



# Urea-free Coir Pith Composting Technology



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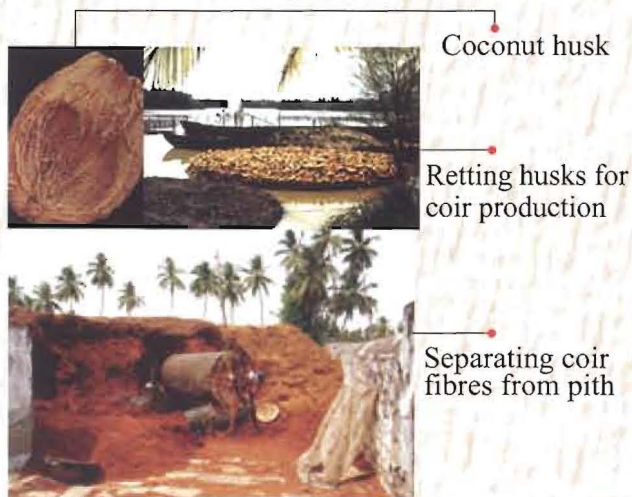




## Introduction

Coir pith is a by-product generated from coir industries. It is composed of short fibres and the mesocarp pith remaining after the extraction of long fibres from the retted or fresh coconut husk. The ratio of fibre to pith in the coconut mesocarp is 30:70, weight by weight basis. In India, husks obtained from about 40-60% of the coconuts produced are used for coir fibre production. Each year, on an average, not less than 0.5 to 1 million tonnes of coir-pith waste is produced in India that needs to be utilized gainfully.

Coir pith has high porosity and holds up to 500% moisture that makes it a unique input as soil amendment. In addition to these important physical properties, it contains high concentration of potash which makes it more useful. However, high polyphenolic content makes raw coir-pith toxic to roots of many crops. Therefore, composting is an ideal option for its beneficial utilization in agriculture as this can help in reducing the concentration of toxic phenolics and make the plant nutrients easily available.



## Composting of coir-pith

Composting coir-pith is also a challenge because it possesses very high C: N ratio and lignin content varying from 30 to 54% which makes it difficult to decompose by microorganisms. In order to make it amenable to microbial decomposition, the C:N ratio is reduced by addition of urea followed by addition of ligno-cellulose degrading mushroom fungi such as *Pleurotus sajor caju*. The coir-pith compost produced by this technology is good source of manure that improves the physical properties, adds valuable plant nutrients to soil besides being used as plant growth medium for horticultural and field crops. However, this technology depends on regular supply of the mushroom fungal culture for composting the coir pith which at times becomes the limiting factor from farmers' point of view.

## Urea-free composting of coir-pith

ICAR-CPCRI has developed a simple, farmer friendly technology for composting coir-pith that does not involve addition of urea as nitrogen source for reducing the C:N ratio or mushroom fungi for substrate decomposition. The concept of co-composting is adopted in the ICAR-CPCRI technology. In this technology, organic materials with high nitrogen content and low C:N ratio, such as animal manures, are mixed with organic materials having low nitrogen and high C:N ratio, such as coir pith. This mixing of high C:N with low C:N material helps in improved microbial decomposition of the substrates. This is a low-cost, simple and rapid composting technology based on local resources that can be adopted easily by farmers and cottage-industry level entrepreneurs.

### The technology requires five main inputs:

- Coir pith
- Poultry manure
- Lime (Calcium oxide)

- Rock phosphate (available as Rajphos in local fertilizer stores)
- Water

## Large-scale production of coir-pith compost

- Select a place that has good shade and is protected from direct rain falling on the composting site.
- Alternatively, green house nets draped on wooden poles can be used to create a shaded area
- Mix properly 90 kg of coir-pith with 10 kg of good quality poultry manure along with 0.5 kg of lime and 0.5 kg of rock phosphate.
- Spread the mixture evenly in an area of 2 x 1 x 0.5 m (1 x b x h) dimensions.
- Larger heap of 500 kg (450 kg coir pith+ 50 kg poultry manure+2.5 kg each of lime and rock phosphate) spread in an area of 4 x 2 x 1 m (1 x b x h) is more ideal for composting.
- Sprinkle water regularly using watering can such that the whole coir pith heap remains sufficiently moist. Over wetting and drying should not take place.
- Cover the heap with gunny bag or green house net or dry grasses to prevent moisture loss.
- Once in 15 days the whole heap must be turned properly.
- Turning the heap enhances the speed of decomposition indicated by colour change of reddish brown raw coir pith to dark brown colour.
- Water regularly and cover the heap as mentioned above.
- After 45-60 days, the coir pith will become dark brown to black colour indicating the completion of composting process.
- The final product can be shade dried and packed for further use.



Raw coir pith

Coir pith+poultry manure+lime+rock phosphate heap



Composted coir pith



### **Physico-chemical and microbial properties of urea-free coir pith compost**

The coir-pith compost produced by ICAR-CPCRI technology is highly porous, dark coloured, odour free product, with pH in the range of 6.1 to 6.4 and having up to 500% water holding capacity. The final product possesses C:N ratio of 21 to 22 and organic carbon content of 28-30%. The N, P and K content ranges between 1.3 to 1.4, 0.9 to 1.2 and 1.3 to 1.6 %, respectively. It is also a good source of plant micronutrients such as Fe, Cu, Zn and Mn. Microbiologically, the urea-free coir pith compost is rich in plant-beneficial microbes such as free-living nitrogen-fixing and phosphate solubilizing bacteria. It also has significantly high populations of actinomycetes which are known to produce antibiotics and help in suppression of soil pathogens.

### **Advantages of using coir-pith compost**

- The urea-free coir-pith composting technology developed by ICAR-CPCRI can be an ideal input for organic cultivation of field and horticultural crops.
- The addition of coir pith compost improves the physical properties and water holding capacity of soils.
- It increases the organic matter and carbon content of poor humid tropical soils.



It helps in better root formation and enhances crop growth.

It is an ideal medium for raising pot-tray seedlings.



Coir-pith compost as soilless medium for raising vegetable seedlings

### **Kalpa Soil Care**

The urea-free coir-pith compost produced using this co-composting technology by ICAR-CPCRI has been released by the trade name 'Kalpa Soil Care'.



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