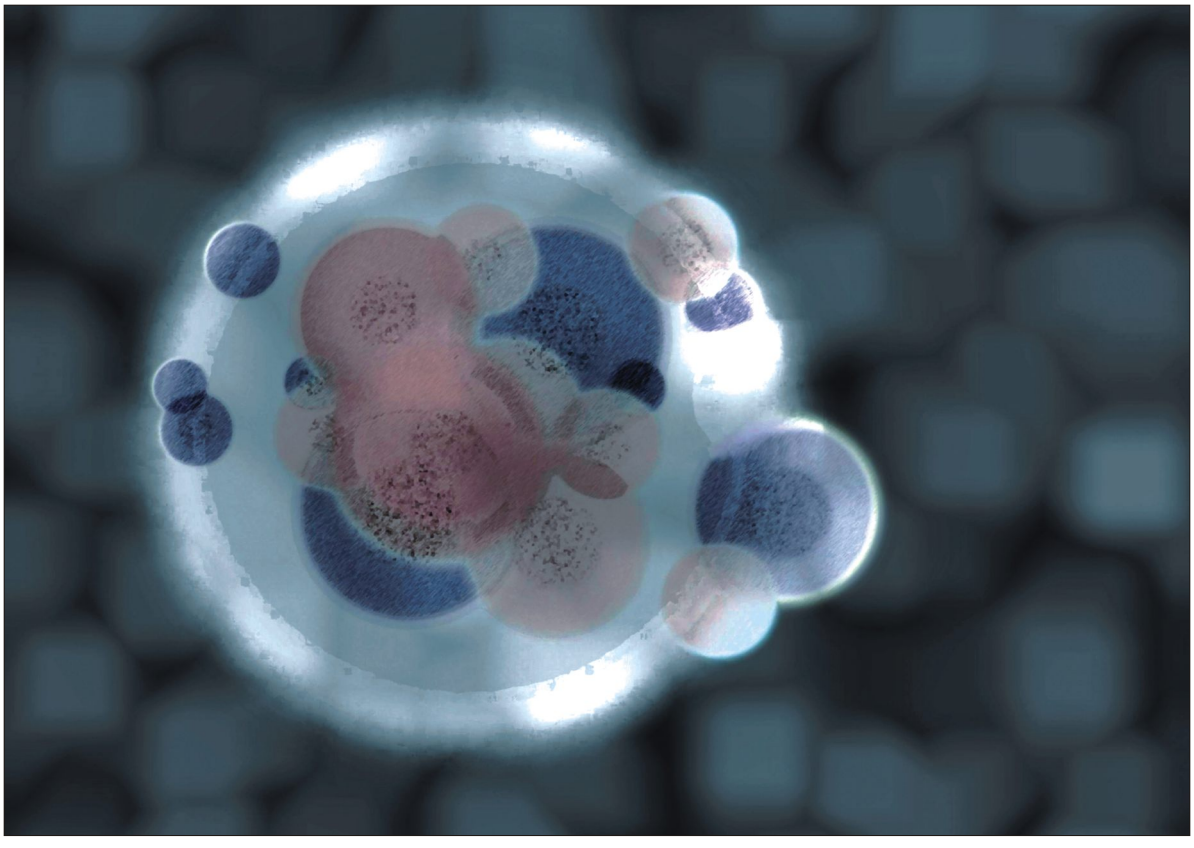

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Effect of Nature of Harvest of Jute Plants on the Production of Cuttings and Improvement of Fibre Quality

M. Shamsul Haque, M. Asaduzzaman, Firoza Akhter, M.A. Samad, Taher Baksh and Zakaria Ahmed
Microbiology and Biochemistry Division, Bangladesh Jute Research Institute,
Manik Mia Avenue, Dhaka-1207, Bangladesh

Abstract: Harvesting jute plants leaving 1″, 2″, 3″, 4″, 5″ and 6″ from the basal portion in the soil and retted separately, produced significant effect on the production of jute cutting and fibre quality. Harvesting plants leaving 4″-6″ from the soil eliminated cutting completely and produced A-grade fibre. But harvesting plants leaving 4″-6″ of basal portion in the soil apprehend loss of fibre weight.

