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Presentation Title: Key SBM functional compounds reduced pathogen-related mortality in growing pigs infected with PRRSv: Results and clinical description.

Abstract

Introduction: This presentation will serve as a review of previously published research¹ evaluating the effects of dietary soy isoflavones (ISF) on the clinical response and wean-to-market growth performance of pigs infected with porcine reproductive and respiratory syndrome virus (PRRSv) during the early post-weaning period.

Methods: Ninety-six weaned barrows were housed in a biosafety level-2 containment facility and allotted to 1 of 3 experimental treatments that were maintained throughout the entirety of the study: noninfected pigs fed an ISF-devoid control diet (NEG, $n = 24$), infected pigs fed the control diet (POS, $n = 36$), and infected pigs fed a diet supplemented with total ISF in excess of 1,600 mg/kg (ISF, $n = 36$). Following a 7-day adaptation period, pigs were inoculated intranasally with either a sham-control (PBS) or live PRRSv (1×10^5 TCID₅₀/mL, strain NADC20). Following inoculation, individual blood samples ($n = 8$ -12/treatment) were routinely collected to monitor viral clearance and hematological parameters, including serum neutralizing anti-PRRSv antibody production. Pen-based oral fluids were utilized to monitor population PRRSv clearance at later growth stages. Comparison of experimental treatments were performed by 1- or 2-way ANOVA depending on whether an outcome was repeatedly measured.

Results: Dietary ISF increased ($P < 0.05$) neutrophil cell counts and the relative proportion of peripherally circulating memory T-cells. Dietary ISF also elicited an earlier, more robust anti-PRRSv neutralizing antibody response when compared to POS pigs and decreased ($P < 0.05$) the time to full PRRSv clearance from oral fluids. Additionally, and most notably, POS pigs experienced ~50% greater wean-to-market mortality compared to the ISF pigs ($P > 0.05$). Regarding growth performance, as anticipated, PRRSv infection decreased growth performance during early growth phases which resulted in 5.4% lower average final body weights (BW) for POS vs. NEG pigs ($P < 0.05$), though this difference was not observed at the time of harvest². Dietary ISF resulted in inconsistent effects on growth performance throughout the growth period. Despite variable impacts on growth performance and lack of statistical differences in live body weight between treatments at the time of harvest, when the data were modeled and applied to current packer pricing grids, the lower mortality experienced by the ISF treatment resulted in an approximately 27% increase in projected revenue relative to the POS treatment.

Conclusions: Dietary ISF supported beneficial immune responses and reduced mortality in PRRSv-infected pigs. Decreasing mortality has direct financial implications to producers. While biological mechanism of these effects remains unclear, these findings suggest that further investigation of soy isoflavones or other soy-derived bioactive components and their application under pathogenic challenge is merited.

¹Smith, B.N., M.L. Oelschlager, M.S. Abdul Rasheed, R.N. Dilger. 2020. Dietary soy isoflavones reduce pathogen-related mortality in growing pigs under porcine reproductive and respiratory syndrome viral challenge. J. Ani. Sci. 98(2). doi:10.1093/jas/skaa024.

²Bryan, E.E., B.N. Smith, L.T. Honegger, D.D. Boler, R.N. Dilger, A.C. Dilger. 2020. Effect of porcine reproductive and respiratory syndrome virus infection and soy isoflavone supplementation on carcass cutability and meat quality of pigs. J. Ani. Sci. 98(4). doi: 10.0193/jas/skaa080.