

# Effect of Hulless Barleys Differing in $\beta$ -Glucan Content on the Intestinal Ecology of Weaned Pigs

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Isolated cereal non-starch polysaccharides (NSP) such as  $\beta$ -glucan have positive effects on health-promoting bacteria in the gastrointestinal tract of the pig. However, little information is available on the effects of whole cereals with high  $\beta$ -glucan, such as specialty hulless barleys. Such knowledge could possibly 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 and 4 hulless barleys with  $\beta$ -glucan contents ranging from 46 to 94 g/kg. A total of 40 weaned pigs (13 kg) were used. For 15d, they were fed a diet composed of 80% cereal, 7.5% whey, 7.5% soy protein isolate and 5% minerals. The treatments had no effects on growth and feed intake. The last day, the pigs were killed 4 h after the last meal and digesta samples were taken. The pH in SI and colon was significantly ( $P < 0.05$ ) lower in animals fed the hulless varieties with high  $\beta$ -glucan content, as compared to barleys low in  $\beta$ -glucan. Moreover, a decreased abundance of lactobacilli ( $P < 0.05$ ) but also of enterobacteria and streptococci (both not detected) was found in SI of pigs fed with high  $\beta$ -glucan barleys. Further microbiological analyses revealed a graded and significant shift in both, SI and colon microbial communities in pigs fed the hulless barley varieties with normal to high  $\beta$ -glucan contents. Species identification suggest that hulless high  $\beta$ -glucan varieties favour xylan and  $\beta$ -glucan-degrading bacteria and reduce proteolytic bacteria in the colon. Potentially health promoting bacteria such as bifidobacteria were detected occasionally in animals fed the hulless barleys with high  $\beta$ -glucan content.

**Implications:** The form and content of dietary cereal  $\beta$ -glucan are important factors to influence the intestinal environment in pigs. The inclusion of hulless varieties with high  $\beta$ -glucan content could favour beneficial bacteria thereby reducing the abundance of other, potentially harmful microorganisms.