Key words: Harvest, cuttings, jute fibre, quality

Introduction

Jute refers to two plant species, *Chorchorus cpasularis* and *C. olitorius* as well the fibre derived from them. In Bangladesh retting is commonly carried out by steeping bundles of harvested jute plants in water of ditches, ponds and rivers for about 15-20 days during which the enzymes of the microbes, mostly bacteria enter into the plant tissue, hydrolyze the pectin, cementing the fibre strands, and release the fibre for mechanical separation. After drying the fibre certain portion (18″-20″) of the bottom of fibers always found unrented and hard. This hard basal parts of the fibre is technically called the cuttings (Paul and Bhattacharyya, 1974). During export this hard cutting is cut off. In order to reduce the cutting various researches were conducted but no tangible and effective method has yet to be developed. In Bangladesh jute plants are normally harvested at the bottom of the plants (ground level). The bottom parts of the plants are much thicker which resulted enough cuttings in the fibre. It was assumed, if the plants are harvested leaving certain thicker bottom portion of the jute plants in the field then production of cutting might be minimized (Allen, 1946).

This experiment was undertaken to develop a suitable way of harvesting jute plants through which the cutting could be eliminated or reduced to certain extent.

Materials and Methods

Jute plants of CVL-1 variety were grown at Jute Experimental Station, Bangladesh Jute Research Institute (BJRI). The plants were harvested at 120 days maturity. 50 Kg each of jute plants were harvested leaving 1″-6″ from the basal portion in the soil and retted separately. Same quantity of jute plants harvested customarily were retted and treated as control. All the "rets" were covered with water hyacinth. The progress of retting was examined every alternate day, 10 days after steeping the plants under water. The end point of retting was determined by extracting fibre of a single plant from the ret. When the fibers of the middle portion of the plant became well separated the retting was taken as completed. The fibers from all the treatments were extracted, crushed and dried. Retting time was recorded and fibre quality was also assessed.

Results and Discussion

There was no significant difference in retting time within the treatments when plants were harvested leaving 1″-6″ bottom portion in the soil. It took 15-16 days in retting. Whereas in control (customary harvest) retting is done in 18 days. But there was significant difference in percent cutting among treatment when compared to control (Fig. 1). The percent cutting in the resultant fibers were found 16%, 6%, 2% and 1% in case of control and plants harvested leaving 1″-3″ in the soil, respectively. But no cuttings were produced in case of plants harvested leaving 4″-6″ from the basal portion in the soil. The plants harvested leaving 3″-6″ basal portion in the soil produced A-grade fibers whereas the plants harvested leaving 1″-2″ in the soil and the control produced B-grade fibre (Table 1). There was marked difference in price of the fibre produced from different treatments. Fibers obtained from harvesting the plants leaving 3″-6″ portion in the soil fetched high price due to high quality of fibre than produced from treatment leaving 1″-2″ portion in the soil and control (customary harvest). Fibre price was Taka 5.00, 7.00, 10.00 and 5.50 per Kg in treatments leaving 1″-6″ and control (customary harvest) respectively (Mohiuddin, 1986).

Table 1: Effect of harvesting jute plants leaving 1"-6" of the basal parts in the soil on percent cutting fibre quality and market of fibre

Treatment (Harvested leaving behind)	Retting period (days)	Percent cutting	Fibre grade	Fibre per kg (TK.)
1"	16	6	B	5.00
2"	15	2	B	7.00
3"	15	1	A	10.00
4"	15	0	A	10.00
5"	15	0	A	10.00
6"	15	0	A	10.00
Control (cutomary harvest)	18	16	C^+	5.00

Bundle strength of the five samples (namely 1″ cut, 2″ cut, 3″ cut, 5″ cut and 6″ cut) suffer a loss of 13-14% strength comparison to their control one (Table 2). This interpretation is made on the basis of bundle strength, luster and whiteness of the treated samples (Khundu *et al.*, 1970). This loss effects a little in industrial processing of jute to its finished products. Since the Research and Quality Control Directorate of jute industry Corporation accepts the 13% CV (coefficient of variation) in any operation of jute goods manufacturing system (Khundu *et al.*, 1970). On the other hand 4″ cut sample showed practically no loss of its strength during retting process. This is a matter of importance for jute industry (Saha *et al.*, 1994). Upper limits of almost all the samples is very close to the value of control sample which bears a positive sign of the experiment. The study of whiteness and luster showed that the value of both the parameters increases with the increase of cut inches, i.e. whiteness increase from 31.6 (for increases from 20 (for control) to 24.56 of 5″ and

