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Jute retting process: present practice and problems in Bangladesh

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Abstract: Jute retting process is one of the important responsible factors for quality of jute fiber. Scarcity of jute retting water in some areas of Bangladesh is one of the major issues. The main purpose of this study was provided information about the status of present jute retting process as well as mentioned the advantages and disadvantages of different jute retting processes. Data about traditional jute retting process and ribbon retting process were collected through personal interview of jute growers. The farmers are involved in jute cultivation and majority of them use the traditional method and time consuming approach of retting in ponds/canals. The traditional method hampers the quality of the jute fiber, fish cultivation and pollutes the environment as it decomposes bio-mass. For minimizing the problems of jute retting process, the farmers are now more interested on ribbon retting process. Therefore, forgetting quality jute fiber, a low cost ribbon retting technique is essential and farmers could able to produce high quality jute fiber.

Keywords: Jute retting, water shortage, environment, ribbon retting, and quality fiber.

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1 Introduction

Jute (*Corchorus capsularis* and *Colitorius*) is least expensive and most versatile textile fibers. There is an enormous contribution of jute in the economy of Bangladesh. Total demand of jute goods in the international market is 0.75 Mt (Uddin et al., 2014). In 2012, total production of jute in India and Bangladesh were 1.91 Mt and 1.45 Mt, which are 55.23% and 41.94% of global jute production, respectively. In the same year Bangladesh and India exported raw jute with allied fibers 0.39 Mt and 0.18 Mt, respectively to global jute market. In FY 2012-2013, Bangladesh and India exported jute and allied products 72.24% and 18.96% of the total jute goods market in the world, respectively (IJSG,

2014). Fiber of jute is biodegradable and environmentally friendly. Jute fiber is used to manufacture colorful carpets, carpet backing, cordage, decorations, apparel fabrics, blankets, geo- and agro-textiles, non-woven materials, industrial fabrics, thermal insulations and numerous utility items in a range of traditional to innovative applications (FAO, 1998). For diversifying use of jute fiber, it is necessary to practice suitable retting process of jute for quality of fiber.

Jute retting is a biological process in which fibers are extracted by decomposing the plants through the joint action of water and aquatic microorganisms, like bacteria. Retting process with some other factors influences the main characteristics, which indicate the quality of fiber like strength, color, luster and texture (IJSG, 2009). In water scarce area of Bangladesh, retting is conducted in small ditches, canals, and ponds etc. where water stands for only a short period.

Around 4 million farmers in Bangladesh are involved in jute cultivation (IJSG, 2009) and majority of them use

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the traditional method and time consuming approach of retting in ponds/canals. The traditional method hampers the quality of the jute fiber and pollutes an environment as it decomposes bio-mass. Moreover, nowadays the trend of dryness of river and ponds/canals during short harvesting period due to the climate change, it is difficult for the farmers to ret jute (Husain, 2011).

Retting and extraction processes have a profound effect on the quality of fiber produced, and on the cost of fiber production. It affects the quality of the end products and their competitiveness in the market. Eventually, the retting processes pollute the environment due to biomass decomposition. Therefore, the main objectives of the study were investigated the present status of jute retting process and identify advantages and disadvantages of present jute retting process at the selected area in Bangladesh.

2 Materials and methods

2.1 Location selection

The study was conducted at Muktagachaupazila, Mymensingh, Bangladesh, for knowing the present status of jute retting process and its advantages and disadvantages on the quality of fiber as well as the environment. It is one of water scarce areas of Bangladesh. The soil of Muktagacha is loamy in texture with pH 6.7 and it is fertile and favorable to cultivate jute.

2.2 Design and pre-test of questionnaire

A questionnaire was prepared for collecting data from farmers to know the condition of jute cultivation and processing method at the field level. It was designed in such a way so that it is possible to find primary data in the field condition.

2.3 Data collection

Several field visits were performed and communicated with agricultural field officers for collecting data from the jute growers. Upazila agricultural extension offices were described about the cultivation status and condition of retting process of jute in the study area. Data were collected from different regions of study area through questionnaire and also visited to the regions

where jute was retted. The farmers were described the condition of jute retting process and jute fiber quality. The farmers of study area were mixed of literate and illiterate. Secondary data from thesis, journal paper and project report etc. were also used in the study.

2.4 Condition of location during jute retting

The Brahmaputra river flows just beside of Muktagachaupazila, Mymensingh, Bangladesh and most of the water used for agricultural work come from this river. Due to the climate change, nowadays there is no sufficient water in Brahmaputra River so that the farmers are unable to apply retting process in right time. For this reason, farmers delay to harvest or after harvest farmers stag the entire jute crop and wait until for sufficient water. Therefore, some of lower areas like as canals, tanks, ponds or ditches water use for retting jute which affect the quality of the jute retting as well as jute fiber quality because of it is done in muddy water.

