

CIRCOT Leaflet No. 12

## Paper Grade Pulp from Cotton Stalks by a Biological Route



Central Institute for Research on Cotton Technology, Mumbai

## *Introduction*

Paper Industry depends largely on forest resources for its raw material requirements. The fast rate at which forest cover is depleting the world over and the necessity being felt for preservation of the environment have prompted researchers to attempt the use of unconventional fibrous raw materials. Crop residues, which are renewable by nature, are one class of materials that could be profitably used in the preparation of pulp and paper. Cotton plant stalk is a residual material generated by cotton cultivation to the extent of 15 million tonnes per annum. A technology was developed at CIRCOT a few years ago to produce different grades of pulp and paper by conventional process. This



*Chipped Cotton Stalks*

however, involved cooking of raw material in alkali at a very high temperature for a long time. The effluents that come out are also highly toxic. A more eco-friendly process for preparation of pulp and paper referred to as biopulping has been recently developed at CIRCOT using micro-organisms.

### *Earlier Attempts in Biopulping*

Biopulping is a relatively new concept, which in the early years employed *basidiomycetous* fungi, viz. *Phanerochete*, *Aureobasidium*, *Pleurotus*, etc. for breaking lignocellulosic bonds. This method was tried by many workers with different levels of success. The process developed by them involves the multiplication of each organism in pure culture. Besides demanding qualified and skilled personnel for inoculation, this process results in low pulp yield. Application of enzymes has been another approach that involves maintenance of specific pH levels and temperature conditions to obtain uniform results.

### **CIRCOT Approach**

The CIRCOT process involves *in situ* treatment of mild alkali treated cellulosic materials at room temperature for 7 days with mixed microbial consortium under anaerobic conditions.

The highlights of the process are :

- \* *Low requirement of chemicals*
- \* *Cooking of raw material at 100°C for 30 min only*
- \* *Effluents generated are less toxic*

- \* *Properties of paper are on par with chemically prepared samples.*
- \* *The process is inexpensive and ecofriendly.*
- \* *Unskilled persons with necessary training can handle the process*



*Bio-softened Pulp*



**For further details contact :**

**The Director  
Central Institute for Research on  
Cotton Technology  
Adenwala Road, Matunga,  
Mumbai 400 019  
Tel. : 412 7273, 412 7276,  
418 4274 & 418 4275**

**Fax : 022-413 0835  
Gram : TECHSEARCH  
E-mail : circot@x400.nicgw.nic.in  
(or)  
circot@bom3.vsnl.net.in**