

**Effect of diets differing in rumen soluble nitrogen on poor quality
roughage utilization by sheep**

by

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Summary

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Supervisor	:	Prof. W.A. van Niekerk
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The aim of this study was to determine whether a rapid release N source can be substituted with a slow release N source without having any negative effects on intake, digestibility, rumen fermentation and microbial protein synthesis, if sheep are fed a poor quality roughage. Five rumen cannulated wethers were used in the trial in a 5x5 latin square design. Cannulated wethers were assigned to different treatments after each experimental period. The treatments studied had different proportions of urea to Optigen®II, with the same inclusion level of starch and a mineral premix between treatments. The five different treatments were: 100% urea; 75% urea:25% Optigen®II; 50% urea:50% Optigen®II; 25% urea:75% Optigen®II and 100% Optigen®II. Significant differences ($P < 0.05$) between the 25% urea:75% Optigen®II and the other treatments in terms of intake suggested that a combination of urea and Optigen®II might be the preferred supplementation due to a significantly higher dry matter intake (DMI), organic matter intake (OMI), neutral detergent fibre intake (NDF intake) and digestible organic matter intake (DOMI). The intake variables of 100% urea and 100% Optigen®II did not differ ($p > 0.05$). No differences ($P > 0.05$) were recorded for dry matter digestibility (DMD), organic matter digestibility (OMD) and neutral detergent fibre (NDF) digestibility between treatments. However, the 100% Optigen®II treatment had a significant ($P < 0.05$) lower apparent nitrogen digestibility, which might be the result of a slower rumen NH_3 -N release and higher nitrogen excretion than the other treatments. No differences were observed for pH and VFA between different treatments. The rumen NH_3 -N concentration of the 100% Optigen®II treatment was significantly ($P < 0.05$) lower than the 100% urea treatment at 2 and 4 hours after infusion. The effective degradability of both DM and NDF did not differ ($P > 0.05$) between treatments. Neither were there differences between treatments for total microbial crude nitrogen (MCN) production. Based on biological evaluation, it could be suggested that urea might be substituted with Optigen®II in supplements. From an economical point of view, urea might still be the preferred NPN source, as urea is cheaper than Optigen®II in terms of R/kg nitrogen.