

# FARMER COMPOSTING OF COTTON GIN TRASH

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## Abstract

McKaskle Farms of Braggadocio, Missouri is composting over 850 tons of cotton gin trash annually. This material is used as a fertilizer source in their cotton cropping system. This paper discusses the Mc-Kaskle Farms composting process and a budget for the composting operation.

## Introduction

McKaskle Farms is located in the extreme Southeastern corner of Missouri. The farm is engaged in the production of niche market cotton and soybeans, which require the use of unconventional fertilizer materials. These niche markets created an incentive to explore other fertilizer materials such as compost.

McKaskle Farms has access to gin trash from two local cotton gins. Cotton gin trash is treated as a waste material in the majority of area gins. Previously, this material was stockpiled and then later hauled onto a field for disposal. Farmer experience indicates that this material increased soil organic matter, over time, which resulted in net yield increase.

In 1994, McKaskle farms started on farm composting of cotton gin trash. A conventional farm bucket loader was used to turn the material. In 1995, the composting operation was expanded and a compost turning machine was added. The quality of the compost increased and the composting process became easier with the addition of the compost turning machine.

The compost machine purchased by the McKaskle farm was a Sandberger (TM), with a mechanically operated drum for the turning compost. The machine also featured a pusher-axle, which allowed the use of a conventional tractor for the composting process. During compost turning, the tractor would be placed in neutral and the compost machine would push the tractor. Without this feature, most farm tractors would require a creeper gear, for speed reduction. Most conventional farm tractors operate at speeds too fast for most compost turning machines without some modification. Additionally, the Sandberger (TM) machine was equipped with nozzles to allow the addition of water in the compost material.

## The Compost Process

At the McKaskle farms, cotton is hauled from the cotton gin stockpile, by truck and placed in windrows on crop field turn rows. The windrows may extend for several hundred feet in length. For the compost machine to operate the windrows are no more than 5 feet in height, in the center and 8 feet at the base in a pyramid configuration. Once placed in the field, usually the composting process will begin.

The windrows are observed regularly to determine if the composting process has begun, if not, windrows will be turned and water will be added to the gin trash. It is not unusual to add 1000 gallons of water in a 100 ft. length of wind row to start the composting process. After the compost has started, the internal temperature of the pile will be measured. Once the temperature of the compost reaches 140 degrees Fahrenheit, the pile will be turned with the compost turner. Additional water will be added as needed. The turning/watering cycle will continue until the gin trash is completely broken down into compost. Typically, on the McKaskle Farm the gin trash will be turned six to eight times before it is completely broken down.

For good compost to be made, a Carbon:Nitrogen ratio of at least 20:1 to 30:1 must be maintained. McKaskle Farms does not add any additional nitrogen source materials to the cotton gin trash.

After the compost process is complete, the cotton gin trash compost will remain in the wind row until it is spread. McKaskle Farms spreads the compost at a rate of 2.5 tons of the material per acre. A chain drag spreader is used. The compost is spread before planting and tilled into the soil.

## Discussion

Table 1. is an analysis of cotton gin trash compost produced at McKaskle Farms. Application of 2.5 tons of compost material per acre, distributes approximately 40 pound of nitrogen, 12 pounds of phosphorus and 30 pounds of potassium.

Table 2. is a budget of the composting process at the McKaskle Farms. The budget includes the cost of a new compost machine, spreader and bucket loader. Assumed are the use of a used truck for hauling and an hourly rate for tractor usage. Labor is at \$7.00 per hour.

According to these calculations, compost costs approximately \$10.67/ ton to produce and spread. This is assuming a total production of 850 tons of composted cotton gin trash. Conventional fertilizer of the same analysis can be purchased for \$7.14.

The benefits of using compost over conventional fertilizer are not considered in this discussion. It is generally agreed, the increase of organic matter in the soil is beneficial to the crop. The disposal cost incurred by the gin was not considered. Most cotton producing states do not allow the burning of cotton gin trash, therefore, most gin trash is hauled to a field and dumped. The additional use of laborers time is not considered. Outside the cropping season, farm labor may not be efficiently utilized.

### Conclusion

As stated, McKaskle Farms is engaged in the production of niche market cotton. This cotton does not allow the use of most conventional fertilizer materials. With usage of cover crops and other fertilizer materials, soil fertility needs have been supplied. On farm yields of niche market cotton is comparable to conventional cotton yield in the region.

**Table 1. Analysis of McKaskle Farm Compost.**

Moisture	Dry Matter	Adj. Crude Protein	Nitrogen	Phosphorus	Potassium
41.68%	58.31%	4.88%	.78%	.24%	.6%

**Table 2. Budget Estimate for McKaskle Farms Composting Process.**

**Annual Fixed Costs**

Compost Turning Machine

(Initial cost - \$20,000, salvage value - \$2000, 10yr. life)

Depreciation  
\$ 1800  
Interest  
800  
Repairs, Insurance, Taxes  
400

Loader and spreader

(Initial cost - \$10,500, salvage value - \$1050, 10yr. life)

Depreciation  
945  
Interest  
420  
Repairs, Insurance, Taxes  
210

Truck

(Value - \$3000, salvage value - \$300, 10 yr. life, 25% usage)

Depreciation  
67  
Interest  
30  
Repairs, Insurance, Taxes  
25

Total Fixed Costs

\$ 4697

Variable Costs

Tractor Usage (100 hrs. @ \$25/hr.)

\$ 2500

Labor (200 hrs. @ \$7/hr.)

240

Fuel

Tractor (100 hrs. @ 11.25 gals/hr. @ \$1.20/gal)

1350

Truck (50 hrs. @ 5 gal/hr. @ \$1.20/gal.)

300

**Total Variable Costs**

**\$ 4390**

**Total Fixed and Variable**

**\$ 9087**

Cost per ton of compost @ 850 tons/year \$ 10.67

Estimated Fertilizer Value per ton (N, P and K only) \$ 7.14