Reduce, reuse, recycle

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Abstract (Summary)
Researchers from the Forest Products Department at Mississippi State University have taken the first step toward solving waste management problems faced by furniture manufacturers and poultry producers. In a recent six-month study, they learned that wood waste from furniture production composted with poultry litter resulted in a less toxic and potentially more useful byproduct. Proper application of litter provides the nutrients to support plant growth while improving soil quality with the addition of organic matter. Composting is a proven method that can reduce waste volume and toxicity, and transform waste into a product that can be used as a soil amendment to increase organic matter and waterholding capacity, as well as improve soil texture. Composting in this manner could be an economical, simple, safe and viable option for waste disposal and utilization. The composted materials can be used as soil amendments or potting media.

Full Text (932 words)

[Headnote]
Composting furniture wood waste with poultry litter makes for a more beneficial byproduct

Researchers from the Forest Products Dept. at Mississippi State University have taken the first step toward solving waste management problems faced by furniture manufacturers and poultry producers.

In a recent six-month study, they learned that wood waste from furniture production composted with poultry litter resulted in a less toxic and potentially more useful byproduct.

The study is important because furniture manufacturing and poultry production are key enterprises in Mississippi. The state's furniture production ranks second nationally, and furniture companies produce large quantities of waste - hardwood and softwood sawdust, wood chips, wood flakes, fabric scraps and more - during their manufacturing cycle.

One viable disposal method is burning the wood waste for energy. Unfortunately, many small furniture manufacturers don't have facilities to burn their wood waste. Selling the wood waste to other firms typically results in a negative cash flow because the cost of transportation usually exceeds the price received. One small company located in the Mississippi Delta estimates spending at least $6,000 each month for landfill disposal of its wood waste.

Mississippi ranks fourth nationally in broiler production. The annual revenue of farm income for poultry/eggs is about $2 billion, or 32 percent of the total value of the state's agricultural products. There are approximately 2,800 broiler, breeder and pullet farms - 2,000 of which are broiler farms.

Broilers are produced in a single-story production facility with 4-6 inches of wood chips or rice hulls on the floor as bedding material. Manure mixed with the bedding material is referred to as "litter."

Each year Mississippi produces approximately 830 million broilers, which have the potential to produce approximately 1 million tons of litter annually. The normal practice is to apply the litter to pastureland as fertilizer.

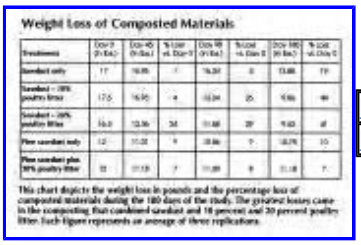
Useful fertilizer

Proper application of litter provides the nutrients to support plant growth while improving soil quality with the addition of organic matter. Recent research has indicated that poultry litter is a useful fertilizer for row crop and forestry production. Researchers are continuing to look for other uses for poultry litter.

Composting is a proven method that can reduce waste volume and toxicity, and transform waste into a product that can be used as a soil amendment to increase organic matter and waterholding capacity, as well as improve soil texture.

Wood waste composted with a nitrogen source such as poultry litter could provide a good solution to farmers. A greenhouse study discovered that this combination was comparable to rich potting media used by farmers.

The objectives of this study were 1) to evaluate the biotechnology of composting furniture production waste with different concentrations of added chicken litter, and 2) to test the toxicity of the composted wood waste.


Weight Loss of Composted Materials

Enlarge 200%
Enlarge 400%

Weight Loss of Composted Materials

A Mississippi furniture plant provided the wood waste and a local sawmill provided fresh Southern yellow pine sawdust. The wood waste was cleared of large materials (essentially reducing it to sawdust) and mixed well. Local poultry farms provided litter, which was allowed to dry.

The process

Fifteen plastic containers held the sawdust and litter mixture. Five holes were drilled into the bottom of each container to prevent water retention and anaerobic conditions. The containers were numbered and weighed. Treatments then were randomly selected for each container. Approximately 17 pounds of sawdust were placed into each container, except for pine sawdust.

This study consisted of these five treatments, replicated three times:

1. A control containing 17 pounds of sawdust only

2. 17 pounds of sawdust, plus 10 percent litter

3. 17 pounds of sawdust, plus 20 percent litter

4. 12 pounds of pine sawdust only

5. 12 pounds of pine sawdust, plus 30 percent litter

The containers were randomly placed outdoors, in two rows, for six months. When needed, an aerator turned the contents. Compost samples were collected at day O, 45, 90 and 180.

Toxicity was measured using a Microbics Model 500 Toxicity Analyzer. Decomposition rate was determined by measuring weight loss, based on total dry weight, of test units at each sampling time. The pH was analyzed using a Markson Microcomputer pH-Vision 6072.

All treatments containing furniture waste showed significant weight loss at day 180. Weight reduction was more significant for litter-amended treatments, but there was no significant difference between the 10 percent and 20 percent litter samples. The pine sawdust showed no significant weight reduction.

The color started changing for 20 percent and 10 percent amended treatments after 55 and 75 days, respectively. By day 180, the color of these treatments was significantly darker than the controls. All treatments showed an improved pH level by day 180.

Toxicity for all treatments decreased after 90 days. By day 180, the level remained the same as day 90 for all treatments except 20 percent amended sawdust. Toxicity for that treatment dropped to near zero.

Conclusion

Composting in this manner could be an economical, simple, safe and viable option for waste disposal and utilization. The composted materials can be used as soil amendments or potting media. Poultry producers and furniture manufacturers could combine resources and build a large, agriculturally located composting site and supply local farmers and nurseries with value-added product.

Further research is needed to study the effects of composting on leaching of nutrients such as nitrogen, phosphorus and potassium, which could provide farmers with information on how to prevent over-fertilization and nutrient runoff.

For more information about the study, contact Hamid Borazjani via phone, 662/325-3106 or e-mail, hborazjani@cfr.msstate.edu.

[Sidebar]
Composting can reduce waste Volume and toxicity.

[Sidebar]
Composting in this manner could be a viable option for WaSte disposal and utilization.

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