Sewage sludge application data given

Editor's Note: The following article on the "Land Application of Sewage Sludge" was contained in the March issue of "The Agronomist," publication of the Maryland Extension Service.)

In recent years, much publicity and controversy has developed regarding the environmental consequences of what can be done with the vast quantities of sewage sludge which are accumulating at numerous sewage treatment plants across the state. Because so little scientific information is yet available regarding the long-term effect of sludge applications on the environment, sludge can become an emotional issue very easily. And thus, the controversy grows. Disregarding the emotional aspects of the issue, just what is sewage sludge and what do we know about its suitability for land application.

Sewage sludge is the solid portion of wastewater, or more accurately, the solid material that remains after wastewater treatment. The major objectives of sewage treatment is removal of suspended solids and other contaminents from wastewater so that when the effluent leaves the treatment plant, it will have minimum impact upon the environment. But, as wastewater treatment processes are improved to clean the effluent, the "dirtier" the sludge left behind becomes. Dirty sludges high in pollutants are not as desirable for land application as are "clean" sludges.

Maryland's growing population currently generates approximately 525,000 wet tons per year (20% solids and 80% water) Of this, about 275,000 wet tons are produced at the Blue Plains Waste Water Treatment Plant near Washington, D.C., and 180,000 wet tons are produced at Baltimore's Back River Plant. The remaining 70,000 wet tons/year are generated by the numerous other waste water treatment plants across the state.

It has been estimated that by 1985, approximately 38% of the land area of the 12 Northeast states would be required to accommodate the sludge produced if all sewage sludge were applied to land

There are three general types of sludge produced as a result of that various stages of treatment

(1) Primary sludge consist of the solid material that settles out or is skimmed off during the first treatment stage. No further treatment is carried out on this material. Primary sludge is not recommend for land application.

(2) Secondary or biologically treated sludge consists of the flocculated products of aerated microbial digestion of raw organic sludge. Much of the raw soluble and suspended organic material is digested by microbial organisms. Coliform bacteria are reduced by about 95%. This form, when stabilized, represents most of the sludge amenable to land application. Secondary sludge may be stabilized, by chlorine oxidation, heat treatment, anaerobic or aerobic digestion, or by treatment with lime. The stabilization process reduces offensive odors and disease organisms
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(3) Tertiary sludge, which constitutes a very small portion of all sludges, is subjected to additional physical and chemical treatment such as filtration, chemical precipitation, or further chemical and biological treatment to reduce nutrient concentrations. Because of the final chemical treatment, tertiary sludges may not be appropriate for land application.

After the sludge is processed, it can leave the sewage treatment plant either as liquid sludge (1% to 10% solids), semi-solid "cake" (20% to 30% solids), or as a dry sludge with 25% to 80% solids. One further optional process is composting, Composting is a controlled aerobic, thermophilic microbiological process which results in the removal of most odors, enteric pathogens and live seeds. Some organic matter and nitrogen is also lost. But the heavy metals such as copper, cadmium, lead, zinc, nickel, etc remain. The composted product is much easier to handle and spread than other forms of sludge. It is a humus-like material containing about 20% moisture.

There are both advantages and disadvantages to the land application of sludge. On the plus side, sludges supply organic matter, and are excellent sources of nitrogen and phosphorus which are valuable fertilizer nutrients. Sludges in Maryland have been found to contain from less than 1% to more than 10% nitrogen with 2% to 7% common. They may also contain from less than 1% to more than 14%. Phosphorus with 3% to 8% common. Sewage sludges contain very little, if any, potassium. Potassium is not organically bound, as most of the nitrogen and phosphorus, are, thus is removed almost totally in the effluent.

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