



## Long-term benefits of modifying pigs feed presentation on *Salmonella* species shedding, digestive microbiota and health

P. LeBel<sup>1</sup>, A. Letellier<sup>1</sup>, B. Laplante<sup>2</sup>, E. Yergeau<sup>3</sup>, and P. Fravallo<sup>1</sup>,

<sup>1</sup>Research Chair in Meat Safety, Faculty of Veterinary Medicine, University of Montreal, St-Hyacinthe, Qc, Canada,

<sup>2</sup>F. Ménard, L'Ange-Gardien, QC, Canada,

<sup>3</sup>National Research Council Canada, Energy, Mining and Environment, Montreal, QC, Canada.

Salmonellosis is one of the most important foodborne illness in Canada. According to many epidemiological studies, a promising on-farm intervention is the use of mash feed instead of the typically used pellet feed. However, these studies failed to clearly isolate this variable between the compared groups. Moreover, the feed change has been associated with a lower feed conversion and the benefit on *Salmonella* is often only serological. In this study, over 900 pigs in the same building were assigned a diet varying only in their processing and particle size, during the entire finishing period, leading to 4 experimental groups: pellet with small particle (PS), pellet with large particle (PL), mash with small particle (MS), or mash with large particle (ML). Individual fecal samples were taken at the farm 2 weeks before slaughter, and intestinal content and ileal wall on 24 pigs per group were sampled at slaughter. At the end of the finishing period, significantly more pigs (9/24) shed *Salmonella* in the group fed the industrial reference feed (PS) than in the 3 other experimental groups (MS = 0/24; ML = 2/24; PL = 2/24). Also, a global *Salmonella* shedding benefit from the use of a mash feed compared with a pellet feed regardless of the particle size was observed on the farm (11/48 vs. 2/48) and in the rectal content at slaughter (17/48 vs. 7/48). Real-time PCR quantification showed significantly more *Bifidobacterium* spp. in pig feces on the farm when mash and large particle size diets were used and a significantly greater ratio of lactobacilli / enterobacteria in the feces on the farm and in the rectal content when a large particle size feed was used. Next-generation

sequencing is being done on the same samples to extend the digestive flora analysis. Histological analysis on ileal wall showed a tendency to a greater proportion of acid mucin-producing goblet cells when a mash feed was used, and more samples are being analyzed to deepen our analysis. A similar feed conversion rate was obtained with the use of PS and PL, and because the latter provides gut health and a *Salmonella spp.* benefit, it might be the key to a cost-efficient solution for producers.