

## Dietary inclusion of a microencapsulated blend of organic acids and pure botanicals impacts intestinal health in weaned pigs

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AviPlus®S (Vetagro SpA, Italy) is a microencapsulated blend of sorbic, citric acid, thymol and vanillin. Although dietary inclusion of organic acids and botanicals has been shown to improve pig performance, the mechanism behind their efficacy has yet to be elucidated. The objective of this study was to assess the impact of dietary inclusion of AviPlus®S on measures of intestinal health in weaned pigs. Twenty pigs weaned at 19 d of age and placed into one of two pens (n = 10) received either a basal diet or the basal diet supplemented with 5 g AviPlus®S/kg for 14 d. Individual body weights were recorded initially and every 7 d. At the completion of the study, 6 pigs closest to their group mean ADG were selected for tissue collection. Ileal and jejunal samples were collected for Ussing chamber analysis of intermittent short circuit current (Isc), and dextran flux. Ileal mucosal and blood samples were collected for analysis of cytokines (IL6, IL10, IL12, TNF $\alpha$ , IFN $\gamma$ , and TGF $\beta$ ) at mRNA level and circulating, respectively. Pigs fed the AviPlus®S had greater (P < 0.05) ADG during both the second week of the study and overall. Pigs fed the AviPlus®S also had reduced jejunal dextran flux and Isc in the ileum (P < 0.12 and P < 0.07, respectively); the gene expression of several cytokines were down regulated in AviPlus®S fed pigs and the corresponding proteins followed similar patterns. Overall, it appears that dietary inclusion of AviPlus®S improved intestinal health by allowing for tighter gap junctions in the jejunum (reduced dextran flux), and by possibly reducing the secretory activity of ileal mucosa (reduced Isc) via reduction in inflammation (reduced gene and protein expression of inflammatory cytokines). Whether the improved growth seen in this study with AviPlus®S is the result of reduced intestinal inflammation via modulation of intestinal microflora or by a direct effect on the intestinal mucosa requires further study, however this study does provide a biological mechanism to explain improved performance seen with dietary inclusion of microencapsulated organic acids and botanicals.

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