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USE OF INDIGENOUS MATERIALS FOR REMOVAL OF DARK GREY (*SHAMLA*) COLOUR OF JUTE FIBRE (*CORCHORUS CAPSULARIS VAR.* CVL-1)

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A laboratory experiment was designed to evaluate the effect of indigenous materials on removal of dark grey (shamla) colour of jute fibre. Extracts of jute leaf, stem, green ribbon, stick and roots collected under both cold and boiled conditions together with retting effluents of Mesta and Kenap, rice straw extract and tamarind solution have been examined. Jute leaf and rice straw extracts and both the retting effluents along with tamarind solution (2.5 - 3.0%) were found to be significantly effective in removal of shamla colour of jute fibre. The fibre became bright cream ranking to A from C grade due to treatments for 30 mins. However, the other extracts of jute plant were appeared to be ineffective to remove the shamla colour of jute fibre.

Keywords : Indigenous retting effluents; Jute; Tamarind.

Introduction

Jute is a vitally important cash crop of Bangladesh. Export of jute fibre contributes significantly in the foreign exchange of the country. However, the extent of export depends on quality of jute fibre. The most affecting factor of the fibre is the dark colour which is commonly known as "Shamla" colour. Shamla colour generally develops during retting of jute plants due to formation of complex between tannin of the plants and iron coming from retting water[1]. Ali and Chaudhuri[2] reported that tannin-iron complex usually occurs from retting of jute plants in insufficient water, reuse of same retting water and weighting the steeped plants with stems of banana plants, soils and logs of Bale tree (*Aegle sp.*). Cream colour of the jute fibre is more attractive than that of shamla colour. The fibre with shamla colour is ranked as low grade fibre and always fetches low price. To remove this shamla colour an inexpensive method had been proposed by Sarkar[3] while Indian Jute Enquiry Committee suggested the use of tamarind for the purpose. Based on sour taste of tamarind, Ali and Chaudhuri[2] examined the fruit extracts of Kothbell (*Feronia elephantune*), Kaghazee Leembu (*Citrus medica*) and Jambura (*Citrus maxima meer*) together with some fungal extracts and citric and sulphuric acids. In the present investigation, an attempt has been made to assess the impact of some indigenous materials on the removal of shamla colour of jute fibre (*Corchorus capsularis* variety CVL-1) and to make economically beneficial to the poor/marginal farmers.

Materials and Methods

Preparation of primary extracts : Samples of jute (*C. capsularis* var. CVL-1) leaf, stem, green ribbon, fresh stick and root were collected from an experimental field. Samples of stem, green ribbon, stick and root were cut into small pieces (> 0.5 cm). Fifty gram of each sample, in duplicate, was crushed with a pastle into a mortar separately and mixed with 250 ml of distilled water and was allowed to stand for 2 hours. One set of sample for leaf, stem, ribbon, stick and root was filtered through cheese cloth and the filtrates were collected. The other set of samples after crushing were boiled for 30 mins. and then allowed to cool and filtered. The extracts were collected in separate containers. The residues were rejected.

Similarly, retting effluents of Mesta and Kenap and extract of rice straw were collected from retting tanks where Mesta

and Kenap varities of jute and mature rice straw were allowed to rett at a ratio of 1:20 (solid:water). Tamarind sample was also collected from a local source and a 2.5% solution of it was prepared. Rice straw extract was collected after 2 days of soaking.

Preparation of working extracts : A series of working solutions (0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0 and 3.5%) of tamarind, and retting effluents of Mesta and Kenap, and rice straw extract were prepared by dilution with water. However, only a 4% solution of both cold and boiled extracts of jute leaf, stem, green ribbon, stick and root was prepared separately. pH of the extracts were measured electrochemically by a corning pH meter.

Jute fibre (500 g) was rinsed for 30 minutes in a series of seventeen extracts of different concentrations together with a control contained in plastic jars. Aftr treatment, the fibre was washed with clear water and then dried in the sun. The change in dark grey colour of jute was recorded as an average of duplicate readings. The experiment was conducted at Bangladesh Jute Research Institute,Central Station, Dhaka.

