Potential Use of EM for Composting Wood and Paper Processing Wastes

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Background

Wood and paper processing wastes are largely ligno-cellulosic materials that are produced in large volumes in the industrialized world. They are often in the form of sludges and have undesirable chemical properties as a result of the process from which they are derived. Land application is the cheapest and most expedient disposal option, but this requires large land areas. Because of their unusual chemical and physical characteristics, these wastes often decompose rather slowly. Nevertheless, they do present a serious environmental pollution hazard. Thus, there is an urgent need to develop methods whereby these wastes can be transformed into useful organic amendments (i.e., soil conditioners and biofertilizers) through composting.

Experimental Procedure

A laboratory and greenhouse study was conducted to determine whether Effective Microorganisms (EM) could enhance the composting process for converting a paper waste sludge into good quality compost for safe and beneficial use as a soil conditioner and biofertilizer. The paper mill sludge was amended with nitrogen and phosphorus fertilizers to lower the C:N and C:P ratios, and with rice bran to provide a readily available carbon and energy source for the microorganisms. The objective here was to accelerate the decomposition rate of the sludge. The treatments consisted of a control (no EM) and three levels of EM (i.e., dilutions of 1:1000, 1:500 and 1:100); two levels of rice bran were mixed thoroughly with 6.2kg of sludge and then composted in small piles in the laboratory and greenhouse. The piles were moistened to 50 percent moisture by weight. The experiment as a completely randomized design with three replications.

Preliminary Results

1. Compost was produced in approximately 10 days. The composting time progressively decreased as the EM level increased (i.e., as the dilution level decreased).
2. The completeness of composting and the rate of decomposition was assessed by carbon dioxide evolved, temperature changes, odor, color, compost texture, and compost bioassay tests with lettuce seedlings in the greenhouse.
3. Rice bran and EM at the low dilution levels (i.e., high levels of EM organisms) resulted in greater microbial activity, greater decomposition rates, and better quality compost compared with sludge treated only with rice bran.
4. Compost produced from the paper mill sludge treated with EM was used successfully in the production of *Eucalyptus* sp. seedlings for the paper and cellulose industries. This is an excellent example of how an industry's waste is being recycled for its own advantage and for the benefit of society and the environment.
5. Evaluation of EM for composting paper and cellulose industry waste will be continued with results presented in due course.