



c) Degradation of Fiber



d) Sansevieria Trifasciata Fiber

2. Experimental Procedure

Materials

1. Selection of Plant: Plants of Sansevieria Trifasciata were collected from in and around Ram Nagar, Nainital, the leaves were used to obtain the fibers.
2. Fibre Extraction: The fiber was extracted from the leaves by retting method. The leaves were collected and remained in water for seven to eight weeks. When the leaves were completely degraded in the water, the fibers were extracted by removing the outer layer. The extracted fibers were washed thoroughly to remove any traces of pulp adhering to them. They were then dried in sunlight for about five to seven hours to remove moisture.

Method

1. Fiber Diameter: Projection Microscope was used to calculate the diameter of the fiber.
2. Fiber Fineness: The fiber was tested for its fineness as indicated in ASTM D-1577:07 test method.
3. Tenacity and Elongation: Tenacity of the fibers was tested using ASTM D- 3822:07. The gauge length between the jaws was 15cm. The preconditioned fiber samples were fixed between two jaws. After the rupture of the fibers the tenacity and elongation were noted.

3. Results and Discussion

The properties of the fiber were tested in the laboratory of Northern India Textile Research Association (NITRA), Ghaziabad to find out the results.

1. Fibre Diameter



Projection Microscope

The thickness or diameter is one of its most important properties of the fiber. Fiber diameter is usually measured with a Projection Microscope. An image of fiber scraps is magnified and projected onto a screen, from which the diameter is measured. The diameter of the fiber was calculated as 50.76 microns.

2. Fiber Fineness



Fineness is one of the three most important fibre characteristics. "The fineness determines how many fibres are present in the cross-section of a yarn of given thickness. Additional fibres in the cross-section provide not only additional strength, but also a better distribution in the yarn". Thirty fibres are needed at the minimum in the yarn cross-section, but there are usually over 100. "Fibre fineness plays an important role in determining the quality of resultant yarn and hence that of the resultant fabrics". The fiber was tested for its fineness by Single-Fiber Weighing method. This test method is recommended for measurement of the linear density of single fibers and is not suitable for fibers shorter than 30 mm. The length of a single fiber was measured and the fiber was weighed. The linear density of the fiber was then calculated in denier units. It was found to be 19.45 denier with 13.48 as coefficient of variation.

3. Tenacity and Elongation



Tensile Strength Tester

Fiber Strength is considered to be next to fiber length and fineness in the order of importance amongst fiber properties. It denotes the maximum tension the fiber is able to withstand before breaking. It can be expressed as breaking strength or tenacity etc. It determines elongation percentage of fiber at break. Elongation is compared as a “percentage of the starting length”. This is an important property of a fiber as it is this nature of fibers that makes them useable in the form of textile products. “They must be able to deform (e.g. at knee or elbow) in order to withstand high loading (and also during processing), but they must also return to shape. The fiber elongation should therefore be at least 1-2% and preferably slightly more”. Strength and elongation are therefore inseparably connected. The fiber was preconditioned at, 21 +/- 1°C (70 +/- 2°F) and 65 +/- 2 % relative humidity. The fiber specimen was mounted in the jaws of the clamps. All slack was removed without really stretching the specimen. Care was taken to keep the specimen straight within the jaws and it was ensured that the fiber sample lay on the line of action between the force-measuring device and the point where the fiber left the moving jaw face. The tensile testing machine was started and when the fiber specimen started to break, the elongation and tensile strength were recorded on the computer. The results were as follows:

Sr. No.	Test Parameters	Test Method	Test Results
1.	Breaking Strength, gms	ASTM D-3822:07	114.99gms
	CV% of Strength		27.54
a)	Tenacity (gm/denier)		5.97
b)	Elongation at break,%		3.27
	CV% of Elongation		15.70

4. Conclusion

The fiber was extracted from natural source i.e. Sansevieria Trifasciata Plant using water retting method. The results showed that the fiber had good strength and fineness with low elongation. Due to its greater strength, cost-effective and renewable source, the fiber can be used to make products like sacks, ropes, handicrafts, mattresses for bedding and other wider applications of textiles.

References

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