PRESERVATION EXPERIMENTS ON COIR TWINES

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INTRODUCTION

THE essential characteristics of coir twines and their importance in the fishing industry were pointed out in an earlier communication (Nayar, 1959). Like other vegetable fibres, under prolonged immersion in water, coir also deteriorates. To retard this process of 'rotting' application of suitable preservatives is necessary. Further, the importance of preservation of coir twines and ropes need particular emphasis as they are being increasingly used as head and foot ropes with nylon nets which as a rule cannot be dried in the sun. The first attempts to study the effects of some of the common indigenous tannin preservatives on coir twines were made by Miyamoto and Shariff (1959). Unfortunately these authors could not complete the experiments since most of the material was lost during the course of the investigations and hence the present study on the preservation of coir twines was initiated as a continuation of the previous work.

MATERIAL AND METHODS

The coir twines known to the industry as 'Special Mangaden' produced in Quilon District of Kerala State was used in these series of experiments. The specifications of the twines are as follows:

Mass	..	4·80 gm. metre
Diameter	..	3·68 mm.
No. of twists:	..	
Outer	..	106·2/metre
Inner	..	98·2/metre

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* The local names given are those in the Malayalam language.

Preservatives

The basic preservatives used for the study were extracts of the bark of *Odina wodier* (Local name*: Kalasam) and extracts of the fruits of *Diospyros embryopteris* (Local name*: 'Panachikka') and English Cutch in solution and Coal-tar.

Methods of Treatment of Twines

1. *Coal-tar.*—The material was kept for seven minutes in a solution of Coal-tar and Kerosene (3 : 1 proportion) just enough to submerge the twines. They were then taken out and dried in the shade.

2. *Cutch + Coal-tar.*—A 5% solution of cutch in water was prepared and boiled till all the cutch dissolved in water. The solution was cooled and then the twines were kept immersed in it for 12 hours. After draining off the excess solution they were dried, redyed thrice and thereafter treated with coal-tar-kerosene solution as in Item No.1.

3. *'Kalasam' bark extract + Coal-tar.*—A 5% solution of the extract in water was prepared and the twines treated as in Item No. 2.

4. *'Panachikka' extract + Coal-tar.*—A concentrated solution of 'Panachikka' in water was prepared and then the solution filtered. The twines were kept immersed in this sticky purple coloured solution for 12 hours and then taken out and dried. The twines were redyed thrice and were given coal-tar treatment as in Item No. 1 and dried in shade.

5. *Cutch fixed with Copper Sulphate and Ammonia + Coal-tar.*—The twines were treated as in Item No. 2. After drying they were subjected to a process of 'fixation' using 1% solution of Copper Sulphate and Ammonia following Olie's (1918) method. The twines were then subjected to Coal-tar treatment as in Item No. 1.

6. *'Kalasam' bark extract fixed with Copper Sulphate and Ammonia + Coal-tar.*—Twines were treated with a 5% solution, dried, redyed and then subjected to 'fixation' as in Item No. 5 and given a subsequent treatment with coal-tar.

7. *'Panachikka' extract with Copper Sulphate and Ammonia + Coal-tar.*—The twines after treatment as in Item No. 4 were subjected to a process of 'fixation' as in Item No. 5 and subsequently treated with Coal-tar and dried.

The percentage impregnation of the various preservatives was determined on the basis of the difference in weight of the twines before and after treatment.

The twines after treatment and drying were immersed from a raft in the Cochin backwaters and their breaking strength determined at an interval of 20 days. The water temperature of the area where the twines were immersed was also being recorded.

RESULTS

Percentage Impregnation and Effectiveness

The percentage impregnation and the effectiveness of the various preservatives are indicated in Table I.

TABLE I

Showing the impregnation and effectiveness of different preservatives

Name of preservative	Impregnation (%)	No. of days by which the twines lost half their original breaking strength	Effectiveness
Control (untreated) ..	..	62	1·00
Coal-tar ..	178·9	140	2·25
Cutch + coal-tar ..	171·5	150	2·40
Kalasam + coal-tar ..	157·4	154	2·48
Panachikka + coal-tar ..	166·4	184	2·96
Cutch 'fixed' + coal-tar ..	192·2	198	3·19
Kalasam 'fixed' + coal-tar ..	153·1	182	2·93
Panachikka 'fixed' + coal-tar ..	165·0	192	3·09

Temperature of backwaters

Table II presents the water temperature recorded in the area where the twines were exposed.

