A SYMPOSIUM - UNDERSTANDING THE NUTRITIONAL CHEMISTRY OF GRAINS WILL HELP TO IMPROVE THE PROFITABILITY AND SUSTAINABILITY OF THE PIG INDUSTRY

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Introduction

Reducing feed costs is the most efficient and effective way to improve piggery profitability. Fundamental to this is improvement in the utilisation of cereal grains and protein meals as the major components of Australian pig diets. With due consideration for an increasing demand for feed grains by all livestock sectors in Australia and overseas, increasing concerns related to nutrient loading of the environment, and future constraints on the use of traditional feed ingredients, such as meat and bone meal, due to consumer and legislative pressures, the importance of understanding the nutritional quality of grains as a means of improving utilisation cannot be underestimated. In this regard, the papers to be presented in this symposium are both timely and will serve as a cornerstone for future research in these fields.

A novel way of assessing factors influencing the nutritional quality of grains (e.g., available energy) for pigs is to compare the digestion of energy across a number of species, including ruminants. Comparisons of whole tract energy digestion and at the terminal ileum in pigs and chickens, might provide useful insights into the way energy utilisation is defined and indicate opportunities to improve the energy yield of grains for pigs. In this symposium, van Barneveld et al. (2001) compare the digestibility of energy from wheat, a weather-damaged wheat of the same variety, a waxy (low amylose) isoline of sorghum, and a normal isoline of sorghum in pigs, broiler chickens, sheep and cattle. This extensive comparison allows the relative importance of chemical characteristics and cell wall features of these grains to be assessed in relation to energy digestibility.

An area of increasing interest and active research is cell wall chemistry. Pigs obtain much of their available energy in cereals from starch. Knowledge of grain-related factors that maximise starch digestion in the small intestine offers potential to improve the efficiency of grain feeding for the pig industry, for example through manipulation of particle size via processing. Fundamental to understanding these factors is identification of the cell wall microstructure. In this symposium, Autio (2001) discusses the light microscopic techniques to determine the cell wall structures, particularly that of starch and its conformation when it gelatinises and is processed, in relation to digestibility in the pig.

The use of enzymes in diets to enhance nutrient and mineral digestibility and improve growth is well established in the chicken industries. Relatively less attention has focused on the use of enzymes in the pig industry, and evidence to support their use is often equivocal. This is largely because there has been a general ignorance to the basic premise that the digestive physiology of the pig contrasts markedly to that of the chicken. Nevertheless, there is a growing body of evidence that some enzymes under certain conditions (e.g., when incorporated into diets containing grains high in non-starch polysaccharides or ingredients high in phytate) can afford benefits. Of particular interest is the period after weaning. Choct and Cadogan (2001) ask the question in the final paper of this symposium as to the effectiveness of supplemental enzymes in pig diets. These authors have an impressive blend of scientific and practical experience in the area of feed enzymes, and their paper will provide much interest and further discussion.