Developed products from Cotton rose woven and non-woven fabric:

Shopping bag

File cover

Place mat

Oven gloves for domestic use

Oven gloves for laboratory use

Thermo tiffin bag

Conclusion

In the present global scenario, there is a huge quantum of underutilized plant fibres which offers a potential opportunity for the textile application. The underutilized plants can generate positive environmental benefits, thus contributing to the sustainable development in agricultural field which in turn to create dual benefit. The natural fibres are renewable resource, thus providing a better solution of sustainable supply, like it has low cost, low density, least processing expenditure, no health hazards, and better mechanical and physical properties. The most important property of natural fibre is biodegradability and non carcinogenic which bring it back into fashion, with an advantage of being cost-effective.

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Products from *Hibiscus Mutabilis* (Cotton Rose)

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The cotton rose (*Hibiscus mutabilis*) is an ornamental plant bears beautiful flowers locally known as Tholopadma. It belongs to the family Malvaceae. It is a large shrub or small multi-stemmed tree growing 2-5 m tall that loses some or all of its leaves during winter. Its younger stems, leaf stalks and flowers buds are covered in a mixture of star shaped hairs and short wooly hairs.

Extraction of fibre from Cotton rose:- Extraction of fibre from cotton rose barks were carried out by water retting method. In order to obtain the fibre, initially, the stems were cut to a predetermined length and barks were removed from the stem.

The bundles of barks were tied with the ropes, weighed and immersed in water completely. After 15 days, bundles were taken out and removed the fibres from the barks. Fibres were washed properly in running water to remove the dirt that adhered to the fibre and air dried.

Fabrication of cotton rose fibre: For fabrication, two techniques namely- Non-woven and weaving were used. Yarns and non-woven fabrics from cotton rose were made by blending with jute in different ratios such as 50:50 and 30:70 at National Institute of Natural Fibre Engineering and Technology (NINFET), Kolkata. Fabrics were made by using cotton as warp and jute as weft with basket weave.

Physical Properties of Non-woven fabrics:

Types of fabric / Properties		Cotton rose/jute (50:50)	Cotton rose/jute (30:70)
Tenacity at maximum load (cN/tex)	Machine direction	0.20 (22.46)	0.28 (12.48)
	Cross direction	0.10 (30.08)	0.26 (46.50)
Bending Modulus(cN/tex)		3.97×10^{-4}	3.39×10^{-4}
TIV (tog)		2.31	1.98
Thickness (mm)		4.83	4.35

Physical Properties of woven fabrics:

Types of fabric / Properties		Cotton rose/jute (50:50)	Cotton rose/jute (30:70)
Tearing strength (kgf)	Warp	38.97	37.25
	Weft	39.35	38.25
Fabric thickness (mm)		1.84	1.78
GSM (g)		5.04	4.80

Products developed from cotton rose fibre/ woven/ non-woven fabric:

- Based on thermal insulation property of non-woven fabric, different insulating products like Oven gloves for laboratory and domestic use, thermo-tiffin bag were made and both the gloves for laboratory and domestic use were found suitable by the consumers.

On the other hand, the thermo tiffin bag is able to keep food items warm for 4-5 hours.

- Different utility products were prepared from Cotton rose/jute blended woven fabric such as Shopping bag, File cover, place mat, etc. The products were designed using techniques like embroidery, drawn thread etc. Keeping in mind about the properties of the woven and non-woven fabrics, these products were prepared.

Development of hygiene product:

Cotton rose fibres were used to prepare sanitary napkins as core (100%) and mixing with jute .

Cotton rose/Jute fibre (50:50)

Cotton rose fibre (100%)