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**The effect of different carbohydrate and nitrogen sources on feed intake, nitrogen balance and performance of growing sheep**

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## SUMMARY

The study aimed to evaluate the effect of different carbohydrate and nitrogen (N) supplements on feed intake, nutrient utilization, and performance of sheep. Twelve male Dorper sheep with a body weight (BW) of 23 kg (standard deviation (SD) 2.20) were used. The experimental design was a 4 × 3 Youden square which consisted of four experimental diets and three 21-d-experimental periods (14 d adaptation and 7 d sample collection). Two carbohydrate sources (whey permeate, corn) and two N sources (protected urea, unprotected urea), which differed in their rate and extent of degradation in the rumen, were combined, resulting in four diets: 1) rapidly degradable carbohydrate with rapidly degradable N source (whey permeate-unprotected urea), 2) slowly degradable carbohydrate and slowly degradable N source (corn-protected urea), 3) rapidly degradable carbohydrate with slowly degradable N source (whey permeate-protected urea), and 4) slowly degradable carbohydrate with rapidly degradable N source (corn-unprotected urea). Dry matter (DM) intake ( $P=0.75$ ), apparent total tract digestibility of DM ( $P = 0.89$ ), and daily BW gain ( $P = 0.98$ ) were not affected by dietary treatment. Mean daily DM intake ( $\text{g/kg LW}^{0.75}$ ), apparent total tract digestibility of DM (%), and daily BW gain ( $\text{g/kg LW}^{0.75}$ ) were 60.4 (SD 3.45), 60.1 (SD 3.17), and 2.0 (SD 6.34), respectively. However, N intake (g/d), urinary and fecal N excretions (% of N intake) and, to some extent, N retention (% of N intake), were affected by carbohydrate source, regardless of N source. Urinary N excretion (% of N intake) was significantly reduced ( $P < 0.01$ ), fecal N excretion (% of N intake) was higher, and N retention (% of N intake) had a tendency ( $P = 0.09$ ) to increase when sheep were fed a rapidly degradable carbohydrate (whey permeate) compared with corn, regardless of N sources. This implies that sheep receiving whey-permeate-based diets utilized N more efficiently than those sheep receiving diets containing corn. Moreover, the decrease in N excretion with whey permeate may be of ecological significance by potentially reducing the excretion of N into the environment.