

Title: Post-processing contamination chemical mitigation strategies to control PEDv in feed and feed ingredients – NPB #14-158

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Scientific abstract: The objective of this experiment was to evaluate the effectiveness of various chemicals to mitigate PEDv in swine feed and ingredients. Treatments were arranged in a 7×4 factorial with 7 chemical treatments and 4 feed matrices. The chemical treatments included: 1) negative control with no chemical addition, 2) 0.003% commercial formaldehyde, 3) 1% sodium bisulfate, 4) 1% sodium chlorate, 5) 3% organic acid blend 6) 2% essential oil blend, and 7) 2% medium chain fatty acid blend. The 4 matrices included: 1) complete swine diet, 2) blood meal, 3) meat and bone meal, and 4) spray-dried animal plasma. Matrices were first chemically treated, then inoculated with 5.6×10^4 TCID₅₀/g PEDv, stored at room temperature, and analyzed by real-time PCR on d 0, 1, 3, 7, 14, 21, and 42. The analyzed values represent threshold cycle (CT) at which the virus was detected, and thus lower values indicate greater nucleic acid presence, not infectivity. Commercial formaldehyde, medium chain fatty acid, essential oil and organic acid addition each decreased RNA concentration of PEDv compared to the control ($P < 0.05$), with the commercial formaldehyde treatment being the most effective on d 0 by decreasing the CT by 1.4 to 2.8 CT compared to the control. Feed matrix appears important in retention of PEDv as RNA concentrations were 1.2 to 3.8 CT higher in the complete swine diet and blood meal than meat and bone meal or spray-dried animal plasma on d 0 ($P < 0.05$). Additionally, PEDv stability over time was influenced by matrix as RNA concentrations only improved 0.7 and 2.9 CT by d 42 for spray-dried animal plasma and meat and bone meal, respectively, compared to 4.1 and 5.6 CT for the complete swine diet and blood meal. In summary, time, commercial formaldehyde, and organic acid treatments all enhance the RNA degradation of PEDv in swine feed and ingredients, but their effectiveness varies within matrix. More research is needed to relate RNA concentration to infectivity and to elucidate the appropriate chemical concentration for each feed ingredient or diet.

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