

BANANA YARN: GOLDEN REVOLUTION IN TEXTILES



K. N. Shiva
S. Uma
P. Suresh Kumar

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(K. N. Shiva, S. Uma and P. Suresh Kumar)

Preamble

Among the tributes presented to the Hon'ble Prime Minister Shri. Narendra Modi during first National Handloom Day celebrations on 7 August 2015, shawl woven using 25 types of natural fiber including one from the banana stem, made by the Anakaputhur Jute Weavers Association (AJWA) was also presented (<http://www.livemint.com/Sundayapp/YvUhHL0t7xdJIRzginXknN/Going-bananas-over-Madras-checks.html>).

Banana farming generates vast quantities of biomass, after harvesting the fruit bunch, out of which pseudostem (30-34%) and peduncle together contributes 40 per cent of the banana plant biomass. Currently less than 2% of these wastes is used for production of fibre and composting under nutrient recycling, the remaining are incinerated and wasted due to non-availability of suitable technology for its commercial utilization. India has huge potential of extraction of natural fibre from banana with its traditional varieties like Red banana, Nendran and Poovan which are highly suitable for making banana fibres and further separation into yarn. It is a lignocellulosic material mainly consists of polysaccharides with cellulose microfibrils embedded with hemicelluloses, lignin, pectin and water soluble components. Banana pseudostem contains- 59.18 % cellulose, 17.5 % lignocellulose, 54.6% Alpha-cellulose, 1.4% ash and 18.2 % lignin.

Banana fibre is used in Philippines for making shirts and other dresses. In Japan, the cultivation of banana for clothing and household use dates back to at least the 13th century. Banana fibers can be used for various purposes such as in textile, paper or handicrafts industry. Relatively higher tensile strength and stiffness of banana fibre make it promising fibre material. Longer fibres of banana results in more yarns production. Moreover, the higher yarn strength of banana fibre facilitates the blending with other natural or synthetic fibres for production of blended fabric and textiles. Raw fiber is cleaned by artisans through a simple bleaching method using alkali like sodium hydroxide and pectin and other impurities are then removed. Each strand of the fibre is taken out, softened with softening chemicals and woven into fabrics after being dyed in various colours. Banana fibre has an affinity to colours that makes it easier to weave attractive designs from it. The process maybe cumbersome but the six yard wonders fabricated from this fibre is very comfortable and in much demand.



Machine extraction of fibres from banana pseudostems

ICAR-NRCB initiative

ICAR- NRCB and Navsari Agricultural University, Gujarat have taken initiatives to utilize these wastes for fibre and to yarn production and textiles through ICAR-adhoc projects, in house and NAIP, an externally funded project. The technologies developed were transferred for efficient extraction of banana fibre and its utilization in textile industry. With the increasing demand for bio-shirts, the shirts and *sarees* made of banana fiber could find takers because of their ability to keep the body cooler by not absorbing heat. The fibres, extracted from the banana pseudostem, are odorless and can be dyed. They do not shrink and the color does not fade after a wash. The fabric's stiffness, even in the absence of starch, could make it a favourite among masses. Though the fabric could be 100% banana fiber, a mix of 60% cotton will give it maximum durability and better blending.

Anakaputhur: Silver line in utilizing banana fiber

Mr. C. Sekar, innovative weaver from Anakaputhur, near Chennai, & Head, Anakaputhur Jute Weavers' Association traditionally known for its handlooms, picked up the idea of using banana fibre and revived the weaving industry which otherwise may have completely lost its identity in the urban chaos. With his creative legacy, he is now utilizing banana fibre making saris that he and his fellow weavers are now trying to promote the banana based textiles in a bigger way (<http://www.ananafit.com/about-us.html>) with the technological help of ICAR- NRC Banana.



Separation of yarn from banana fibers

With the technological know-how, they have made 100 percent pure banana fibre *sarees* and sold hundreds of such *sarees* in last couple of years. The demand for such saris is increasing and getting a yarn round the year became hiccup to upscale the activities. According to Mr. Sekar, about 500 grams of yarn is required to create one *saree*. He advocates 30:30:40 blend of banana:cotton:silk for making premium silk saris, which can attract premium segment.



Courtesy: Photo: Nathan G./Mint

Weaving of *saree* of yarns made out of banana fibres

Cost advantage & sustainability

The utilization of banana fibre would be an innovative method to reduce pollution in an effective manner and to boost our economy for a better world as otherwise farmer tends to burn the field for clearance. While banana stems are available in plenty, the manual extraction of fibres from the stems is labour intensive and time consuming. To the maximum 500 g of fibre can be extracted manually by a single person. Machines are being popularized by the centre for the extraction of fibre through TSP/NEH programmes with which 10 kg of fibre can be extracted. With the area under banana is around 8 lakh ha, roughly half the population can be utilized for the extraction of fibre every year. With the fibre recovery of 75 to 100 g/plant on average, around 150 to 200 kg of spinnable fibre can be extracted from one ha depending upon the variety. One kg fiber cost around Rs. 200/-, therefore farmer can earn an additional income of Rs. 40,000 - 50,000 per ha. Roughly, 3 kg of fiber may be utilized to produce one kg of yarn. With the wild banana wealth, north eastern states could be also be used for regular supply of the

fibres for textile industry. The banana yarn blended with cotton *sarees* is sold Rs.1500/- onwards and shirt from Rs. 750/-, while with silk blended embroidery *sarees* are sold Rs. 5000/- onwards in the market.

The efforts of the Anaputhur handlooms has been recognized and appreciated by different newspapers of the country. The company achieved several milestones in a short period of time. The company has been included in the Limca book of record for producing a *saree* from 25 different natural fibres. The company was the winner of ‘Parivartan Sustainability Leadership Award 2011’ for ‘Exceptional Leadership in Catalyzing Sustainability’ in the apparel and textile sector.



Shirt and sarees produced from banana pseudostem fiber yarns

Fibre extracting machines are being popularized by the institute for the extraction of fibre through TSP/ NEH programmes. ICAR-NRCB has till date distributed ten fibre extracting

machine across eight states (Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Meghalaya, Arunachal Pradesh, Nagaland and Tripura) and offered 15 trainings covering women self groups and entrepreneurs. In total more than 200 trainees got exposure to utilization of banana fibre. Of these, Kerala and Tamil Nadu have successfully employed the machinery and making fibre industry a profitable venture with the technical backstopping and handholding from the centre.