TACKLING THE ENVIRONMENTAL IMPACT OF PIG MANURE

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Intensive indoor pig production is the most productive and economic means of raising pigs; however, large quantities of manure produced as part of this intensive farming practice raises environmental concerns. Pig production is responsible for approximately 15% of total atmospheric ammonia emissions associated with livestock production (Olivier et al., 1998).

The build-up of noxious gases such as ammonia in confined conditions can lead to adverse effects on the growth, health and welfare of the animal. The reduction of ammonia production has been shown to promote a healthier and more productive growth environment.

Historically, producers have used management practices such as ventilation or cost effective antibiotic use to manage or reduce the production of these harmful gases. However, government regulations have focused on the withdrawal of in-feed antibiotics in some countries and consumer pressure is accelerating this withdrawal in others.

Direct-fed microbials that influence the availability of substrate for gut microbiota within the pig's intestinal tract have the potential to reduce the production of noxious gases from pig manure offering an alternative approach to addressing environmental concern associated with pig manure.

A study conducted by Prenafeta-Boldú et al. (2016) explored the potential of a 3-strain Bacillus spp. (direct-fed microbial product) to reduce the emission of environmentally harmful gases from pig manure (such as methane, ammonia and hydrogen sulphide) when included in pig diets.

The inclusion of this Bacillus product (3×10^8 CFU/g) at 250mg/kg and 500mg/kg significantly decreased methane and ammonia volatilisation (conversion from liquid to gas) by 40% and 50% respectively, compared to the control ($P<0.05$).

In this study, the dietary supplementation of Bacillus spp. had minor effects on the microbial composition of manure; however, there was a significant reduction in the organic matter and in particular protein in the manure as a result of the direct-fed microbial treatment ($P<0.05$).

The fibre content of the manure also decreased upon direct-fed microbial supplementation by 21% and 31% respectively when the direct-fed microbial was added at 250 and 500mg/kg, while volatile fatty acids concentration tended to increase.

These findings indicate that the direct-fed microbial product was able to enhance fibre degradation in the animal's gut and increase the production of volatile fatty acids which can be used as an energy source by the animal as well as conferring other health benefits.

This research demonstrates the additional benefits that direct-fed microbials offer within animal nutrition.

Their ability to influence substrate availability for microbial fermentation can lead to a variety of benefits for pig production including the reduction of emissions of harmful gases into the atmosphere.

Direct-fed microbials are becoming increasingly more important today in markets where there is great pressure to remove antibiotic supplementation in animal diets while still maintaining performance and managing the environmental impact.

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