A Study of Physical Changes in The Bast Fibre of Crotalaria Juncea Linn Due to Weathering

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SUMMARY

The article describes the experiments conducted on *Crotalaria juncea* Linn, (Sunn fiber) bast fibers to determine the effect of weathering during storage on its bast fibers. To obtain optimum strength bast fibers should be stored in close and covered space.

INTRODUCTION

Crotalaria juncea Linn the well known Sunn Fibre of Uttar Pradesh is of great commercial importance and is being exported.

The Sunn fibre is essentially a cultivator crop and is cultivated with the first advent of rain and it is ready for harvesting by the end of Aug. or by the middle of September or it takes about four months to mature.

The Sunn fibre, a bast, is usually extracted by retting. Very often there is no sufficient space to store the fibres in closed and covered area and the fibres are kept in open, which leads to considerable weakening and discolouration of the fibre. This fibre is extremely suitable for the production of cigarette tissue, tissue and high quality papers. A study was carried to determine the effect of weather on the physical properties of Sunn fibres.

PROCEDURE

The sample of Varansi (Sunn) fibres was divided into three parts. One part was covered with a black cloth and kept in darkness. The second part was hanged inside the laboratory, exposing to diffused sun light. The third part was spread in thin layer on the bamboo frames on the roof top of the laboratory. The samples were fortnightly drawn from the lot exposed on the roof. The chemical analysis of sunn fibres is as follows : –

TABLE—I

Sl. No.	Factors	Percentages
1.	Moisture	9.5
2.	Ash	1.89
3.	Fats and Resin	1.10
4.	Cellulose (Cross and Bevan)	84.82
5.	Alpha Cellulose	72.79
6.	Lignin	5.80

In view of the heterogenous and jumbled nature of sunn fibre it was considered to carry out only the bundle strength of the fibre and this gave a correct indication about the loss of strength of the sunn fibre on weathering.

Small portion was taken from ten random places and put together to form bundles. The bundles were cut to 4 inches length and successively *combed* on *gill pins* of three different sizes, first on the coarse pin, then on the medium pins and finally the fine pins. After combing, the bundles were cut to exactly 3 centimeters length and accurately weighed. A distance of 1 centimeter was maintained for each bundle between the clamps. The extension of the fibre, being very low, could not be recorded.

The result of the experiment on breaking length is given in Table-II.

EFFECT OF STAINING REAGENTS

A study was also made to determine the effect of some of the important staining reagents, on the fresh sample of sunn fibre and weather affected

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TABLE II

RELATIVE HUMIDITY 65%, TEMPERATURE 27°C. LENGTH OF BUNDLE 3 cm., THE DISTANCE BETWEEN THE CLAMPS 1 cm.

S.N.	Sample No.	Wt. of Bundle Mg.	Breaking Strength in lbs.	Breaking Length. K.M.	Mean Breaking Length k.m.	Remarks
1A	1	14.60	25.5	23.77		Controlled Sample kept
1B		17.70	26.0	19.99		
1C		13.41	20.5	20.81	22.94	in a dry
1D		17.11	29.0	23.07		dark place
1E		14.58	20.0	27.07		
2A	2	11.51	24.0	28.38		Sample ex-
2B		19.66	30 0	20.77		posed to
2C		18.27	25.0	18.62		diffused to
2D		19.28	37.0	26 12	22.78	light for
2E		15.28	22.5	20 04		six months.
3A	3	9.34	13.5	19.67		Exposed
3B		11.10	16.0	19.62		to weather
3C		12.20	20.0	21 31	21.4	for 15 days
3D		14.20	22.0	21 09		
3E		17.86	32 0	24 39		
4A	4	21.17	30.5	19.61		Exposed to
4B		13.90	22.0	21.70		Weather
4C		14.35	15.5	14 7	19.16	for 30 days.
4D		25.55	32.5	18.78		
4E		14.87	23.0	21.05		
5A	5	13.23	18.0	18.52		Exposed to
5B		12.90	13.5	14.24		weather
5C		15.61	17.0	17.00	17.36	for 50 days.
5D		15.50	20.0	17.56		
5E		14.55	21.0	19.64		
6A	6	17.30	17.5	13.77		Exposed to
6B		13.33	16.5	16.85		weather
6C		14.10	22.5	21.72		for 70 days
6D		12.45	15.0	16.40		
6E		13.70	17.0	16.89		
7A	7	16.72	15.5	12.62		Exposed to
7B		14.90	15.0	13.70		weather
7C		14.24	19.0	18.16	13.95	for 85 days
7D		13.75	14.0	13.86		
7E		16.10	13,5	11.41		
8A	8	14.55	12.0	11.22		Exposed
8B		12.30	11.0	12.17		weather
8C		13.20	12.5	12 89	13.81	for 100 days
8D		14.24	15.0	14.34		
8E		14.37	19.5	18.47		
9A	9	13.60	13,0	13.01		Exposed
9B		15.30	11.5	10.23		to weather
9C		22.20	20,0	12.26	12.80	for 115 days
9D		17.00	19.0	15.21		

S.N	Sample No.	Wt. of Bundle Mg	Breaking Strength lbs	Breaking Length K.M.	Mean Breaking Length K.M	Remarks
9E		18.92	18.5	13.31		
10A	10	20.72	20.5	13.47		Exposed
10B		17.13	17.0	13,51		to weather
10C		13.82	14.0	13.79	12.57	for 145 days
10D		14.64	9.5	8.83		
10E		20.00	19.5	13 27		
11A	11	16.94	13.0	10.44		Exposed
11B		17.36	13.5	10.58		to weather
11C		14 36	15,5	14.69	11.32	for 160 days
11D		11.94	6.5	7.41		
11E		28.22	27.0	13.50		
12A	12	15.35	11.0	9 75		Exposed
12B		13.58	7.5	7.52		to weather
12C		13.42	10.5	10.65	9.55	for 280 days
12D		13.84	10.5	10.65		
12E		15.60	11.5	10.03		

sunn fibre, the result obtained is shown in Table-III.

TABLE – III

S. No.	Reagent	Sunn Fibre Fresh	Sunn Fibre Weather Effected
1.	Tex Chrome	Deep blue	Purple
2.	Habeneas Reagent	Bluish brown	Bluish Brown
3.	Phloroglucinol in Concentrated Hydrochloric acid	Light Pink	No colouration
4.	Shirla Stain A	Dirty purple	Light purple

CONCLUSION

It is a common knowledge that Vegetable fibres undergo detention on being exposed to weather due to bacterial and actinic (Solar) activity and results in a loss of strength. The loss of strength during the initial stage is due to decomposition of pectic bodies and soluble sugars along with other water soluble matter.

In final stage the fall in breaking length is very gradual and it may be due to first distintegration of low chain length of hemi-cellulose and then the more resistant constituent of the fibres slowly uudergoing composition. The fresh sunn fibre can be easily distinguished from weather affected sunn fibres by staining with staining reagent "Tex chroma".

To obtain optimum strength properties, the bast fibre of *Crotalaria Juncea* Linn (Sunn) should be stored in closed and covered area.