

USE OF A HUMIC SUBSTANCE AS A TOOL TO IMPROVE FINISHING PIG PRODUCTIVITY

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Average finishing pig mortality continues to increase (4.6% in 2012 vs. 5.2% in 2022; Metafarms, 2021). This industry-wide increase in finishing mortality may be due to several ongoing health challenges. Although feeding a humic substance (HS) to provide bioactive components such as humic and fulvic acids does not likely address pathogen loads directly, feeding a HS may help support animal defense mechanisms by reducing free radicals associated with oxidative stress. Additionally, increased levels of endogenous antioxidants and maintaining more of a homeostatic state during periods of stress can potentially make animals more resilient in the face of environmental and other challenges encountered during the finishing grow-out period.



Humic Substance
(AAFCO 73.241 - Reed-Sedge Peat)

FEEDING A HUMIC SUBSTANCE HELPS SUPPORT OXIDATIVE BALANCE AND ANIMAL HEALTH

A research study conducted in pigs (Weber et al., 2014) observed that pigs fed a HS had increased serum glutathione levels (Fig. 1). Increased levels of this important endogenous antioxidant may be indicative of an improved antioxidant capacity. Interestingly, this finding aligns with data from more recent published research studies conducted in laying hens (Stepchenko et al., 2021) and rodents (Vaskova et al., 2019) where it was observed that feeding a HS increases endogenous glutathione levels. In the abovementioned pig research study (Weber et al., 2014), pigs fed a HS maintained greater serum glucose levels when subjected to an inflammatory challenge model in the form of an *E. coli* lipopolysaccharide (LPS) injection. This suggests that pigs supplemented with the HS maintain a more favorable energy status enabling them to better cope with challenging scenarios. It is also interesting that when the HS was fed in combination with a source of butyric acid the increase in serum cortisol, a stress hormone, was substantially decreased (~62%) post LPS challenge indicating that there may be further benefits when combining a HS with other feed additive technologies.

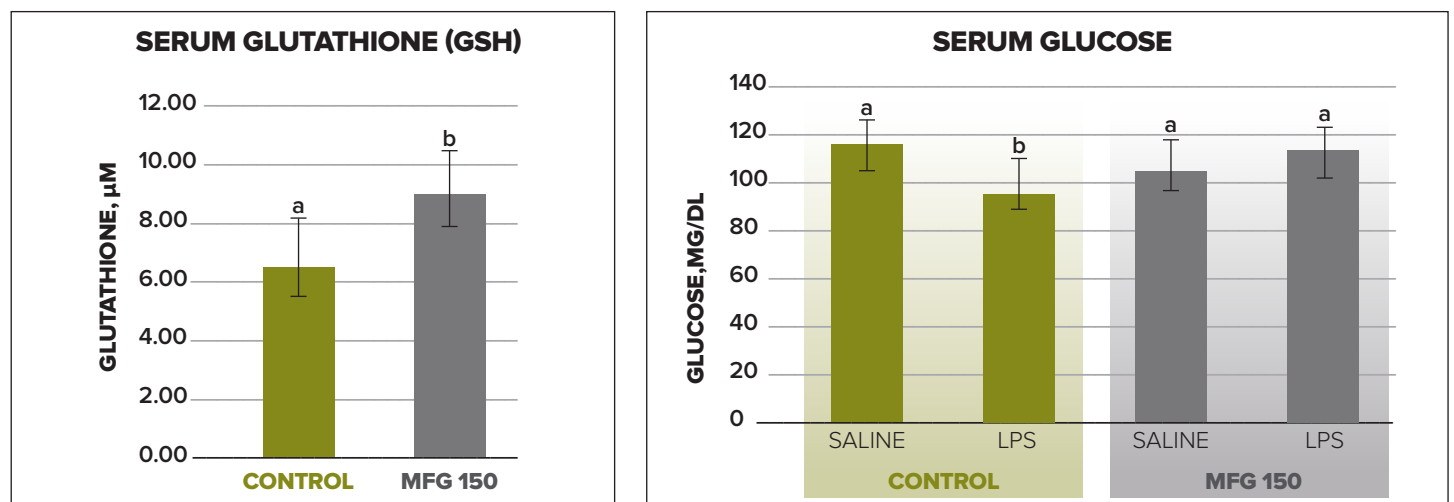


Figure 1. The effect of Humic Substance Supplementation on Serum Glutathione and Glucose Levels After Challenge with *E. coli* Lipopolysaccharide (LPS). Reference: Adapted from Weber et al., 2014