TABLE II

Showing the temperature of backwaters where the twines were exposed (during the year 1959)

Period		Water temperature in Centigrade		
		Average	Maximum	Minimum
March	..	31·1	32·5	28·0
April	..	32·2	34·0	30·0
May	..	32·3	34·0	29·0
June	..	29·7	32·0	27·5
July	..	29·3	32·5	27·5
August	..	30·5	31·5	29·0
September	..	30·4	32·0	29·0
October	..	30·7	31·5	30·0

Breaking Strength of Treated Twines

The breaking strength of the twines treated with different preservatives after *n* days of continuous immersion is indicated in Fig. 1.

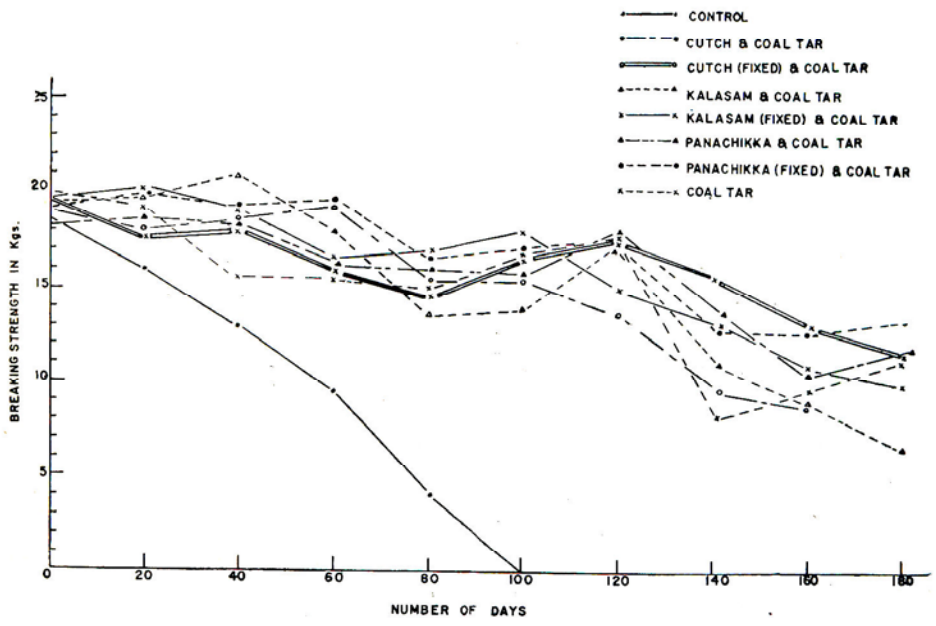

FIG. 1. Showing the breaking strength of the treated and untreated after *n* days of continuous immersion.

DISCUSSION

The percentage impregnation of a preservative is an important factor to be studied since it gives not only an indication of the resultant increase in weight of a gear after treatment but also might influence the effectiveness of preservatives. It will be apparent from Table I that Cutch 'fixed' + Coal-tar imparts to the twines the highest percentage increase in weight to the twines and Kalasam 'fixed' + Coal-tar imparts the least weight to the twines.

Effectiveness

The effectiveness of the various preservatives was determined by the method described by Nayar *et al.* (1962). In Table I, the number of days by which the twines lost half their original breaking strength was calculated from Fig. 1 applying the intermittent supplement method, and the effectiveness of each preservative shows the ratio of effectiveness when control (untreated) is taken as 1.

In combination with coal-tar, Panachikka offers better effectiveness. If tannin fixation is followed by coal-tar treatment, cutch appears to be effective than the other preservatives in the series. It is interesting to note that unlike sisal (Nayar *et al.*, 1962) fixation of tannin does not seem to highly enhance the effectiveness of the preservatives. The above results indicate that for coir ropes and webbings that are under immersion for longer period, tannin + Coal-tar treatment is better and this prolongs the life of the gear nearly three times.

Impregnation and Effectiveness

From Table I it would be evident that the highest effectiveness is imparted by cutch 'fixed' + coal-tar treatment. This treatment also imparts the highest percentage impregnation. But when the effectiveness of this treatment is compared with Kalasam 'fixed' + coal-tar treatment it is seen that the difference in the effectiveness of the two methods is very negligible. It is also interesting to note that among the various methods studied, the latter method of treatment imparts the least increase in weight to the twines and this is an added advantage. Hence it can reasonably be inferred that 'Kalasam' 'fixed' + coal-tar treatment ensures maximum effectiveness to gears fabricated with coir twines, with the least increase in the weight of the gear after treatment.

SUMMARY

The effectiveness of the two indigenous tannin preservatives and English Cutch, following different methods of treatment on coir twines has been evaluated.

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