2.5 Data analysis

After collection of data from the farmers, all data were analyzed using Microsoft Excel 2007 and discussed critically for providing present status of jute cultivation, retting process and quality of jute fiber for different retting processes and its impact on environment at selected area.

3 Results and discussions

3.1 Fiber production

According to Department of Agricultural Extension (DAE) officials in Dhaka, Bangladesh, around 0.67 million hectares of land were brought under jute cultivation in 2012 where as about 0.62 million hectares were cultivated in 2011. The trend of jute production in different years is shown in Figure1 (BBS, 2008). According to Figure1, jute cultivation was almost in similar pattern during the mentioned period. Early years of 2003-2004 to 2006-2007 jute productions were reduced due to low selling price, less amount of yield, and benefit. In recent years jute production are competitively high but there is a massive problem in

retting process due to water scarcity and low fiber quality. It indicates the increasing trend of production but benefit

is very low for poor quality fiber.

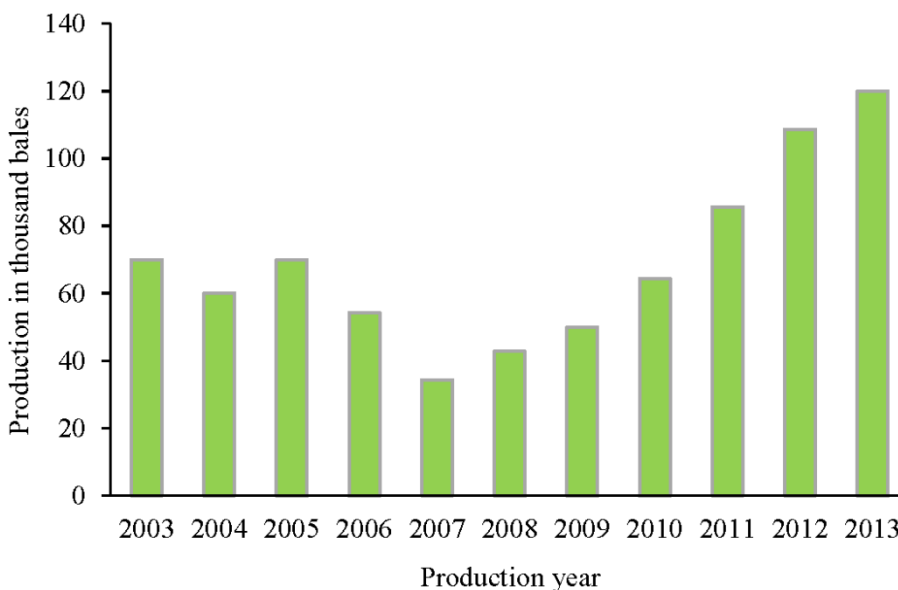


Figure 1 Year wise production

3.2 Retting practice

The traditional retting method is known as stem retting in which the complete plant stem is immersed in sufficient water as shown in Figure 2. In general, the practice of retting of jute plants in the jute growing regions is to immerse the jute bundles in clear slow flowing water in canals, tanks, ponds or ditches. The

minimum ratio of plant material to water in stagnant water should be 1:20 (IISG, 2009). In this process, bundles are kept under water in 2-3 layers. In about 15-20 days, the retting is completed and then fibers are extracted manually, washed and dried for sale (Islam and Rahman, 2013). The traditional retting has been used for a long time to pull out of fibers from jute.



Figure 2 (a) Stem retting in the rice field and (b) Stem retting in the small canal with dirty water

Ribbon retting is a particular method of retting based on a mechanical pretreatment of plant stalks that allowed reducing the requirement of water, the length of retting

time and the level of environmental pollution to almost one-fourth in comparison to other method that processed the whole plant. In the production year of 2012-2013,

ribbon retting method was used almost 7.5%, on the other hand in the production year of 2008-2009 it was only 1%. The quality of the ribbon retted fibers is shown in Figure 3 (b) which is better than that of traditional method and the quality in both the processes can be easily observed from

Figure 3. Comparison between two retting processes in different production year at study area is shown in Table 1. From Table 1, it is showed that farmers are now more interested on ribbon retting process.

