

AMINONews®

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Reducing dietary crude protein improves gut health in piglets

Feed is one of the most important component which accounts for 60 to 70% of the total cost of pig production. In commercial piglet diets, allowing only protein feedstuffs to meet the dietary lysine needs of the animal would increase levels of other essential and non-essential amino acids (AA) beyond requirement. This would eventually result in diets with higher crude protein (CP) content. The major negative effects of high CP diet include excessive nitrogen excretion, reduced nitrogen utilization, higher hind-gut protein fermentation, and last but not least, higher feed cost. The most important environmental concern in swine farms are ammonia and nitrogen emissions which causes air and water pollution. There are ongoing debatable discussion on the strategies to reduce ammonia and other noxious gases emission in swine production.

Reducing dietary CP at the same time meeting nutritional requirements with supplemental AAs has been suggested as one of the most effective nutritional strategy to decrease nitrogen excretion and promoting gut health. This strategy has gained interest in swine production over the last decade.

Benefits of 1% dietary CP reduction in piglets

- Improves nutrient digestibility
- Reduces nitrogen and ammonia emission by 10% and 12%, respectively
- Reduces water consumption and manure volume by 3% and 5%, respectively
- Promotes gut health by modulating gut microbiota and maintains gut integrity
- Feed cost saving

Reduced CP diets minimize post-weaning diarrhea in piglets

In traditional swine feeding practices, high CP diets have been used in young piglets to facilitate smooth transition from sow's milk to solid feed. This practice would lead to increased protein fermentation in the hindgut and proliferation of pathogenic bacteria in the gut, which further results in post-weaning diarrhea (PWD) in weaned piglets. The effect of reduced CP diets moderating gut health consequences in young piglets are mediated through changes in microbial population and activities. Feeding piglets with reduced CP diet without compromising ideal AA profile decreases the quantity of substrate available for the growth of pathogenic bacteria and reduces the proteolytic fermentation and production of toxic metabolites (Opapeju et al., 2008). One of the major factors contributing to PWD is the fermentation of undigested protein and AA by gut microbiota (review by Wang et al., 2018). In high CP diets, these toxic metabolic products are produced in large amounts which might predispose to PWD in piglets. In addition, high CP diets increase intestinal pH which could favor the proliferation of pathogenic bacteria such as Bacteroides and Clostridium spp, thereby

increasing PWD incidence. Previous studies demonstrated that young pigs fed reduced CP diets supplemented with AA minimized the incidences of PWD in piglets.

Reduced CP diets promotes gut microbiota

Gut microbiota is one of the most crucial component for maintaining intestinal functions. Dietary protein content is considered to be an important factor influencing the composition and activity of gut microbiota (Chen et al., 2018). Previous studies demonstrated that piglets fed reduced CP diet decreased pathogenic bacteria (Clostridium, Coliforms) compared to those fed high CP diets (Wellock et al., 2006; Opapeju et al., 2009; Bhandari et al., 2010).

To sum up, formulation of reduced CP diets using supplemental AA allows more sustainable and healthy swine production.

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