

COMPOSTING OF WOOD WASTES: Plywood and Sawmill Residue



INTRODUCTION

Wood waste disposal is becoming a huge problem for Mississippi's forest products industry. The 1997 U.S. Census reports 892 wood product manufacturers operating in Mississippi. These manufacturers cover all aspects of the industry including furniture, paper, sawmills, and other wood products. A survey of 376 wood products manufacturing companies conducted by MSU's Food and Fiber Center in 1994 revealed that there were 12.2 million tons of wood and bark residues produced annually in Mississippi.

Small manufacturers that do not have the capability to burn the wood waste for energy must transport it elsewhere for incineration or to a landfill. Because of high transportation costs, landfill costs, environmental concerns, and governmental regulations, alternative methods of disposal are being sought. One alternative is the composting of wood waste.

Research in the Forest and Wildlife Research Center has found ways to compost many of these wastes and reclaim them for value-added products. Studies by Forest Products Laboratory scientists Hamid Borazjani, Susan Diehl, and Harold Stewart have demonstrated that furniture scraps and waste, plywood waste, and hardwood / sawmill residue can be successfully composted.

Composting is an aerobic biological treatment process which converts solid organic material into a stable humus at elevated temperatures (40 - 60°C). Composting wood waste reduces the waste volume, detoxifies the waste and transforms the waste into a product that can be used as a soil amendment. Composting increases the organic matter content and improves the water-holding capacity and the texture of the soil. A composting operation can be implemented at a plant site and requires limited knowledge, equipment, and space.





M E T H O D S

Two recent studies investigated composting of hardwood sawdust / bark waste, and phenolic bonded softwood plywood waste. Amendments included chicken manure, cow manure, horse manure, gin trash and inorganic fertilizer.

An additional objective of these projects was to specifically evaluate the effectiveness of chicken manure in composting. In 1999, Mississippi's poultry industry produced 600,000 tons of litter. Composting was viewed as a way to dispose of both wood wastes and chicken litter in an environmentally friendly and economical way.

In the plywood waste study, a pilot-scale composting operation was set-up to test different amendments to sawdust obtained from a furniture company in Mississippi. Eighteen containers were filled with sawdust and amendments. The amendments were 5% chicken manure, 5% cow manure, 5% horse manure, 3% cotton gin trash, and one liter of inorganic fertilizer solution.

The compost cans were placed outdoors for six months. The treatments were aerated once or twice per week depending on rainfall and the moisture content was kept at 50%. At the end of 180 days, all treatments showed a decrease in toxicity and weight (Figure 1).



Chicken manure amended treatments showed the best results in reduction of toxicity, weight loss, and color change.

The treatments were then evaluated in a greenhouse study to determine if the composted material could be used as a soil additive. Soybeans, cotton, and corn were grown in the various treatments for 55 days. At the end of the cycle, the plants weights were measured and recorded. Once again, chicken manure proved to be the only treatment comparable to commercial potting media (Figure 2).

According to the 1997 U.S. Census, there are 138 sawmills operating in Mississippi. These sawmills produce huge amounts of sawdust and bark waste. In order to alleviate the industry of this waste residue, a hardwood sawdust and bark waste study was initiated.

In this study, chicken manure was added to hardwood sawdust collected from a sawmill in Mississippi. The chicken litter was added in percentages (10, 20, and 30 percent), aerated and watered weekly. All percentages of added chicken manure were well composted and showed significant weight loss in 90-days. The compost

is currently being evaluated as a commercial potting media to be used by nurseries in South Mississippi.



P R O C E D U R E S

Composting is a relatively simple operation and has been an agricultural practice for many years. Several area wood manufacturers could combine their resources and build a large-scale, composting site and supply local farmers and nurseries with the product. Plant owners who want to have a composting site on their property need a grinder, mixer, and a tractor or means to mix the compost rows or piles. Lumber mills, construction companies, furniture companies, and dry wall businesses may find composting could be an effective alternative for disposal. Composting removes the toxins in wood that can be detrimental to plant growth and produces a stable product that can be used as a soil conditioner or mulch. The addition of chicken manure allows wood to decay faster and increases the nitrogen content of the end product.

