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Accelerated process for preparation of bio-enriched compost from cotton plant residues

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Accelerated Process for preparation of bio-enriched compost from cotton plant stalks

Introduction

Cotton stalks left in the field after harvesting of seed cotton are lignocellulosic in nature made up mainly of cellulose, hemicelluloses and lignin. In India, about 30 million cotton stalks are generated annually. Most of the stalks produced are burnt to clear fields for the next crop which causes air pollution and deterioration of soil fertility. Cotton stalks contain 67-75% holocellulose, 24-28% lignin and 6-8% ash. These are rich in minerals especially potassium. Composting of cotton stalks is the best way to bring back the nutrients into soil. Composting of cotton stalks however is difficult due to its high lignin content and hardness.

Innovation at ICAR- CIRCOT

A rapid composting process for the preparation of bio-enriched compost from cotton stalks has been developed at ICAR- CIRCOT. Chipped cotton stalks are treated with microbial consortia and nutrients to hasten the composting process. Good quality compost was prepared from wet and dry cotton stalks in 45 and 60 days respectively by using microbial consortia while time taken for preparation of compost from untreated wet and dry stalks was 60 and 90 days respectively. Thus, in accelerated process developed by ICAR-CIRCOT, fifteen and thirty days could be saved in preparation of compost from wet and dry cotton stalks respectively. The nutrient (NPK) level of cotton stalks compost was about three times higher than farm yard manure (FYM). Five tonne cotton stalks compost could successfully replace the recommended 12.5 tonnes FYM in the integrated nutrient management (INM) for cotton as seed cotton yields were equivalent.

Benefits

- Compost enriched with nutrients and plant growth promoting organisms
- Alternative to FYM in soil fertility management
- Effective on farm management of cotton crop residues
- Reduction in environmental pollution due to burning of cotton plant residue

The Process

Chipped cotton stalks

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Add alkali (NaOH pellets) @0.2% and mix

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Add cattle dung@10% and mix

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Add Urea (1.2%) and Diammonium Phosphate (2%) and mix

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Add microbial consortia* @ (1%) and mix

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Moisten the mixture with water to 50% moisture content

↓

Mix well and make into heaps

↓

Cover with polyethylene sheets

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Turn heaps every week for aeration

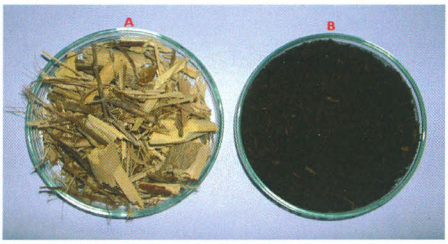
↓ **After 45/60 days**

Compost

*containing plant growth promoting microorganisms like *Phosphobacteria, Azospirillum, Azotobacter, Trichoderma viridie* and *Pseudomonas fluorescens*.

Economics

- Yield of compost- 800 Kg per tonne of cotton stalks
- Production cost – Rs. 2960/- per tonne
- Cost savings due to replacement of 2.5 tonne FYM (costing Rs. 3000-3500/- per tonne) by one tonne compost in INM for cotton - Rs. 4540 to 5790/-



A-Cotton stalks B- Compost from cotton stalks

Demonstration of CIRCOT's technology on preparation of bio-enriched compost from cotton stalks at Vill. Tekoda, Tal. Ashti, Dist. Wardha (M.S.)

Agrisearch with a human touch

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