

# Effects of Incremental Urea Supplementation on Rumen Fermentation, Nutrient Digestion, Plasma Metabolites, and Growth Performance in Fattening Lambs

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**Abstract:** This study investigated the effects of partially substituting soybean meal (SBM) with incremental amount of urea on rumen fermentation, nutrient digestion, plasma metabolites, and growth performance in fattening lambs. Seventy fattening male lambs were sorted into two blocks according to body weight (BW) and assigned to one of five dietary treatments in a randomized block design: SBM at 170 g/kg dry matter (DM) or reduced SBM (40 g/kg DM) plus 0, 10, 20, or 30 g urea/kg DM. Compared with the lambs receiving the SBM diet, the lambs fed the reduced SBM diet plus urea had higher ( $p < 0.01$ ) concentrations of ruminal ammonia, and the ruminal concentration of ammonia also increased linearly ( $p < 0.01$ ) with the increasing urea supplementation. Linear and quadratic effects ( $p < 0.01$ ) on the crude protein (CP) intake and digestibility were observed with the increasing urea addition to the diet. The concentrations of plasma ammonia and blood urea nitrogen (BUN) increased (linear,  $p < 0.01$ ; quadratic,  $p < 0.01$ ) with the increasing urea supplementation. The final BW, DM intake (DMI), average daily gain (ADG), and gain efficiency were similar ( $p \geq 0.42$ ) between the SBM group and the urea-supplemented groups. However, the DMI and ADG increased quadratically ( $p \leq 0.03$ ) with the increasing urea addition to the diet, with the 10 g urea/kg DM diet resulting in the highest DMI and ADG. The results of this study demonstrated that 10 g urea could substitute 130 g soybean meal per kg feed DM without any adverse effect on growth performance or health in fattening lambs when fed a high concentrate diet.

**Keywords:** urea; fattening Hu lamb; growth performance; nutrient digestion; rumen fermentation