urea sources (31.7 %). Urea sources did not affect fermentation of detergent fibre fractions of Tobiata, but incremented fermentation of fibre fractions of sugarcane, being greater for UU followed in decreasing order by SRU and control. There were no differences between urea sources in efficiency of CPM synthesis. CPM was higher for sugarcane than Tobiata (187 vs. 163 g CPM kg<sup>-1</sup> OMfer) and both urea supplements were different compared to their respective controls. Among controls, the efficiency was higher for Tobiata than sugarcane (36 vs. 106 g CPM kg<sup>-1</sup> OMfer). Urea improved fermentation more in sugarcane than in Tobiata. This confirms the need for N supplementation especially in sugarcane, but also in Tobiata. Supplementation with SRU does not advantage microbial protein synthesis and fermentation in a RUSITEC compared to UU.

**Keywords:** Efficiency, microbial yield, neutral detergent fibre, non-protein nitrogen, nutrient fermentation