

BANANA FIBRE AND FIBRE BASED HANDICRAFTS

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Preamble

By virtue of gigantic growth, banana plant produces large amount of biomass. More than two-thirds of the total biomass produced during banana cultivation consisted of pseudostem, leaves, mid rib, peduncle and corm. Banana pseudostem is a waste material after the harvest. In pseudostem, only 9-10 layers of sheath of the plant yield fibre. The fresh pseudostem yields about 1-1.5% of fibre. It is estimated that annually 30 million tons of biomass is produced through banana cultivation, from which there is scope to produce 1.5 million tons of banana fibre across the country as byproduct, which otherwise recycled into soil for enrichment or goes as a waste. The biomass production varies from 54.60 t/ha (Poovan, AAB) to 94.10 t/ha (Saba, ABB). Utilization of banana fibre is an underexploited area due to the lack of awareness and lack of systematic research on structural and physical properties of the fibre. As banana is cultivated round the year, supply of raw materials is ensured round the year for production of a wide array of products. From outer sheath, coarse fibre is extracted while fine fibre is extracted from inner sheath. Both the fibres are utilized for making many handicrafts.

Advantages

- Natural fibre and eco-friendly in nature.
- Raw material available cheaply.
- Choice for making diversified products.
- Wide range of applications (textile, handicraft, absorbent, automobiles, *etc.*)
- Employment generation to rural sector, particularly for SHG of women.

Banana fibre is extracted from the sheath of banana pseudostem by hand or machine. The natural fibre has multifaceted uses in preparing many value added products of handicraft items such as table-mat, bag, wall hangings and other fancy articles, ropes, craft paper, *etc.* A farmer or an entrepreneur can earn additional income up to Rs. 10,000/- from one acre of banana cultivation. The scutcher waste as byproduct can also be utilized for making vermicompost.

Keeping these points in view, an improved banana fibre extractor was designed and developed with high efficiency and quality to meet the market demand and to satisfy the customers need.

The training and transfer of technology for the product is available at ICAR – National Research Centre for Banana, Thogamalai Road, Thayanur Post, Tiruchirappalli – 620 102, Tamil Nadu. This product is highly suitable Self-help group for women (SHGs). *Khadi* Village Industrial Commission (KVIC) helps in promotion and marketing of natural fibres and its products including banana fiber and its products.



Machine extraction of fibre from banana stem



SHG women manufacturing banana fibres and handcraft items

Impact of banana fiber extraction and fibre based handicrafts

Mr. A. Sivakumar, SSKJ Trading Pvt. Ltd., Trichy, Tamil Nadu, engaged in manufacturing and marketing of banana pseudostem fibre extractor under the brand name of BANANA STAR since 2010. The machine has a stand for workers and scutcher waste collection basket, wheels for moving from one place to another. The entrepreneur developed this machine under the aegis of ICAR-National Research Centre for Banana, Tiruchirappalli under the scheme 'Waste to Wealth', a fibre extraction project for the benefit of banana farming community, self-help groups at village level and various other entrepreneurs/stakeholders involved in the banana related activities/business. The machine BANANA STAR was tested several times for its efficiency and comparative studies at ICAR – NRC Banana, Trichy and received efficiency certificate.

'WASTE TO WEALTH'
A Project For
Banana Cultivators

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OUR MACHINERY

We introduce our latest power rapier machine, **BANANA STAR** which is far finer superior machines that are available presently in the market. It is manufactured using high quality materials such as ISO Certified Steel Frames, Flat Free 304 Stainless steel shafts and blades for long life and low maintenance. Higher percentage of fiber recovery is the hallmark of our machine. In 8 hours, our machine can extract 15 to 18 kg of dry fiber of desired length based on the variety of banana plant used. The machine is user-friendly and safe to handling. With our machine, farmers can extract around 150 kg fiber per acre, and therefore a farmer with 10 acres can extract around 1.5 tons of fiber, earning around Rs. 7 Lakhs in two months, including expenses. Apart from the fiber, the scutcher waste can be used to produce vermicompost for use in the farmer's own field as a measure which is available at free of cost.

EXTRACTION OF BANANA FIBER

Banana fiber is extracted from the pseudo stem sheath of the plant. The extraction can be done mainly in three ways: Manual, Chemical and Mechanical. Of these, mechanical extraction is the best way to obtain fiber of both good quantity and quality in an eco-friendly way. In this process the fiber is extracted by tearing the pseudo stem sheath one by one into a rapier machine. The rapier machine removes non-fibrous tissues and the coherent material (known as scutcher) from the fiber bundle present in the sheath and gives the fine fiber as output. After extraction, the fiber is made clean for a day and packed in HDPE bag. Then it is stored away from moisture and light to keep it in good condition until it is used.

ADVANTAGES OF THE MACHINE

- EXTRACTS 15 KG FIBER IN 8 HOURS.
- CONSUMES LESS ELECTRICITY THAT 6-8 LITERS PER HOUR.
- PROVIDES FIBER OF SUPERIOR QUALITY IN TERMS OF LENGTH, SOFTNESS, STRENGTH, AND COLOUR.
- LESS MAINTENANCE, EASY AND SAFE TO OPERATE.
- CLEAN WORK ENVIRONMENT.
- REDUCES DRUDGERY.

USES OF BANANA FIBER

Banana fiber is used for the following purposes:

- To make currencies, bond papers, and specialty papers which can last for 100 years.
- As a very good replacement for wood pulp in the paper industry, as it has high cellulose content, thus reducing the environmental impact of deforestation.
- In making composite materials as a replacement for fiber glass.
- For manufacturing mattresses, pillows and cushions in the furniture industry.
- In handicrafts, substitively for making bags, purses, mobile phone cover, door mats, curtains, and yoga mats etc.
- As fibers in packaging to absorb shock and vibration.
- In the manufacture of bottles.
- Research is underway to find out other uses of this fiber.

Machine Certified by
NRCB-ICAR
Ministry of Agriculture

So far, the entrepreneur has supplied 47 machines to various Districts of Tamil Nadu, Kerala, North-eastern states and the sales turnover is Rs.33 lakhs. Importantly, the entrepreneur is facilitating buying and selling of fibre and its products of our customers as well as other customers of banana fibre. Mr. Sivakumar was recognized with 'Best Entrepreneur Award' in 2013.

Mrs. P. T. Paremalam, Erode District, Tamil Nadu is running fibre based products in the name of 'Sri Achu Fibres' for the past six years since 2011. After getting training from ICAR-NRCB, she manufactures diversified banana fibre and fibre based products, banana fibre pillows, fibre seat pads, table mats, bags, cell phone pouch, yoga mats, *etc.* Sri Achu Fibres provides employment to many women in banana fiber based handicrafts and fabric production. It also

contributes for export promotion, in addition to domestic markets. The sale of products is Rs. 20 lakhs per year with a net income of Rs. 3 lakh per year.

Recognizing her contributions to the banana fibre based products and natural fibre industry, she was awarded with 'Best Entrepreneur Award' in 2013 and 'Best Women Entrepreneur' of Tamil Nadu Award' in 2016 by ICAR - National Research Centre for Banana, Tiruchirappalli.



Mr. Sivakumar receiving 'Best Entrepreneur Award'.



Mrs. Paremalam receiving 'Best Woman Entrepreneur Award'.