Results and Discussion

The effects of various indigenous materials on the removal of dark grey (shamla) colour of jute fibre have been studied and the results thus obtained are presented in Tables 1 - 2. Results revealed that extract collected from different parts of jute plant both under cold and hot conditions failed to remove the shamla colour of jute fibre except that collected from jute leaves. The extract of jute leaves collected either cold or boiled conditions has been found to be highly effective in removing the shamla colour of the jute fibre. It was observed that both cold and boiled extracts of jute leaves are equally promising to serve the purpose. Extracts of stem, green ribbon, stick and roots were found to be of no use to remove the shamla colour of jute fibre. Acidity of the extract might possibly be one of the stimulating factor to make the extract effective in removing the shamla colour of the jute fibre. Data presented in Table 1 on pH of the leaf extract (pH 3.2) was comparatively strongly acidic than those of other extracts collected from stem, green ribbon, stick and root of jute plant. Rinsing of jute fibre having dark grey (shamla) colour in leaf extract of jute plant for 30 mins. removed the colour and made the fibre bright cream ranking it from C to A grade.

Retting effluents collected from Mesta and Kenap, and rice straw extract together with tamarind solution showed promising impact on removal of shamla colour of jute fibre (Table 2). Effluents as well as tamarind solution at low concentration (0.5 to 1.0%) removed the shamla colour partially from dark grey to light grey ao light cream and the fibre grade (C) remained unchanged. However, on increasing the concentration of effluents and tamarind solution from 1% to 1.5 and 2.0%, the extent of diminishing the shamla colour improved markedly and the fibre appeared to be cream in colour resulting an improvement in grade ranking B. A further increase in concentration of the removing solution/ effluents collected from indigenous materials from 2% to 2.5 and 3.0% stimulated the removal of shamla colour and improved the fibre to bright cream colour. The fibre appeared to be ranked A grade. All the indigenous materials were found to be almost equally active in removing the shamla colour of the jute fibre. However, the efficiency of the indigenous materials increased significantly with the increase in concentration of the solution/effluents. It could be seen that tamarind or retting effluents of Mesta and Kenap or rice straw extract having the concentration 2.5 to 3.0% were most effective in the removal of shamla colour of jute fibre.

The findings of the present investigation corroborated well with results of other

Table 1. Effect of different parts of jute plant extracts on the shamla colour of jute fibre.

Extractants used		pH of extracts	Colour		Grade remarks
			Before	After	
			Treatment		
Leaf crushed	Cold	3.2	dark grey	bright cream	A
	boiled	3.2	dark grey	bright cream	A
Stem crushed	Cold	7.1	dark grey	dark grey	C
	boiled	7.2	dark grey	dark grey	C
Green ribbon crushed	Cold	6.9	dark grey	dark grey	C
	boiled	6.3	dark grey	dark grey	C
Stick crushed	Cold	7.5	dark grey	dark grey	C
	boiled	7.0	dark grey	dark grey	C
Root crushed	Cold	7.1	dark grey	dark grey	C
	boiled	7.1	dark grey	dark grey	C
Control		5.9	dark grey	dark grey	C

Table 2. Effect of indigenous materials on the shamla colour of jute fibre.

Extractants used	pH of extracts	Conc.	Colour		Grade remarks
			Before	After	
			Treatment		
Tamarind solution	3.8	0.5	dark grey	light grey	C
	3.7	1.0	dark grey	light cream	C
	3.6	1.5	dark grey	cream	B
	3.5	2.0	dark grey	cream	B
	3.5	2.5	dark grey	bright cream	A
	3.0	3.0	dark grey	bright cream	A
Mesta retting effluent	6.8	0.5	dark grey	light grey	C
	6.7	1.0	dark grey	light cream	C
	6.7	1.5	dark grey	light cream	B
	6.6	2.0	dark grey	cream	B
	6.7	2.5	dark grey	bright cream	A
	6.8	3.0	dark grey	bright cream	A
Kenap retting effluent	6.8	0.5	dark grey	light grey	C
	6.8	1.0	dark grey	light grey	C
	6.9	1.5	dark grey	cream	B
	6.9	2.0	dark grey	cream	B
	6.8	2.5	dark grey	bright cream	A
	6.9	3.0	dark grey	bright cream	A
Rice straw extract	6.5	0.5	dark grey	light grey	C
	6.5	1.0	dark grey	light grey	B
	6.6	1.5	dark grey	cream	B
	6.6	2.0	dark grey	cream	A
	6.5	2.5	dark grey	bright cream	A+
	6.6	3.0	dark grey	very bright cream	A++
Control	6.5		dark grey	dark grey	C

investigators. Ali and Chaudhuri[2] used both organic (citric) and inorganic (sulphuric) acids to remove the shamla colour of jute fibre and found that concentration of acids beared a positive relationship with the removal of shamla colour. It was also evident that organic acid was relatively more effective than inorganic acid upto the concentration used (0.1%). Thus, the better efficiency of jute leaf extract and tamarind solution is quite obvious so far the removal of shamla colour of jute fibre is concerned.

References

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