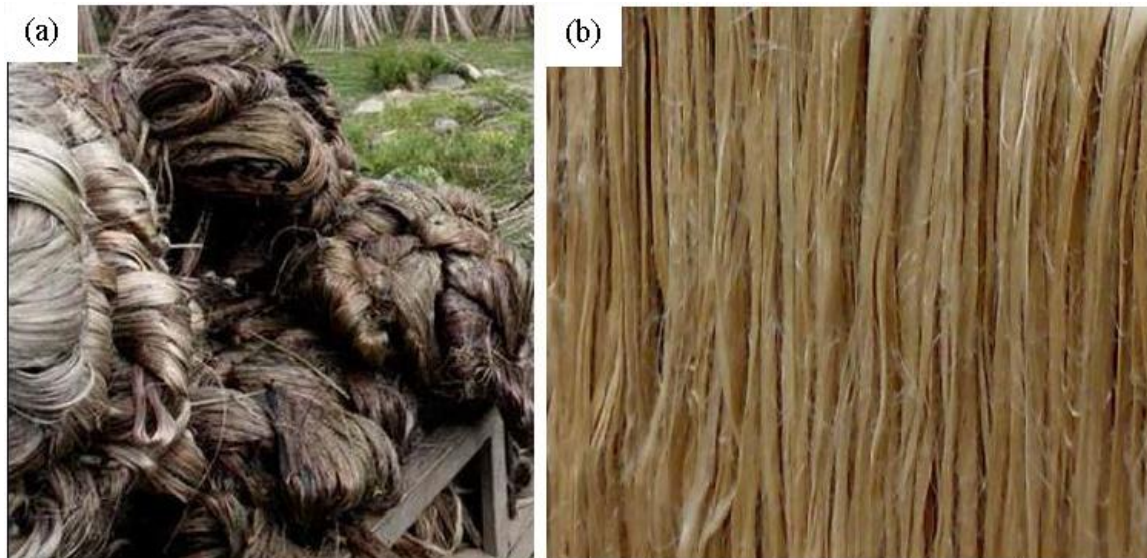


Figure 3 Fiber quality of jute using (a) stem retting in the muddy water and (b) ribbon retting in the clear water

Table 1 Comparison between two retting processes at the study area in different production years

Retting processes	Yield in different retting processes (bale)			
	2009-10	2010-11	2011-12	2012-13
Stem retting	8807.87	8368.19	8323.5	8983.6
Ribbon retting	134.13	258.81	438.0	728.4
Total yield	8942.00	8627.00	8761.5	9712.0

3.3 Advantages of different retting processes

In the traditional process jute is retted in open natural water bodies. There is no need to require any further artificial activities as it is retted naturally. In this process the labor is only required for cutting the jute stem in the field and carrying out it from field to the ditches, ponds and other water bodies to submerge under water. On the other hand, ribbon retting process requires more labor for disintegrate the fiber from the stem and forming the process. Through the traditional process the requirement of man-hr is comparatively low and there is no required the skilled labor to retting the jute stem.

3.4 Disadvantages of different retting processes

3.4.1 Fiber quality

Jute fiber's inherent characteristics of strength, versatility, and eco-friendly can directly provide technical and industrial requirements through its appropriate functional end uses. Dark color fiber and black spot on the jute fiber are responsible for the low quality.

Fiber quality might not be the same all the round as there is no control on the natural retting process. So it is not possible to get assurance regarding good quality fiber through traditional method. In study area, most of the farmers are produced yield of low quality of jute fiber, because of bad qualities of water like: dark black colored water, muddy water, and lower level or insufficient water. It is found in some cases that fiber strength decreases due

to over retting or under retting as they are stacked by bundles of 20-30 plants in each bundle.

3.4.2 Retting process time

Stem-water ratio is one of the important factors to produce quality fiber. Due to the shortage of water during retting period of jute, all crops cannot be stacked at a time. As a result traditional process takes more time for retting. In study area, farmers piled green jute for long time after harvesting and look forward to availability of sufficient water. Ribbon retting reduces time of traditional retting by 4–5 days as well as reduces requirement of water (Banik et al., 2003).

3.4.3 Impact on environment

In traditional process, a huge amount of biomass undergoes decomposition in stagnant water causes pollution around environment. During the process of jute retting, different microorganisms like bacteria and fungi are grown at green jute in the water of pond/canal/river which is harmful for fish cultivation. Moreover, open water retting in pond/canal/river causes the disgusting odor and pollute the local environment.

3.4.4 Impact on fish cultivation

In the study area commercial fish cultivation is achieved popularity in recent years, where farmers do not allow jute retting on their ponds or ditches. Due to stem retting of jute in pond/ditch, bad stench to the fish body creates a great problem which reduces the price of the cultivated fish.

3.4.5 Uncontrolled process

There is no control over volume of water, quality of water, and temperature in traditional retting process in ponds/canals/river. Under-retting gives coarse and over-retting dazed and weak fibers. Incomplete submergence produces croppy fibers of extremely low value (Ahmed and Nizam, 2008).

The study has been provided information about the present status of jute retting process and identified problems on different jute retting process at the water scarce area in Bangladesh. Due to the shortage of water in harvesting period, farmers use muddy water and small canal with insufficient water for traditional retting of green jute. Several problems like environment pollution, fish cultivation, bad quality fiber, and time consuming etc. are appeared in traditional jute retting process. Therefore the traditional retting process of jute is not feasible in the water scarcity area. The appropriate technology like as ribbon retting with artificial polythene tank is needed to extend in the water scarce areas of Bangladesh.

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4 Conclusions