Ratios of commensal to pathogenic bacteria as markers of pig intestinal health: development and validation of qPCR profiling assays

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Summary of the implications to Pork Industry

The project was to investigate whether certain ratios of bacterial groups provided an indication of intestinal health with the potential for use within the pig industry for the management of animal intestinal health. The implications of Bethany's findings to pork industry essentially reside in the qPCR assays she has developed, which can be used for future investigations on the topic.

She has developed four individual TaqMan qPCR assays for the quantification of *Clostridium perfringens, Lactobacillus* species, *E. coli* and *Enterobacteriaceae* based upon primers and probes targeting the 16S rRNA gene. Strong and statistically significant correlations were present between the enumeration of *E. coli* and *Enterobacteriaceae* using microbial methods with enumeration using qPCR. This means that the molecular technique – qPCR is useful in bacterial enumeration, which can potentially replace or complement the traditional and cumbersome microbiological method such as bacterial culture.

She found there are no significant correlations between water content and the numbers of *Cl. perfringens* or the number of *Cl. perfringens* in relation to Lactobacilli. These results imply a number of possibilities. Firstly, the water content might not be an ideal indicator for intestinal health. Secondly, the focus should be on the pathogenic *E. coli* rather than total *E. coli* numbers. Hence, this should lead to future development of qPCR assay, specifically targeting the *E. coli* genes involving in pathogenicity.

This project opens the way to further develop molecular assays, which would assist producers in the monitoring of overall herd health, identification and control of risk factors associated with scouring, and therefore assisting in the reduction of production losses. As an Honours project, Bethany's results are meaningful and should provide benefits to the pork industry in the future.