Organic acids for control of Salmonella in different feed materials - DTU Orbit (19/12/2018)

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Background
Salmonella control in animal feed is important in order to protect animal and public health. Organic acids is one of the control measures used for treatment of Salmonella contaminated feed or feed ingredients. In the present study, the efficacy of formic acid (FA) and different blends of FA, propionic acid (PA) and sodium formate (SF) was investigated. Four Salmonella strains isolated from feed were assayed for their acid tolerance. Also, the effect of lower temperatures (5°C and 15°C) compared to room temperature was investigated in rape seed and soybean meal.

Results
The efficacy of acid treatments varied significantly between different feed materials. The strongest reduction was seen in pelleted and compound mash feed (2.5 log10 reduction) followed by rapeseed meal (1 log10 reduction) after 5 days exposure. However, in soybean meal the acid effects were limited (less than 0.5 log10 reduction) even after several weeks’ exposure. In all experiments the survival curves showed a concave shape, with a fast initial death phase followed by reduction at a slower rate during the remaining time of the experiment. No difference in Salmonella reduction was observed between FA and a blend of FA and PA, whereas a commercial blend of FA and SF (Amasil) was slightly more efficacious (0.5-1 log10 reduction) than a blend of FA and PA (Luprocid) in compound mash feed. The Salmonella Infantis strain was found to be the most acid tolerant strain followed by, S. Putten, S. Senftenberg and S. Typhimurium. The tolerance of the S. Infantis strain compared with the S. Typhimurium strain was statistically significant (p<0.05). The lethal effect of FA on the S. Typhimurium strain and the S. Infantis strain was lower at 5°C and 15°C compared to room temperatures.

Conclusions
Acid treatment of Salmonella in feed is a matter of reducing the number of viable bacterial cells rather than eliminating the organism. Recommendations on the use of acids for controlling Salmonella in feed should take into account the relative efficacy of acid treatment in different feed materials, the variation in acid tolerance between different Salmonella strains, and the treatment temperature.

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