

# Effect of Crude Protein and Crude Fiber on Nitrogen Excretion Patterns in Growing Pigs

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The objectives of the experiment were: (1) to study the effect of crude protein (CP) and fiber (CF) on nitrogen (N) excretion patterns and (2) to relate plasma urea nitrogen (PUN) to urinary N excretion. Three levels of CP (high, 19.5%; medium, 16.5%; low, 13.6%) and two levels of CF (high, 5.1%; low 3.6%) were tested for a total of six treatments with 42 pigs. Diets (wheat, barley, soybean meal and oat-hulls as a CF source) were formulated to 3250 kcal DE/kg and 2.18 gDlys/Mcal, supplemented with synthetic amino acids to maintain a similar content of digestible amino acids. Pigs (32±3.4kg) were housed in confinement-type metabolism crates for 19 d. On day 10 or 11, catheters were installed by cranial vena cava venipuncture. Feces and urine were collected from day 15 to 19. Five blood samples were collected in two-h intervals on days 16 and 19.

Fecal N was reduced 22.8% for low CP and 14.3% for medium CP compared to high CP diets ( $P < .01$ ). Urinary N was reduced 47.9% for low CP and 19.8% for medium CP compared to high CP diets ( $P < .01$ ). Total N retention was reduced 2.3 g/d for medium CP versus high CP diets and 1.8 g/d for low versus medium CP diets ( $P < .01$ ), but N retention as a percentage of N intake was higher for low CP compared to high and medium CP diets ( $P < .01$ ). Fecal N was increased 9.2% ( $P < .10$ ) for high versus low CF diets but urinary N was not affected ( $P > .10$ ). Dietary treatments did not affect ADG and feed efficiency. Urinary N was correlated against the plasma urea nitrogen (PUN) ( $R^2 = .65$ ) suggesting that urinary N excretion can be predicted from PUN concentration.

## Implications

Successful nutrient management is important for sustainable pork production. Nitrogen is of major concern because of its impact on inside and outside barn environment. Reduction of CP is effective to reduce N excretion, especially urinary N. Although ADG and FE were not affected by reducing dietary CP, further research is required to maintain protein deposition. Development of a model to predict urinary N excretion and N status from PUN concentrations might allow successful implementation of nutrient management strategies under commercial farm conditions.