

# Pulping of Whole Length Jute by Neutral Sulphite Anthraquinone (NS-AQ) Process

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## Summary

SMR variety of whole length jute (*Corchorus capsularis*) has been subjected to neutral sulphite anthraquinone (NS-AQ) pulping. The pulping liquor consists of Na<sub>2</sub>SO<sub>3</sub> and Na<sub>2</sub>CO<sub>3</sub>. Fully defiberized pulp can be made even with no screening rejects with an alkali dose as low as 14%. Pulps thus obtained are comparatively better in yield and almost similar in quality to that of control chopped jute. No problem has been observed in disintegration, washing and screening of the pulp. Pulping of whole length jute by the NS-AQ process thus seems to be technically feasible.

Jute possesses the shortest fibres at the bottom. The fibre length attains a peak at a distance of 75 cm from the bottom, and again falls towards the top.

## Introduction

Jute is the bast fibre extracted from the stem of *Corchorus* plant. There are two species of jute, i.e., *Corchorus capsularis* and *Corchorus olitorius*. Most of the valuable vegetable textile fibres except cotton are obtained from jute. In Bangladesh jute is the principal agricultural crop.

Jute has long been renowned as a cheap, strong, durable fabric eminently suited for sacks, bags, carpet making, etc., as its traditional uses. It has long been playing its historical role in the socio-economic development of Bangladesh. Export of jute and its related products accounts for a significant portion of total export earning. In addition, it provides a remarkable employment opportunities to the total work force of the country.

In recent years, this golden fibre of Bangladesh has been facing a stiff competition with the synthetics. As a result, its demand in local and overseas markets has declined. Thus, the export of jute and jute goods has shrunk to a significant degree thereby throwing a dark shadow on the overall economy of the country. Consequently, jute growers are the ultimate victims as they do not get a fair price of their produce. The situation has further aggravated due to comparatively higher growth of low quality jute, e.g., 46% to 54% from 1977 to 1986 (Anon. 1988). The present situation is that about two hundred thousand metric tons (Mt) of jute with an added load of about 45,000 Mt of jute-cuttings are remaining as a surplus every year (Anon. 1988) in Bangladesh.

Therefore, an immediate measure is needed to find out diversified uses of jute. It is a must for the economic survival of the country.

Jute is characterized with a high cellulose content and a low lignin content (Nahar 1987). The chemical composition therefore favours its use in making pulp.

Pulping of jute has been the subject of numerous studies for the last decades both in home and abroad by conventional processes, e.g., soda and kraft. Laboratory studies of jute did not mention the problems in its pulping by the conventional processes (Anon. 1988; Islam 1987; Islam *et al.* 1968; Islam *et al.* 1974; Siddiqueullah *et al.* 1977; Siddiqueullah *et al.* 1977a; Roy 1982; Ghosh 1983; Islam and Khan 1984). But various problems were encountered in a mill trial in pulping of jute by the soda process (Anon. 1988) and also by the kraft process as reported by Bhowmik (1988). These are the lumping of the cooked materials causing difficulties in digester blowing, washing, screening and disintegration. The problems were confirmed in a later study (Akhtaruzzaman *et al.* 1988). Yee (unpublished) also showed disintegration difficulties of kraft jute pulp. On the other hand, pulp produced by the alkaline processes were of inferior quality (Samad, unpublished; Rydholm 1965). It degraded severely on bleaching (Anon. 1988; Bhowmik 1988; Akhtaruzzaman *et al.* 1988). These process difficulties can be eliminated by the application of neutral sulphite anthraquinone (NS-AQ) pulping of jute (Akhtaruzzaman *et al.* 1988). In addition to eliminating these problems, NS-AQ pulping produces a higher pulp yield by 6.3% on the basis of oven-dry jute. The quality of the unbleached NS-AQ pulp from jute is equivalent to that obtained in the kraft process. The quality of the bleached pulp is much superior compared to the kraft counterpart.

All the previous studies were conducted with chopped jute. Chopping of jute is a tedious job, time consuming and expensive, too. It was estimated (Anon. 1988)