1051 Reducing phosphorus solubility in animal manures using chemical amendments. J. D. Toth*[1], G. Zhang[1], Z. Dou[1], and J. D. Ferguson[1], [1]*University of Pennsylvania*.

Controlling nutrient losses from animal manures when they are land-applied is a critical factor in nutrient management, promoting environmental health and maintaining the sustainability of animal agriculture. Phosphorus is of particular concern due to its implication in eutrophication of surface waters and declines in water quality. We conducted a laboratory experiment to test the effect of several chemical amendments on reducing P solubility of animal manure. Freshly excreted swine or dairy manure samples were treated with aluminum sulfate (alum) or coal combustion byproducts: fluidized bed combustion flyash (FBC), flue gas desulfurization product (FGD), or anthracite refuse flyash (ANT). After incubation at ambient temperature for 3 d, subsamples were dried and ground. Samples were extracted with shaking for 1 hr in deionized water and the pH and inorganic and total P concentrations measured. Selected samples were extracted using a sequential procedure developed in our laboratory to identify the changes in soluble P forms as a function of amendment type and rate. Compared to untreated controls, alum, FBC and FGD substantially reduced water soluble inorganic P in the 1 hr extract in fresh swine manure (by 80, 60 and 77%, at 250, 400 and 250 g amendment per kg DM manure, respectively). The 1 hr water extractable inorganic and total P in dairy manure were reduced by an average of 65 (alum at the 50 g rate) and 50% (FBC at the 400 g rate). The ANT amendment was ineffective in reducing water soluble P in swine manure, and both ANT and FGD ineffective in dairy manure. In the sequential, repeated extraction trial, addition of the amendments alum, FBC or FGD to swine manure reduced the total water soluble inorganic P concentration and increased the concentrations of bicarbonate, hydroxide and acid-soluble P by 11-21% compared to the control, demonstrating effectiveness in shifting inorganic P from the most vulnerable, water-soluble fraction to less soluble forms. The alum and FBC amendments had a similar effect on the dairy manure samples. Additional trials are planned to examine the amendments for other manure types and to refine effective rates of addition to reduce soluble P.

Key Words: Phosphorus Solubility, Nutrient Management, Manure Nutrients

Beyond pH: Metabolic Factors Affecting Pork Quality

1052 The Effect of the RN$^-$ Allele on Meat Quality and how the Gene was Discovered. K. Lundstrom* and L. Andersson, *Swedish University of Agricultural Sciences, Uppsala, Sweden*.

The RN$^-$ allele was first identified in France as causing a reduction in the yield of cured cooked ham from composite lines containing the Hampshire breed. The effect was determined by "Napole yield" (Rendement Napole in France), a standardized method for estimating yield. The dominant allele decreasing the yield was called RN$^-$ and was due to an increase in muscle glycogen content. The RN locus has been mapped to chromosome 15, and has recently been identified as a mutation in the PRKAG3 gene, which encodes a muscle-specific isoform of the regulatory λ subunit of adenosine monophosphate-activated protein kinase (AMPK).

The RN$^-$ allele has a great effect on technological meat quality, leading to a decrease in ultimate pH and water holding capacity, and an increase in reflectance value. The chemical composition of meat is also altered with an increase of glycogen and water content and a reduction of protein content. These changes lead to a reduction in the yield of cooked cured ham. On the other hand, the eating quality is enhanced. In several Swedish studies, pork from animals carrying the gene had higher juiciness, meat taste and acidulous taste and usually a higher tenderness. Also Swedish consumers preferred pork from carriers of the RN$^-$ allele in comparison with non-carriers. Processed meat from RN$^-$ carriers also showed a higher juiciness and tenderness in sensory tests with a trained panel. In contrast, French results showed a negative effect on eating quality. Also, the production traits are altered as an effect of the RN$^-$ allele, leading to a higher growth rate and a higher proportion of lean meat in the carcass.

The gene frequency of the RN$^-$ allele has been around 0.6 in Swedish Hampshire. Due to the negative effect of the RN$^-$ allele on technological meat quality, most countries and breeding companies would like to eliminate the mutation. With the mutation identified, this could be easily achieved. However, the positive effects of the RN$^-$ allele on eating quality should be taken into consideration.

Key Words: RN$^-$ allele, Meat Quality, Napole Yield