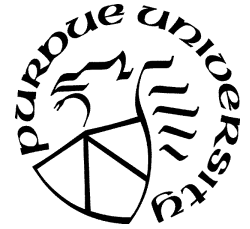


# ANIMAL ISSUES



## Briefing

### Total Farm Nutrient Management - Manure *Treatment*

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#### Situation

Increased public concern, proposed legislation, and the potential of greater environmental regulations have created a major threat to the viability of livestock and poultry production in Indiana. Livestock and poultry producers have been forced to expand the size of their operations to remain economically competitive, while at the same time many rural areas have been experiencing tremendous increases in population densities. This situation has heightened environmental concerns.

The USEPA and USDA have identified livestock production as a major contributor to water pollution. Over application on land of manure nutrients can increase nitrogen (N) and phosphorus (P) levels in water sources resulting in increased nitrate concentrations in drinking water, alga blooms, fish kills, and hypoxia. EPA and USDA recently published a strategy with a baseline initiative for controlling manure nutrients on cropland throughout the US. In the strategy, manure application will be based on agronomic rates, which in many cases, will use crop P removal, resulting in a requirement of 2.5 to 4 times more land than currently required for manure utilization. This will severely limit many livestock operations. For some operations, the quantity of nutrients being purchased and brought onto the farm is greater than the nutrients removed. In the long term, these operations will not be sustainable if the US EPA/USDA strategy is fully implemented.

Indiana General Assembly House Bill 1915, enacted in 1997, requires livestock producers to develop a manure management plan by July 1, 2000. In addition, IDEM has drafted rules over the past 18 months that, if adopted, will require Indiana livestock and poultry producers to develop and implement a more extensive manure management plan. Following is a summary about what we know, what we don't know, and what is being done concerning treatment of manure to fit into a balanced total farm nutrient management.

#### What We Know

- For over 30 years, research has been conducted in the US and Europe on various biological treatments of animal manure. Goals were to either conserve nutrients or remove and stabilize readily degradable organic matter for easier handling, preservation, or utilization.
- Odor control has been a primary focus of many treatment systems where additional oxygen has been added to the manure to control anaerobic volatile gas emissions.

- Some treatment systems have included technologies that capture methane as an energy source; provide compost for horticulture, garden, and mushroom production; production of chars and industrial petrochemicals by pyrolytic procedures, and provide nutrients for algae aquaculture production. Constructed wetlands absorb nutrients from dilute wastewater and have the additional environmental benefit of serving as a wildlife habitat. Fermentation, acidification, drying, and composting procedures have been used to preserve or stabilize nutrients in animal manure.
- Most of these treatment processes require high labor, equipment, and energy inputs, with little or no economic return to the farm. Economic incentives, niche markets or other benefits related to the well-being of the business would greatly increase adoption of treatment systems. Due to the dry nature and high-nutrient content of poultry manure, some poultry operations have been able to process and sell poultry manure products commercially in niche markets such as garden houses and golf courses. Horse manure has been used extensively in commercial mushroom production.

### **What We Don't Know**

- Practical, dependable, and economical processes to concentrate nutrients from manure for energy production, soil amendments, and other value-added products, have not been developed. Reliable odor control has not been accomplished in field situations.
- Specific management and design guidelines for economically sustainable treatment of dilute manure with constructed wetlands are not known. Also, the long-term effectiveness of constructed wetland for manure treatment is still in question. There is no incentive for effective tertiary manure treatment since Indiana is a no discharge state for livestock operations. Therefore, partial treatment is used only to reduce odor and stabilize the manure before land application.

### **What We Are Doing**

- Methods to extract manure nutrients, such as flocculation or chemical precipitation are being developed.
- Composting technology for manure is being developed. The potential for mixing several by-products to produce a stable, useful material is being investigated.