

A Few Hurdles in Pulping of Agriculture Residues in the Light of Experience Gathered in I. P. P.

S. Mukherjee

The concept of pulping agriculture residues is not a new one. Quite a few successful pulping techniques have been developed to utilise raw materials e. g., rice straw, jute stick etc. In I.P.P. jute stick was utilised to produce very good pulp by magnesium bisulphite cooking process. The pulp thus produced had certain excellent characteristics in comparison to other chemical pulps obtained from bamboo, hard wood, etc. In spite of the manifold advantages of jute stick pulping, production of jute stick pulp has been discontinued for the present and the plant has been modified for handling hardwood.

Raw Material

For procurement of raw material I. P. P. had to depend mainly on the success of jute cultivation in the neighbouring districts. But even for a bumper jute crop procurement of jute sticks was

Many entrepreneurs, paper technologists, government planners and agricultural economists, of late, have been thinking of launching paper projects based on agriculture residues. But pulping of agriculture residue is one thing while launching a paper project whose basic pulping raw material is an agriculture residue is a totally different proposition. The purpose of this article is to pass on some information which appears to be of utmost importance to those who are deeply involved in this particular branch of technology.

It will be evident from the discussions in the article that right from procurement, transport and storage of raw material, every operation viz. mechanical treatment (chipping, crushing etc.) prior to pulping itself, screening, beating and paper making will pose unique problems when any agriculture residue will be used for a paper project. An expert team comprising of agriculturist, transport expert, forest specialist, chemist, pulp maker, paper maker and paper mill machinery manufacturer is the answer for the problem.

largely dependant on the initiative and drive of a few contractors as the farmer community as a whole was ignorant of the utility of jute sticks for paper making. In case of a crop failure the situation looked pretty bleak and it has become more so in view of the farmers inhibition to cultivate jute.

uld be able to easily shoulder the responsibility of educating the farmers about the industrial uses of the agricultural residues and their procurement.

But apart from the problem of procurement, the seasonal factor of every agricultural residue should also be taken into account.

In my opinion the State Governments can play a vital role in this regard. With the present emphasis on agriculture and with so many rural agro service centres the State Governments should

Since any agricultural residue will be available during a particular season of the year there is a tendency to stock sufficient raw material to last till the next crop. But storing of, say, jute sticks

S. Mukherjee

Indian Pulp & Paper Company,
Hazinagar W. Bengal.

in large quantity has got certain peculiar difficulties. Apart from huge losses of raw material from the yard, handling of old jute sticks poses serious problems. For running pulp mill with agricultural residues as raw material, conventional method of stacking will not serve any purpose and other methods must be developed. Moreover, the idea of utilising the same plant for several agricultural residues may also be given a thought. This will require lesser amount of stock of a particular agricultural residue. The hazards of a crop failure will also be taken care of.

Chipping and Crushing.

Jute sticks can be very easily chipped or crushed and consume much less power in comparison to bamboo or hardwood. But the problem is the application of a suitable equipment. Conventional high speed multi-knife chippers or heavy duty crushers are not required for treating jute sticks. Since it has been found that crushing is much better mode of treatment a suitable light crusher with convenient handling and feeding system is the answer and this has to be developed. For designing such equipment the lower density of the raw material must be taken into account to get reasonable output from the machine. Industrial pulping of jute sticks or any other agricultural residues will be practically impossible unless a suitable chipping or crushing method is developed.

Cooking

Pulp of a very good quality was produced from jute sticks in batch digesters using magnesium bisulphite cooking process. But the following limitations were observed which affected the productivity of the pulping operations.

- (1) Poor output of pulp per cubic metre of digester capacity due to very low density of jute stick.
- (2) very-high chip to liquor ratio 1 : 7
- (3) High steam consumption.

Thus, inspite of jute stick giving an excellent pulp in the batch process a thorough study of the pulping jute sticks in continuous process appears to be worth while. If successful, the continuous pulping process will be definitely a more economical proposition.

Screening and bleaching.

Jute stick fibres can be screened and bleached very easily. Less amount of knots, very good brightness of unbleached pulp, much less chlorine requirement are some of the most important qualities of jute stick pulp which help to increase productivity. But, here again, serious bottle neck was observed with regard a vital equipment viz, washers was concerned. Jute stick pulp has got a very peculiar characteristic in comparison to other chemical pulps. It has got an unusually high degree of initial wetness in the un-

bleached and unbeaten condition (28-30° SR). This severely restricts output from conventional drop leg washers used for bamboo or hard wood pulp.

Hence, it is felt that to deal with such fibres suitable alteration and modification of equipments is a must. Attention of the paper mill machinery manufacturers should also be drawn to these aspects.

Stock Preparation and Paper making.

There was no problem in stock preparation and paper making with jute stick pulp so far as papers of writing and Printing variety were concerned. But the most unique characteristic of jute stick pulp, viz, its property of being easily converted into grease-proof paper could not be utilised in I. P. P. for lack of suitable beating facility. Although grease proof paper could be made in the laboratory and I. P. P. had the machine to make such paper, the stock preparation plant was found incapable of delivering the goods.

Conclusion

From the above discussion it will be revealed that to develop a pulping process with agriculture residue, however sound the process itself might be, is not enough. A most sound pulping technique and apparently a most economical one may receive severe jolts when put to industrial use for some unforeseen problems which might be outside the scope of the laboratory

work for development of pulping technique for agriculture residue.

A Suggestion

In view of the raw material crisis it is all the more essential to utilise agriculture residues. But the hazards of launching a project entirely based on agriculture residues are so much that private entrepreneurs may not be willing to invest huge

sums of money considering the uncertainty of return. If they do invest at all they will not hesitate to switch over to other more profitable ventures in case of unsatisfactory return from a project and this is only too natural. Under these circumstances, the role of Hindustan Paper Corporation becomes all the more important. For any project on agricultural residues,

a Government guarantee right from the blue-print stage is necessary. For I. P. P. some relief in excise duty for paper made of jute stick pulp was allowed and that was indeed a most encouraging step. But the very high rate of initial investment and the risk involved call for deeper state involvement.