

Treating Livestock Manure: Available Technology, Effectiveness, and Costs

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Recycling of livestock manures by land application for plant uptake and crop production is a traditional and proven technique. When properly carried out, targeted land application enabling crop uptake can be the basis of an environmentally safe and friendly method of manure management. However, the pressures on animal farming are increasing every day, and in some cases, existing methods are not adequate for dealing with the environmental problems arising from livestock manure. Farms located close to housing can expect odor nuisance complaints and those near rivers, streams, and lakes are all too aware of the penalties of pollution following runoff or spillage. The problems related to manure production and handling run deeper, with a range of less apparent pollution issues now becoming evident. Of increasing concern is the potential for spread of diseases (air or waterborne) and emissions to air, especially odor of hydrogen sulfide and ammonia.

Processing and/or biological treatment of manure is a step beyond currently accepted good agricultural practice in the Midwest that may be justified only when odor problems or water-pollution risks have been identified in a manure/nutrient management plan. The cost and level of management skill required for the implementation and operation of treatment schemes should not be underestimated and must be added to the cost of collecting, storing, and spreading the manure.

In this paper, we summarize existing information on: (1) alternative treatment technologies for livestock manure (mechanical solid separation, physical-chemical treatment, and biological treatment), (2) effectiveness of systems in reducing odor and gaseous emissions, organic matter (COD, BOD and solids), nutrients (N and P), and bacterial indicators; and (3) systems capital and operational costs.

Although there is still much debate on the advantages and disadvantages of different treatment strategies, a range of perceived benefits may include abatement of odor, stabilization of organic matter and nutrients, improvement of handling characteristics in storage and during spreading, and control of pathogens. The implementation of manure-treatment systems has a clear role in the overall management scheme, but most of these systems remain to be proven as either effective and/or economical enough and practical at the farm level.

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