

72 Young Scholar Presentation: Use of medium chain fatty acids as mitigation or prevention strategies against pathogens in swine feed. Annie B. Lerner¹,

Roger A. Cochrane², Jordan T. Gebhardt¹,

Steve S. Dritz³, Cassandra K. Jones¹,

Mike D. Tokach¹, Robert D. Goodband¹,

Joel M. DeRouchey¹, Phillip C. Gauger⁴,

Jianqiang Zhang⁴, Drew Magstadt⁴, Jianfa Bai³,

Elizabeth Porter¹, Joe Anderson¹, Benjamin

Bass⁵, Theodore Karnezos⁶, Brenda de Rodas⁷,

Jason C. Woodworth⁸, ¹*Kansas State University,*

²*Pipestone Grow Finish, ³Department of*

Diagnostic Medicine & Pathobiology, College of

Veterinary Medicine, Manhattan, KS 66506, ⁴Iowa

State University, ⁵PMI, ⁶Land O'Lakes, ⁷Purina

Animal Nutrition, ⁸Department of Animal Sciences & Industry, College of Agriculture, Manhattan, KS

66506

Four experiments were conducted to evaluate: 1) medium chain fatty acids (MCFA) application to swine feed pre- or post-viral contamination with porcine epidemic diarrhea virus (PEDV) measured by quantitative reverse transcription polymerase chain reaction (qRT-PCR), 2) MCFA levels and combinations measured by qRT-PCR, and 3) selected MCFA in bioassay. In Exp. 1, treatments were a 2x2 + 1 factorial with the main effects of chemical treatment (0.3% commercial formaldehyde (CF), Sal CURB [Kemin Industries, Des Moines, IA] or 1% MCFA blend (Blend) of 1:1:1 C6:C8:C10 [PMI, Arden Hills, MN]) and timing of application pre- or post-inoculation with PEDV; plus a positive control (PC; feed inoculated with PEDV and no chemical treatment). All combinations of treatment and timing decreased detectable PEDV compared to PC ($P < 0.05$). Pre-inoculation had decreased PEDV detection compared to post-inoculation ($P = 0.009$). Commercial formaldehyde decreased PEDV detection compared to MCFA ($P < 0.001$). In Exp. 2 and 3, pre-inoculation treatments consisted of: 1) PC, 2) 0.3% CF, and varying levels (0.125-0.66%) and combinations of MCFA (C5:0, C6:0, C8:0, or C10:0). In Exp. 2, treating feed with 0.33% C8:0 decreased ($P < 0.05$) PEDV detection compared to all levels of MCFA and PC. In Exp. 3, treating feed with CF, 0.5-1% Blend, all levels of C6:0+C8:0, 0.25% C6:0+C10:0, 0.33% C6:0+C10:0, 0.25% C8:0+C10:0, or 0.33% C8:0 + 0.33% C10:0 resulted in decreased PEDV detection compared to PC ($P < 0.05$). In Exp. 4, feed was treated pre-inoculation with either 1) no treatment (PC), 2) 0.3% CF, 3) 0.5% Blend, or 4) 0.3% C8:0 and analyzed via qRT-PCR and bioassay. Adding 0.5% Blend or 0.3% C8:0 resulted in

decreased PEDV detection compared to PC. All chemical treatments resulted in no evidence of infectivity in the bioassay while the positive control did produce evidence of infectivity. In conclusion, lower levels of MCFA than previously evaluated may provide in-feed protection against PEDV.

Keywords: medium chain fatty acids, PEDV, swine