Use of Jute Sticks at India Paper and Pulp Company, West Bengal

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SUMMARY

The paper describes the use of jute sticks as fibrous raw material used at India Paper and Pulp Company Hazinagar, West Bengal.

The authors have incorporated the difficulties encountered during processing of this raw material by sulphite process. Jute sticks pulp require blending with bamboo or hard wood pulp for satisfactory drainage on wire and good runability.

INTRODUCTION

Per capita forest area in India is less by about seven times in comparison to the world average. There is scarcity of forest based raw materials for pulp and paper making in our country. Pulping agricultural residues has great potential. It is encouraging to note that some new small and medium size paper/paper board mills have been installed based on straw.

About 30 Lakh tonnes of the jute sticks are available in our country annually and out of which fifty percent is in West Bengal. Theoretically the demand of fibrous raw materials for pulp and paper industry can be easily met in our country with jute stick and other agricultural residues. In practice it is not easy to collect transport and store Agriculture residues. In states where Jute sticks are available in huge quantity, but due to some reasons, jute sticks are not popular for the production of pulp. Some reasons for above are enumerated in this paper. Jute is grown for Jute fibres. The plants are soaked in water for a long time. As a result of steeping in water, a process of bacterial fermentation (technically known as retting) set in, where some of the constituent of plant tissues are dissolved due to bacterial activity. After retting the fibres are peeled off and the sticks are left over. For one kg. of jute fibre, we get about 2.5 kgs of jute sticks. These sticks, after sun drying, are used mainly as fuel bv the villagers. Some quantity of jute stick is used for thatching. It has been reported that the calorific value of jute sticks is one third to that of coke. It has been observed as it being bulky the cost of jute stick at F.O.R. mills comes not less than Rs. 200.00 per M.T. through the suppliers.

STORING & TRANSPORTATION

At higher moistnre content, Jute sticks decay at very fast rate. The procurement of jute stick being seasonal, therefore, it is to be stored for longer time. Normally it is available throughout the month of September, October, November and December. Jute sticks can not be stored in contact with the earth. Usually in the field jute sticks are bundled and kept in the upright position, but for a medium size paper mill using jute stick, it would require a huge space to store jute sticks in the upright position and naturally it is not practical to store jute stick in upright position. It is recommended to have pucca floor with some slope for proper drainage of water for storing jute stick. It is also observed that jute sticks become brittle exposed to direct sun light, therefore to avoid huge losses during storage, the jute sticks are to be stored on Pucca floor as stated above and to be protected from direct sun. The bulk density of jute stick is 120 kg. per cubic meter as compared to Bamboo having 210 kg. per cubic meter. It is also observed that moisture content in jute stick is found as high as 80.0%. On an average three metric tonnes of jute stick, can be transported in the truck. Dr. Sanyal (1) reported about 50% bulk reduction by applying pressure of 100 kg. per square centimeter. Mukherjee (II) has highlighted some of the hurdles in usuage of jute sticks, mainly procurement, transport, storage, development of suitable chopper, high steam consumption.

CHIPPING & SCREENING

Conventional chippers are not suitable for chipping jute stick. It is suggested that proper design choppers to cut jute stick into 1/2" to 3/4" length should be used. It has been observed that jute sticks where all jute fibres are not removed, are very troublesome for conventional chippers. It causes jamming of Blower chute etc. Jute stick being bulky, the chipping rate of jute stick become half that of Bamboo. The jute stick chips with fibres causes jamming of the chip screen, therefore chip screen is by-passed, which results in nonuniform chip size for cooking.

