



University of Kentucky
UKnowledge

Soil Science News and Views

Plant and Soil Sciences

9-1987

Sludge for Agricultural Land

William O. Thom

University of Kentucky, wthom@uky.edu

Right click to open a feedback form in a new tab to let us know how this document benefits you.

Follow this and additional works at: https://uknowledge.uky.edu/pss_views

 Part of the [Soil Science Commons](#)

Repository Citation

Thom, William O., "Sludge for Agricultural Land" (1987). *Soil Science News and Views*. 117.
https://uknowledge.uky.edu/pss_views/117

This Report is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in Soil Science News and Views by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.



Department of Agronomy

Soil Science News & Views



Vol. 8, No. 9, September 1987

Sludge for Agricultural Land

William O. Thom

Sludge is a product of municipal wastewater treatment with characteristics dependent on both the initial wastewater composition and the subsequent treatment processes used. The sludge composition influences the options that are available its use. For decades, the objective has been disposal, generally meaning that it was buried in a landfill or incinerated. Efforts in recent years have been directed toward application of sludge to agricultural land. Farmers should be aware of several potential problems when deciding whether or not to use sludge for such purposes.

Land Application

Land application, applying sludge on or just below the soil surface, is the most widely employed sludge use option in the U.S. today. Sludge supplies organic matter, major fertilizer elements and micronutrients to soils and plants. In addition, there are potentially hazardous constituents. Sludge contains a group of elements called heavy metals, some synthetic organic chemicals, and several microorganisms, some of which may cause diseases. Because the composition varies greatly, each sludge intended for land application should be analyzed separately.

Soil Productivity and Nutrients

Sludge supplies organic matter to soils, which improves soil structure and workability, increases water retention, permits easier root penetration, and reduces water runoff and soil erosion.

The nutrient content and availability of sludges are much lower than most commercial fertilizers. However, N and P are found at significant levels in most sludges, Ca is usually adequate, but levels of K and Mg are low. Many sludges contain all the micronutrients required for plant growth, however, just as with the macronutrients, the proportions are not optimum for plant growth. Plant

COOPERATIVE EXTENSION SERVICE
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF KENTUCKY
COLLEGE OF AGRICULTURE
LEXINGTON, KENTUCKY 40546

AN EQUAL OPPORTUNITY EMPLOYER

BULK RATE
POSTAGE & FEES PAID
USDA
PERMIT No. G268

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

availability of nutrients from sludges is different than from fertilizers and is difficult to assess. The variability in nutrient availability and associated crop response under field conditions indicate that reliable recommendations of sludge rates are difficult to make.

Crop Response

High N requiring crops that produce marketable seed are the best for utilizing the N and thus reducing the potential for N leaching into groundwater. Forage grasses can utilize the N in sludge but should be applied 60 days ahead of cutting for hay or 6 months before grazing. Legume crops have the ability to "fix" their N needs, thus sludge can depress yields of legumes when grown the first year after application.

Heavy metals applied in sludge will remain safely in the soil if the soil pH is maintained at 6.5 or above and soil erosion and water runoff are controlled. Heavy metal uptake by crops is also affected by the physiology of the crops, which has prompted severe restrictions for growing some crops following sludge application. Leafy crops such as lettuce, chard, and tobacco take up more metals than do crops such as corn, forage grasses or small grains. Sludge application to cropland should be monitored frequently with soil and plant tissue samples to determine any buildup of heavy metals or other problems.

Precautions and Regulations

Some sludges are suitable for application to agricultural land while others are not, and should not be used. All use of sludge should be done cautiously. Soil and plant tissue samples should be analyzed periodically after sludge application to monitor for buildup of heavy metals or development of potential problems.

Land application of sludge is regulated by both the Federal and State governments. In Kentucky this practice is regulated by the Department of Environmental Protection, Division of Waste Management at Frankfort. Current Kentucky regulations should be thoroughly reviewed before considering land application.

W.O. Thom
Extension Soils Specialist