196 Assessing the effects of medium chain fatty acids and fat sources on PEDV RNA stability and infectivity.

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Research has confirmed that chemical treatments, such as combinations of medium chain fatty acids (MCFA) and commercial formaldehyde, can be effective to reduce the risk of porcine epidemic diarrhea virus (PEDV) cross-contamination in feed. However, the efficacy of individual MCFA levels is unknown. The objective of this study was to compare the efficacy of commercially-available sources of MCFA and other fat sources versus a synthetic custom blend of MCFA to minimize the risk of PEDV cross-contamination as measured by qRT-PCR and bioassay. Treatments were arranged in a 17×4 plus 1 factorial with 17 treatments: 1) Positive control with PEDV and no chemical treatment, 2) 0.3% commercial formaldehyde (Sal CURB, Kemin Industries, Des Moines, IA), 3) 1% MCFA blend [caproic, caprylic, and capric acids; 1:1:1] (aerosolized), 4) 1% MCFA blend [caproic, caprylic, and capric acids; 1:1:1] (non-aerosolized), 5) 0.66% caproic acid, 6) 0.66% caprylic acid, 7) 0.66% capric acid, 8) 0.66% lauric acid, 9) 1% capric and lauric acid (1:1 ratio), 10) 0.3% FRA C12 (Framelco, Raamsdonksveer, Netherlands), 11-15) 1% choice white grease, soy oil, canola oil, palm kernel oil, and coconut oil, and 16-17) 2% palm kernel oil and coconut oil-; 4 analysis days: 0, 1, 3, and 7 post-inoculation; and 1 treatment of PEDV negative, untreated feed. Feed was first treated, then inoculated with PEDV, and stored at room temperature until analyzed by qRT-PCR and swine bioassay. The bioassay was performed by administering Day 1 aliquots of treatments by oral gavage to 10 d old pigs, and collecting fecal swabs every 2 d. The values represent threshold cycle (CT), where a higher CT represents less detectable RNA. All main effects and interactions were significant ($P < 0.002$). The interaction of treatment × day indicated that over time the MCFA treatments, either as a mixture (aerosolized 39.0 CT, and non-aerosolized 40.0 CT), or as individual fatty acids (caproic 37.0 CT, caprylic 37.3 CT, and capric 35.3 CT), and Sal CURB (37.3 CT), had less detectable PEDV RNA compared to the control (32.7 CT). These treatments also resulted in negative bioassays. Day also had a significant impact as CT increased from 29.5 to 34.6 from Day 0 to 7, respectively. In summary, time, Sal CURB, 1% MCFA, 0.66% caproic, 0.66% caprylic, and 0.66% capric acids all enhance the RNA degradation of PEDV in swine feed.

197 Estimation of energy and nutrient composition of food waste from different sources as potential use in swine diets.

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In the United States, approximately 40% of the food produced is wasted annually, representing about 60 million t, and valued at $165 billion dollars. The objective of this study was to investigate nutrient and energy variability in food waste sources collected in the Minneapolis-St. Paul, MN metropolitan area, and their potential for use in swine diets. A total of 3 food waste sources were selected and included a supermarket (SM; retail to consumer), university residential dining hall (RH; consumer to post-consumer), and a waste recycling and transfer station (TS; post-consumer to municipal waste disposal). Samples were collected directly from each site during 12 visits throughout 2015. After collection, samples were oven dried for 72 h at 60°C and ground. Samples were analyzed for inputs to NRC (2012) DE, ME, and NE equations (GE, DM, CP, ether extract, starch, ADF, NDF, and ash). Samples were also analyzed for fatty acid profile and thiobarbituric reactive substances (TBARS). Reference values were obtained from NRC (2012). Data were analyzed using 1-way ANOVA with waste sources as fixed effect. Samples of SM contained the highest ($P < 0.05$) amount of calculated DE (5016 kcal/kg), ME (4832 kcal/kg), and NE (3740 kcal/kg) among the three sources. Samples from SM and RH, but not TS, had greater DE, ME, and NE than corn and soybean meal. Samples of SM contained the most Lys (1.82%) and Met (0.53%) among the sources ($P < 0.05$), but less than soybean meal (Lys 2.79%, Met 0.60%). Samples of TS contained the highest amount of linoleic acid (7.05% DM) among the three sources ($P < 0.05$) and all three sources were greater than corn and soybean meal. Likewise, samples of SM contained greater ($P < 0.05$) iodine value product (211) compared with RH (95) and TS (71). All samples contained low TBARS (SM: 0.17; RH: 0.16; and TS: 0.18 mg MDA eq/g oil). Although the concentrations of nutrients and calculated energy values of SM, RH, and TS were comparatively high compared with corn and soybean meal, their composition was highly variable (SD > 300 kcal/kg for GE, DE, ME and NE; SD > 3% for CP, ether extract, NDF and ADF). Pre-consumer food waste (SM) appears to have greater nutritional value than post-consumer food waste (RH and TS), but all sources are suitable for use in commercial swine diets provided that iodine value product and TBARS are properly managed.