RESEARCH ABSTRACT

ENVIRONMENT

Title: Carbon, water, and land use for pork production when modifying type and regional sourcing of feed ingredients – **NPB #17-128**

Final revised

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Date Submitted: September 6, 2018

Scientific Abstract

Major food companies, including the largest pork producer in the US, have initiated supply chain management programs to minimize their carbon footprint in response to consumer demands and societal concerns. One area highlighted for continued improvement is animal feed, which is the second largest impact category for pork production. We have created a hotspot LCA analysis focused on four pig diets: DDGS, Food Waste, Synthetic AA, and Inorganic P. We compared these four alternative diets to a control diet of corn and soy for three regions in the US (Mid-West, Central and Mid-Atlantic), using our Food System Supply-chain Sustainability model (FoodS^3) to incorporate county specific differences for environmental impacts. We found that a diet using processed food waste has the lowest land and water impact, while the control diet has the lowest GHG impact. We also found that the Mid-West has the lowest GHG impact diets, across diet formulations, the Mid-Atlantic has the lowest water footprint across diet formulations, and the Central diet has the lowest land impacts for all but one diet formulation. However, a complete LCA analysis, including production impacts from all feed ingredients is needed to determine the "best" diet from a carbon, water, and land perspective. Furthermore, work in this area needs to move beyond changing one ingredient to analyzing variations of complex feed. Most commercially available diets in the US contain synthetic AA and inorganic P and many include DDGS. Any changes to production systems must consider the concurrent effects on pig growth, meat quality and economics. With increasing focus on sustainability, both changes to inputs and changes in production systems must consider the effect on environmental impacts. However, determining what changes to feed inputs are truly sustainable remains an ongoing question.