PULPING

Due to high bulk density, it takes about 1 to 1.5

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hour more to load 190 cubic meter digester as compared to Bamboo, the capacity of loading per digester reduces by about 45.0%. Like other agriculture residue cooked in batch digester, jute stick also required high chip to liquor ratio 1 : 6.5 therefore steam consumption is about 35% higher than Bamboo/hardwoods. The advantage of jute stick pulping over Bamboo is cooking chemical consumption which is reduced by 22%. The parameters for cooking jute stick as being followed at I. P. P. are as follows :

1) Process-Sulphite having Magnesia as base	
2) Sulphur as S	7.0%
3) Magnesia as Mgo	6.0%
4) Time to raise to 100°C	3 hours
5) Time to raise from 100°C to-160°C	3 hours
6) Time at max temperature	4 hours
7) Permanganate Number of unbleached pulp	17-20
8) Yield	47.0%

Dr Sanyal[3] obtained normal bleachable pulp from jute stick by sulphate process by using 20% chemicals as NaOH with 25% sulphidity at 165°—170°C having cooking time at maximum temperature for 4 hours. Chip and liquor ratio was maintained at 1 : 5. However experiment conducted at I.P.P. show even using 25% chemicals by soda process at 170°C for 4 hours, satisfactory jute stick pulp could not be obtained.

The main disadvantage of jute stick pulping is weak spent liquor, The solid content in spent liquor, is below 6%. As such it is not economical to use jute stick spent liquor for the production of Celex lye.

The authors are of view that continuous digesters are suitable for agriculture residue where the recovery of spent liquor can be made economical. It has been observed that fresh jute stick gives pulp of better brightness and very small quantity of rejects as compared to conventional raw materials Bamboo and hardwoods.

WASHING AND CLEANING

After cooking the pulp is blown from the digester into Blowpit, where the pulp is partially washed. In case of Jute stick it takes 6 to 8 hours for drainage of liquor before hole is dig out for discharging the pulp with high pressure water jet from blowpit to Green chest through a pump, where as in case of Bamboo pulp it takes only 4 to 5 hours. This is due to low freeness of jure stick pulp, which ia 28° SR. The cleaning of jute stick pulp does not pose any major problem. Due to slow drainage the capacity of washer is reduced to great extent. It is recommended that the washer should be provided with vacuum pump for good mat formation and better drainage.

BLEACHING AND BEATING

Like baggase, jute stick pulp can be easily bleached to high degree to brightness of about 80° G.E. The total consumption of chlorine in jute stick is 10 0%, where as in case of Bamboo/ Hardwond sulphite pulp is 13/14%. The capacity of bleaching plant is reduced due to slow drainage of pulp at the washer.

The jute stick pulp can be beaten to desired degree with low power consumption. Laboratory experiment conducted shows that sulphite jute stick pulp is suitable for making grease-proof paper. It is easy to beat jute stick pulp.

PAPER MAKING

It has been observed that there is no difficulty in running normal varieties of paper having furnish of 30% jute stick fibres with bamboo pulp except sometimes shinning spots are found in the paper. Some of the physical strength properties like bursting strength increases with the use of jute stick fibres.

CONCLUSION

Agricultral residues specially jute stick in West Bengal are able to meet the future demand of cellulosic raw materials provided collection procurement, transportation and storage of jute stick is made economical based on scientific and systematic studies. Special concessions should be given to paper mill using agricultural waste in their furnish for encouraging usuage of jute stick and other nonconventional raw materials. Jute stick gives satisfactory pulp by sulphite process which is easily bleachable and requires less power consumption for beating. The pulp required blending with Bamboo or short wood fibres in order to have satisfactory drainage, strength properties and runability on paper machines. Efforts are to be made to get spent liquor of desired solid content for economical chemical recovery.

Grease proof paper could be produced from sulphite jute stick pulp. Fresh jute stick gives better sulphite pulp than old juta stick.

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REFERENCES

1. Sanyal A.K., Ghosh I.N., Bandyopadhayay S.B., IPPTA—Vol XIII No. 3, 1975.
2. Mukherjee S., IPPTA—Vol XII, No. 2 119—121, 1975.
3. Sanyal A.K., Ghosh I.N., and Bandyopadhayay S.B., IPPTA-Vol. XIII No, 4, 1976