Nurseries and farmers can mix the compost with other soil as an additive. The composted wood waste has been demonstrated to be an effective media in both row crops and ornamental plants.

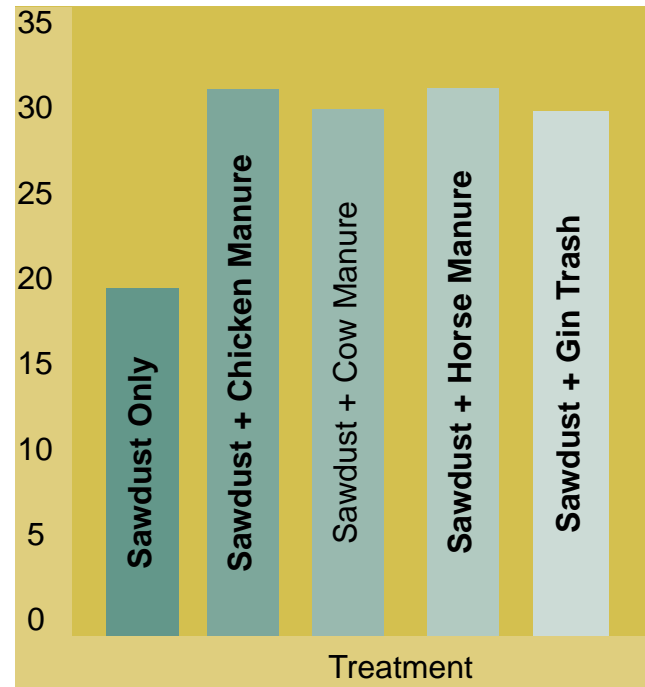


Figure 1. Average percent of total weight loss of the composted plywood sawdust at day 180.

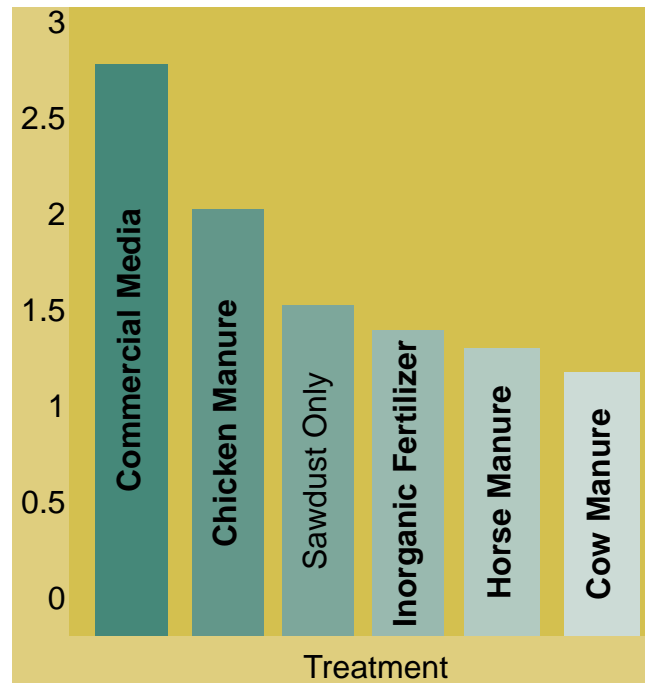


Figure 2. Mean dry weights (grams) of row plants from greenhouse study.

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FUTURE RESEARCH

Scientists have been successful at composting furniture wood wastes, hardwood sawmill wastes and plywood wastes. Next, research will focus on composting used pallets. There are 57 wood container and pallet manufacturers in Mississippi. A survey conducted by MSU's Food and Fiber Center in 1994 revealed that 149,000 scrapped pallets were generated annually in Mississippi by the

wood products manufacturing industry. Of these scrapped pallets, only 7% were being utilized or reused. Due to increased landfill costs, transportation costs, environmental concerns and governmental regulations, scrapped pallets are becoming burdensome to the wood products industry. Composting of used pallets may be an economical alternative for disposal.