

Microbiology of Liquid Feed and Feed Ingredients

K. Braun, R. Friendship and C.F.M. de Lange¹

Department of Animal and Poultry Science, University of Guelph
¹519-824-4120 ext. 56477, cdelange@uoguelph.ca

Background

Studies show that liquid feeding can reduce the occurrence of *Salmonella* and other food borne pathogens. This is likely due to the use of acidic feed ingredients or the presence of large numbers of beneficial lactic acid producing bacteria (LAB) in the feed. There are several co-products from the food industry available for use as ingredients in liquid swine diets, including by-products from dairy processing, candy manufacturing, alcohol production and bakery waste. These ingredients have not been evaluated for pathogens and may represent a food safety risk, which can impact pork safety.

Objective

To analyze co-product samples (acid whey, condensed whey, corn distiller's solubles (CDS), bakery waste, sugar syrup, brewer's yeast and buttermilk) and liquid and dry feed for *Salmonella*, *Yersinia*, LAB, yeast and mould.

Results

- *Salmonella* and *Yersinia* were not detected in any of the samples.
- Yeast and mould counts were variable and higher in stored co-product samples than fresh samples, except for bakery waste and brewer's yeast.
- Storage resulted in significantly increased LAB counts in acid whey, corn distiller's solubles, sugar syrup and buttermilk, but decreased LAB counts in condensed whey, bakery waste and brewer's yeast.
- Complete liquid feed contains approximately 4 times more LAB than dry feed, twice the yeast and two thirds less mould.

Take Home Message

Liquid feed and ingredients can supply substantial amounts of LAB to pigs (up to 2×10^8 cfu/g). This may inhibit growth of feed borne *Salmonella* and *Yersinia* and reduce intestinal colonization of these pathogens in pigs. Yeast fermentation results in nutrient losses (as CO₂) and can increase pressure in the animal's gut as well as feed lines. Lower mould counts in liquid feed versus dry feed suggests that there is less chance for mycotoxin formation in liquid feed.

This research was initiated with the swine liquid feeding association (www.slfa.ca). Financial support is through Ontario Pork and OMAF. The assistance from all the pig producers and manufacturers of the co-products is greatly appreciated.