

Public Abstract

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Phosphorous is necessary for crops and livestock, but excess phosphorous in rivers and lakes can result in eutrophication, which is when algae blooms deplete the dissolved oxygen content below levels that other species need to survive and thus forms a dead zone. The majority of the phosphorous in grains is in the form of phytate which cannot be digested by non-ruminants and is thus excreted in the feces. This requires adding inorganic phosphorous to the diet to meet nutrient requirements, representing an additional cost to the farmer. Phytase is an enzyme that frees the phosphorous and other nutrients that are in phytate so they can be digested and absorbed by the animals. Therefore phytase has the potential to decrease the cost of feed and also decrease the phosphorous in feces, thus decreasing the potential for nutrient runoff. In the Midwest, phytase has been routinely incorporated by feed companies in non-ruminant diets for several years based on cost savings. The knowledge of this win-win technology is affected by its relative invisibility; phytase easily blends in feed rations, requires no extra labor by the farmer, and has no visible effects on the animals. The focus of this study is to examine the knowledge of the farmer concerning phytase and the factors that affect its adoption.

A mail survey of 3014 poultry and livestock farmers was conducted in Iowa and Missouri in spring of 2006. The effective response rate was 37.4 percent. Farmers were asked a variety of questions regarding socioeconomic and farm characteristics, and perceptions regarding manure management practices. Over 60 percent of the respondents neither agreed nor disagreed (i.e. were neutral, 3 on a scale of 1-5) with four questions regarding their perceptions of phytase characteristics: if it is profitable, improves water quality, is time consuming, and is complicated. This would indicate that farmers are not very knowledgeable about the practice. Additionally, while most non-ruminant farmers use phytase, no farmers with broilers, less than five percent of farmers with turkeys, and less than half of the swine farmers stated phytase use. Overall, only 18 percent of non-ruminant farmers stated phytase use, 46 percent stated they did not use phytase, and 36 percent stated they did not know. This suggests an information disconnect between farmers and feed manufacturers/contractors and that we are measuring knowledge rather than actual adoption.

Statistical analysis of the data was conducted and found that farmers are significantly more likely to state phytase adoption if they think phytase is profitable or not time consuming. They are also more likely to state phytase adoption if they give manure to other farms, are located in Iowa, or are a designated CAFO. The farmers are less likely to state phytase use if they have off-farm income between \$10,000 and \$99,999 (compared to no off-farm income) or have poultry or ruminant species (compared to swine weighing less than 55 pounds).

Additionally, farmers are significantly more likely to state *do not know* (versus *no*) concerning phytase use if they earn \$0 - \$9,999 in off-farm income and remain neutral concerning the influence other farmers have on their decisions. Farmers are less likely to state *do not know* if they view phytase as not profitable, have education beyond high school, have beef cattle on feed, or indicate that contractors/integrators have low influence on their decisions.

This study shows that surveys with do not know response options can provide useful information to the researcher or educator. It also shows the importance of understanding the technology, industry, and locus of decision-making in adoption research; phytase was able to be adopted automatically and nearly completely by non-ruminant farmers who remained uninformed of this win-win technology.