

# Effect of Oats and Hulless Barleys Differing in $\beta$ -Glucan Content on Digestibility and Intestinal Fermentation Parameters in Weaned Pigs

R. Jha<sup>1,2</sup>, R. Pieper<sup>3</sup>, B. Rossnagel<sup>4</sup>, A. Van Kessel<sup>2</sup> and P. Leterme<sup>1</sup>

<sup>1</sup>Prairie Swine Centre Inc., 2105 8<sup>th</sup> Street East, Saskatoon, SK S7H 5N9; <sup>2</sup>University of Saskatchewan, Dept of Animal and Poultry Science, Saskatoon; <sup>3</sup>FBN-Ernährungsphysiologie, Dummerstorf, Germany; <sup>4</sup>University of Saskatchewan, Dept of Plant Sciences, Saskatoon; *Email*: rajesh.jha@usask.ca

Isolated cereal non-starch polysaccharides (NSP) such as  $\beta$ -glucan have positive effects on the populations of health-promoting bacteria in the gastrointestinal tract of the pig and may change the proportions of beneficial and toxic fermentation end-products. Very little information is available on the intestinal fermentation characteristics of  $\beta$ -glucan in whole cereal grains, specifically grains with high  $\beta$ -glucan content such as oats and specialty hulless barleys. Such information could contribute to the development of feeding strategies in order to promote intestinal health in pigs.

An experiment was carried out to compare the effects of hulled barleys, 4 hulless barleys with  $\beta$ -glucan contents ranging from 34 to 93 g/kg and 2 oat varieties. A total of 72 weaned pigs (initial weight  $12.8 \pm 1.9$  kg) were fed individually a diet composed of 81.5% cereal, 6% whey, 9% soy protein isolate and 3.5% minerals for 15 days. On day 16, pigs were killed and digesta samples were taken from ileum and colon for determination of short-chain fatty acid (SCFA) content. Ileal and faecal dry matter digestibility was also determined. No difference in SCFA concentration was observed between cereal types in ileum content ( $P > 0.05$ ) but SCFA were markedly lower ( $P < 0.05$ ) in the colon of pigs fed oats. Ileal digestibility was higher ( $P < 0.05$ ) for diets based on hulless barleys (75% on average), as compared to hulled barleys (62%) and oats (55%). Similar trends were found for total tract digestibility, varying from 90% in hulless barley to 68% in oat.

**Implications:** Both oats and hulless barleys have high  $\beta$ -glucan content that could be of interest to improve the pig gut health. Hulless barleys are better digested by the pig and have higher fermentation rates in the colon than oats and are therefore of greater interest for both swine nutrition and health.