Title: Commercial Technology Development on CoUon Plant By-produce and Value Addition

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INTRODUCTION

CIRCOT has developed a method wherein the material is subjected to a cocktail of enzymes in a microbial in-situ system at room temperature.Laboratory conditions forthe whole method have been standardized and scale up trials is under way. Commercial application of this technology along with economic feasibility will be studied in this project..

Objectives

1. To standardize the preparation of absorbant cotton from non-spinnable cotton.
2. Value addition of cotton plant by-products.

Activities

- Modification of Roller Type of Cotton Stalk Compacting Machine
- Preparation of Absorbent Cotton from Non-spinnable Cotton

Salient Findings

1) **Design and Development of a Roller Type Cotton Stalk Compacting Machine**

Prior to this, CIRCOT fabricated different types of cotton stalk compacting machine viz., Hand operated, Power operated, Hand-cum Power operated and a Hydraulic version. The recent version is a Roller Type Compacting Machine. The machine consists of three parts viz., Feeding Tray, Roller type pressing platform and Delivery Tray. The machine is driven by 5 hp motor with chain and pulley type transmission.

Since the top rollers were not provided power transmission, the stalks did not move freely and hence the compacting machine was modified. The top roller now is driven simultaneously with the bottom rollers and compacted stalks come out without any hinderance. The machine has been provided with another three pairs of spur gears which drive the upper rollers. In view of this, the slippage of stalks during compacting is avoided. The rollers are driven by the attached gears from the same motor. A safety cover is attached to gear systems. In addition to this, two plates are provided in the bottom of the lower compacting cylinder to prevent the cotton stalks to go out of the track. Tyeing is manual even now and this could be made automatic proVided there is shortage of labourers. The power consumption would be 30KWH and cost remains Rs.370/-per day.

By calculation it is possible to make bales weighing about 15 kg each of a total weight of 14 to 22 tonnes in a day of 8 hours employing 2 persons. Practically, it was possible to compact only 5 tonnes in a day of 8 hours. The cost towards labourers and electricity, comes to Rs. 370/day. The modified version is as shown below:

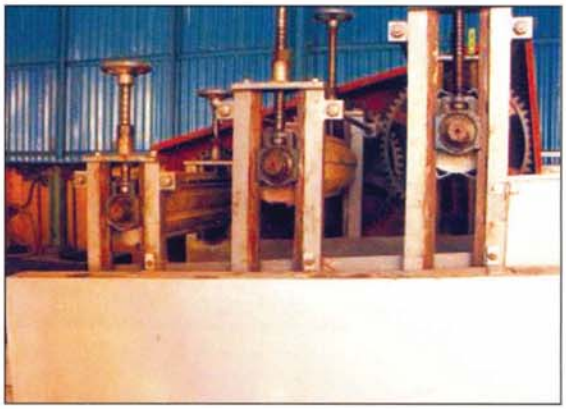

Fig. 1 : Cotton stack compacting machine

2) Preparation of Absorbent Cotton from Non-spinnable Cotton

Bengal Desi cotton was subjected to biological treatment under anaerobic conditions for 48 hours followed by bleaching in hydrogen peroxide. The material resulted in absorbant cotton satisfying the specifications as per Indian Pharmacopoeia. The results are given in Table1. The consortium supplemented with different sources of pectin through wastes namely citrus peels, guava waste, apple pomace and also pure pectin (Table-1). In order to make the process economical.. The samples scored after anaerobic treatment was washed and dried. The opened material becomes absorbent.. Wherever colour is not important this can be used. Five kg scale-up trials also indicated similar results.

The energy requirement has been calculated for initial treatment.. The conventional process requires 22 units as against 16 units when pure enzymes are used. The present system do not consume much energy since this is carried out at room temperature. Bleaching wherever required is same for all the processes.

Table 1 : Variety : Bengal Desi Properties of Absorbent Cotton

Treatment	*Incubation period*	Moisture content (%)	*Absorbency (See)*	*Solubility in 80% H_2SO_4*	*Solubility in 4% NaOH*	*Ash Content (%)*	*Effect of Heat (I1ttC)*	*Sinking Time (Sec.)*	*Water Holding Capacity*
Indian Pharmacopoeia			< 10 see	Soluble	Insoluble	0.50	NY	< 10	23.0
Kier Boiled + Bleached		6.39	0.75	Soluble	Insoluble	0.30	NY	1.5	23.3
1%cotton seed cake+ 1%Guava waste	2 Days	6.57	3.01	Soluble	Insoluble	0.46	NY	1.3	22.5
1%cotton seed cake+ 1%Guava waste	8 Days	6.40	0.84	Soluble	Insoluble	0.48	NY	2.0	19.6
1%cotton seed cake+ 1%Citrus Peels	2 Days	6.36	2.21	Soluble	Insoluble	0.47	NY	2.7	23.4
1%cotton seed cake+ 1% Citrus Peels	8 Days	6.86	2.90	Soluble	Insoluble	0.45	NY	3.3	22.7
1%cotton seed cake+ 1%Apple Skins	2 Days	6.57	7.00	Soluble	Insoluble	0.48	NY	1.7	25.5
1%cotton seed cake+ 1% Apple Skins	8 Days	6.16	1.08	Soluble	Insoluble	0.46	NY	7.4	23.4