Table 2: Effect of harvesting jute plants leaving 1" = 6" of the basal parts in the soil on percent cutting physical properties

Physical character	Control	1" cutting	2" cutting	3" cutting	4" cutting	5" cutting	6" cutting
Bundle strength (lbs/mg)	8.61 mean	7.00 mean	7.60 mean	7.40 mean	8.60 mean	7.70 mean	7.50 mean
Range	6.10-10.0	5.30-9.80	6.20-10.20	6.46-8.29	7.13-11.45	6.95-10.25	5.39-8.38
CV%	4.85	14.0	15.0	15.0	15.0	16.0	14.0
Whiteness	31.60 mean	31.69 mean	35.00 mean	35.78 mean	35.89-39.50	37.9 mean	36.2 mean
Range (%)	24.60-40.80	24.40-37.50	30.50-41.40	31.20-42.60	27.30-39.50	31.50-42.90	29.70-37.7
CV%	13.50	10.00	8.00	10.00	9.07	8.80	9.00
Tensile Strength (gm/tax)	$92.97x10^3$	$75.56x10^3$	$82.05x10^3$	$79.89x10^3$	$92.86x10^3$	$83.13x10^3$	$86.97x10^3$
Breaking Load (Kg)	46.15	37.52	40.74	39.66	46.09	41.27	40.20
Luster (%)	20.00 mean	23.90 mean	24.70 mean	24.90 mean	23.4 mean	24.50 mean	24.50 mean
Range	15.50-23.90	20.10-27.00	18.10-29-10	21.10-27.60	19.20-25.30	20.10-27.30	20.10-30.30
CV%	11.10	9.50	15.00	8.50	9.25	8.20	13.30

CV = Co-efficient of variation

Fig. 1: Different samples (leaving 1"-6" of basal parts in the soil) of jute Fibre and their percent cutting

6" cut sample. This increase of whiteness and luster with minimum loss of strength is the positive indication of finished jute goods or to the diversification of consumption of jute in home and abroad (Saha *et al.*, 1994).

There was no significant difference in retting time when the plants were harvested leaving 1"-6" bottom portion in the soil because the plants were more or less uniform in physical characters, but there was slight difference when it was compared to control. The customary harvest plants were cut at the ground level which resulted plants with thicker bottom parts. Due to the thicker physical character of the bottom parts of control it took a longer period in retting. There was marked difference in the percent cutting among the treatments. The percent cutting increased with the level of harvesting the plants. The thickness of the bottom of the harvested plants decreased as the harvesting was effected leaving more bottom portion (1"-6") in the soil. Thus cutting was directly proportional to the level of harvesting jute plants. The market price of the fibers produced in different treatments differed strikingly. Highest price TK. 10.00 per Kg, was fetched from the fibers obtained from harvesting jute plants leaving 3"-6" bottom portion in the soil. The fibers in these treatments (3"-6") produced no cuttings. So "more the cutting lesser the price" was proved in this case.

It is concluded that better quality fibers with no cutting could be produced through harvesting jute plants leaving 3"-6" bottom portions in the soil. But before disseminating the technology for mass adoption the loss of fibre must be ascertained. Leaving certain portion of the bottom of jute plants in the soil resulted loss of green weight, which would in turn affect the fibre loss. The benefits obtained from harvesting the jute plants leaving 3"-6" bottom portions in the soil could compensate the loss of the fibre weight might be a fruitful field for further investigations in this regard.

References

Allen, L.A., 1946. Recent developments in the microbiology of retting. Part I.-the microbial flora in different systems of retting. J. Chem. Technol. Biotechnol., 65: 365-370.

Khundu, M.M., M. Karim, M. Haque and M. Shahidullah, 1970. Scientific grading of jute. Pak. J. Sci. Ind. Res., 12: 414-417.

Mohiuddin, G., 1986. Improvement of mill softening of jute cuttings. Parts I. Use of different concentration of urea in pilling bin. Bangladesh J. Jute Fib. Res., 9: 31-36.

Paul, N.B. and S.K. Bhattacharyya, 1974. Upgrading of hard barky root cuttings of jute and mesta by a fungal culture. Indian J. Microbiol., 14: 61-66.

Saha, N.G., M. Rahman, M.A. Samad, M.A.A. Miah, A. Islam, T. Basak and G.M. Talukdar, 1994. Important of luster and strength of jute fibre grading. Bangladesh J. Jute Fib. Res., 19: 59-64.