HUMIC SUBSTANCES ENHANCE ANIMAL RESILIENCE IN THE FACE OF ENVIRONMENTAL STRESSORS

Studies conducted in broilers (Edmonds et al., 2014) have demonstrated that feeding a HS improves livability when broilers are subjected to heat stress conditions (heat index of 124.5°F). From a mechanistic perspective, an improved antioxidant status and decreased inflammatory response as shown in published studies evaluating HS may allow animals to better cope with heat stress. Another aspect of HS biology that may lead to animals becoming more resilient in the face of environmental stressors when they are fed a HS is the positive impact on intestinal morphology and intestinal connective tissue integrity. Some earlier original basic research (Yasar et al., 2002) observed increased intestinal villus height and crypt depth in animals fed a HS. It was also observed that intestinal hydroxyproline content was increased in animals fed a HS which is reflective of increased collagen content. Mechanistically, humic substances have been shown to directly increase the chemical and physical resistance to degradation of collagen fibers (Riede et al., 1992) which may lead to greater intestinal connective tissue integrity.

BENEFIT TO PORK PRODUCERS

Feeding a HS to finishing pigs, through its indirect effects on antioxidant systems, and other protective mechanisms, enables finishing pigs to better thrive during the grow out cycle. This benefits the producer in terms of improved livability. In a series of 11 finishing pig studies conducted over several years by the Kent Nutrition Group, it was observed that feeding a HS, on average, improves livability by approximately 0.7%. The improved livability benefit with feeding a HS (Fig. 2.), estimated at \$1.50 per pig placed for each 1.0% decrease in mortality, demonstrates an almost certain return on investment when feeding a high-quality HS to finishing pigs.

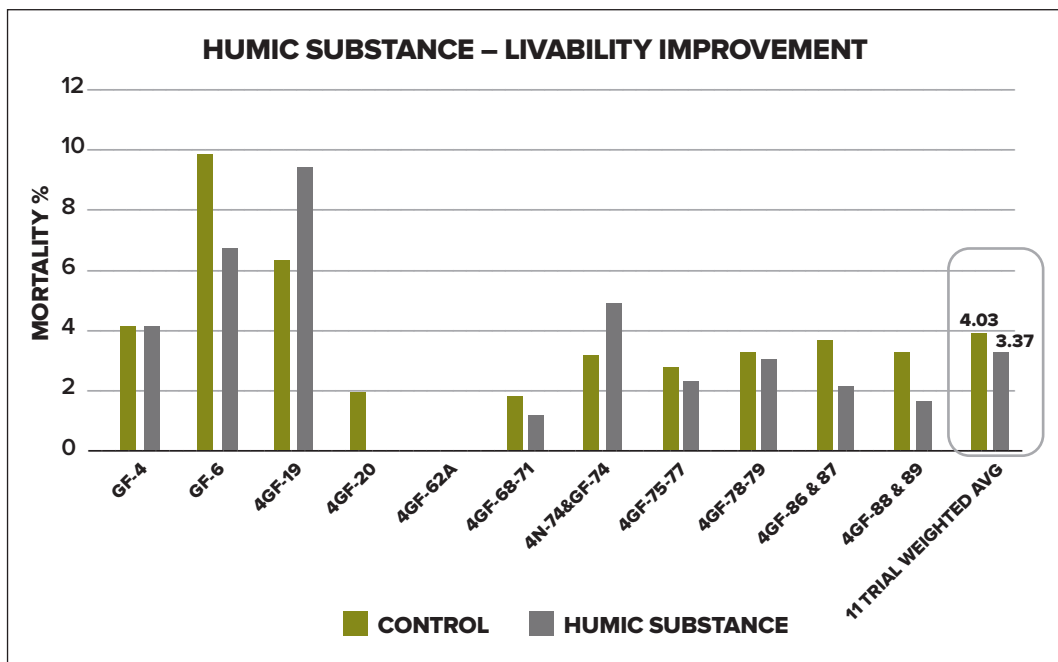


Figure 2. Summary of animal mortality with humic substance application across several trials. Data presented are livability improvement across trials and the weighted average of all trials.