

Animal Feed Science and Technology

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Evaluation of seaweed-derived polysaccharides on indices of gastrointestinal fermentation and selected populations of microbiota in newly weaned pigs challenged with *Salmonella Typhimurium*.

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Abstract

Growing pigs encounter multiple stressors in the immediate post-weaning period, and become vulnerable to infection by microbial pathogens such as *Salmonella*. Novel polysaccharides derived from seaweeds have demonstrated both antimicrobial and prebiotic properties and may offer a means to alleviate such bacterial challenges during this period. An experiment was conducted to investigate the effects of offering diets containing seaweed-derived laminarin or fucoidan on numbers of *Salmonella* Typhimurium in the distal gastrointestinal tract (GIT), in select tissue locations, and in faecal matter of pigs experimentally challenged with *Salmonella* Typhimurium. Populations of lactobacilli and volatile fatty acid (VFA) concentrations in the distal GIT of weaned pigs were also determined. A commercial admixture containing organic acids and herbs was integrated into the experimental design as a positive control. Twenty-four entire male pigs weaned at 24 days (7.9 kg) were assigned (day (d) 0–32) to one of four dietary treatments: (T1) basal diet (control); (T2) basal diet + a commercial admixture containing organic acids and herbs (positive control; 3.6 g/kg); (T3) basal diet + laminarin (300 mg/kg); and (T4) basal diet + fucoidan (240 mg/kg). Sampling of faecal matter was carried out periodically during the experiment and GIT contents and tissue samples were collected post-sacrifice (d 32). Consumption of diets containing fucoidan increased counts of lactobacilli in the caecum ($P<0.05$) and the molar proportion of butyric acid in the caecum ($P<0.05$) and colon ($P<0.05$) and decreased the molar proportion of valeric acid in the caecum ($P<0.05$) and colon ($P<0.01$). However, faecal counts of *Salmonella* Typhimurium increased on d 2 ($P<0.05$) and d 14 ($P<0.05$) post-challenge (PC) of pigs offered fucoidan, and on d 14 ($P<0.05$) and d 20 ($P<0.05$) PC of pigs offered laminarin ($P<0.05$) compared with the control. Diets containing the commercial admixture increased lactobacilli ($P<0.05$) and butyric acid ($P<0.05$) in the caecum and decreased counts of *Salmonella* Typhimurium ($P<0.001$) in tonsil tissue. In conclusion, consumption of diets containing fucoidan induced increases in lactobacilli in the caecum, and butyric acid in the caecum and colon, however both laminarin and fucoidan increased shedding of faecal *Salmonella* Typhimurium at select sampling periods of the experimental study. Copyright © 2011 Elsevier B.V. All rights reserved.

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