

Exploration of banana fibre as low cost eco-friendly waste management

BINAPANI DEKA, PANKAJ DEKA AND RUPAM BORGHAIN

Krishi Vigyan Kendra, Jorhat, Assam Agricultural University, TEOK (ASSAM) INDIA
Email : dbinapani@gmail.com

The production of banana in India is about 27.01 million tons from an area of 0.765 million ha. It provides delicious foods and good quality textile fibre. In most cases, after harvest of the fruits in banana plantations, the stems are wasted and billion tons of stems and leaves are thrown away annually. Such waste provides obtainable sources of fibres, which leads to the reduction of other natural and synthetic fibres' production that requires extra energy, fertilizer and chemical. Considering the pollution aspect of synthetic fibre, there is a need to search for non-conventional renewable resource for textile to give an effective solution. Banana fibres are good absorbent, highly breathable, quickly dry with high tensile strength, biodegradable and have no negative effect on environment. Utilization of banana fibre as cottage industry may be explored for income generation by rural women. Trainings were conducted for extraction of banana fibre and preparation of decorative items. Significant difference was found between pre and post test which was carried out among 25 rural women of Romai area of Dibrugarh District. The ultimate goal of this endeavour was to upgrade the knowledge content about extraction of banana fibre, create awareness and full utilization of banana plants.

Key words : Exploration, Fibre, Eco-friendly, Waste management

How to cite this paper : Deka, BinaPani, Deka, Pankaj and Borgohain, Rupam (2014). Exploration of banana fibre as low cost eco-friendly waste management. *Asian J. Bio. Sci.*, 9 (1) : 129-130.

Historically, banana stems had been used as a source of fibre with the earliest evidence around the 13th century. But its popularity was faded after other convenient fibres such as cotton and silk were made available. Textile production processes are now shaping toward the concept of environmental-friendly and sustainable development. These ideas are not very new in textile industry. The progresses have been improving ranges of natural and environmental eco-friendly textile processes. Many efforts have been made in sciences and technology to develop environmental-friendly process to sustain relationship with the ecosystem. However, alternative materials should be considered. Natural fibres present important advantages such as low density, appropriate stiffness and mechanical properties and high disposability and renewability. This study attempt to popularize an option of natural fibre, by product from banana fruit cultivation, by suggesting a use of left over banana trunk as fibre source in textile process.

Banana pseudostem is a waste material after the harvest. Banana fibre is a natural fibre. It can be produced very cheaply from the waste materials left out in the field after harvest.

Annually 30 million tonnes of biomass is produced through banana cultivation from which 1.5 million tonnes of fibre could be extracted. In pseudostem, only 9-10 layers of sheath of the plant yield fibre. The quantity of biomass produced depends on the variety. Pseudostem yields 0.29 – 0.9 per cent fibre. Fibre can be extracted from the sheath of banana by hand or machine. The natural fibre has multifaceted uses in preparing many value added products and many handicraft items such as table-mat, bag, wall hangings and other fancy articles, ropes, craft paper, etc. Banana fibre has also been recognized for all its good qualities and now its application is increasing in other fields too such as apparel garments and home furnishings. Due to its being lightweight and comfortable to wear, it is still preferred by people there as summer wear. Banana fibre is also used to make fine cushion covers, Neckties, bags, table cloths, curtains etc. Rugs made from banana silk yarn fibres are also very popular world over. This may lead to rural employment and thereby, generation of additional income to the farming community of rural population particularly to women.

The above case study was conducted under the aegis of Home Science component of Krishi Vigyan Kendra,

Table 1 : Distribution of the respondents according to their knowledge content pertaining to different desirable aspects of extraction of banana fibre

Knowledge on	Pre test						Post test					
	Good		Average		Poor		Good		Average		Poor	
	F	P	F	P	F	P	F	P	F	P	F	P
Uses of banana fibre	-	-	2	8	23	92	22	88	3	12	-	-
Procedure extraction of banana fibre	-	-	-	-	25	100	18	72	7	28	-	-
Post treatment of extracted fibre	-	-	-	-	25	100	15	60	10	40	-	-
Preparation of value added products	-	-	2	8	23	92	18	72	7	28	-	-
Marketing	-	-	5	20	20	80	12	48	13	52	-	-

Dibrugarh, Assam Agricultural University in 2011. The main objective of the above study was to popularize the uses of banana fibre which can be prepared from waste material. Therefore, hands on training on extraction of banana fibre were conducted among the 25 numbers of rural women representing two different villages of Romai, Dibrugarh. Pre and post test on different aspects related to the above study was conducted by using specific questionnaire and subsequently data were analysed.

Perusal of data presented in Table 1 reflects that that majority of the respondents (92%) had poor knowledge regarding raw uses of banana fibre. All respondents possessed poor knowledge regarding procedure extraction of banana fibre and post treatment of extracted fibre. Similarly 92 and 80 per cent respondents showed poor knowledge regarding preparation of value added products and marketing, respectively. Therefore, it is vivid from the pre test results that the knowledge content of all respondents regarding all fundamental aspects of banana fibre was not adequate. However, after the fastidious training and interventions related to banana fibre extraction by the rural women showed very encouraging results. The post test results indicated that after the adequate intervention, majority of the respondents (88%) showed good knowledge regarding uses of banana fibre (Table 1). Out of all, 72 per cent of respondents, exhibited good knowledge regarding the procedure of extraction of banana fibre and they were found to properly skilled to perform the task. Sixty per cent of the respondents showed good knowledge on post treatment of extracted fibre and majority of respondents (72%) also got success in preparation of value added products in an innovative way from extracted fibre.

The post evaluation study conducted on adoption of banana fibre extraction showed that out of all the trainees, 20 per cent rural women have already started the techniques of extraction of banana fibre as a household business. They realized that preparation of value added products from banana fibre can be adopted as a profit making home based business best suited for the women entrepreneurship development in rural areas. However, some of the trainees exhibited their vested interest for this venture due to the poor investment capacity, fear of not getting proper market as well as for not getting family support and encouragement.

Conclusion :

As a wealth from waste concept, banana fibre is a major alternative to pulp industry. Raw material is freely available. The banana fibre project creates a lot of employment opportunities in rural and urban sectors. Banana fibre is eco friendly and biodegradable comparing to all other synthetic fibres. For a comparison of fibre extraction, the mechanical extraction should be employed. From the above study it was realized that the mechanical process was appropriate for fibre collection. Banana fibre at present is a waste product of banana cultivation and either not properly utilized or partially done so. The extraction of fibre from the pseudostem is not a common practice and much of the stem is not used for production of fibres. The behaviour of the fibres also gives important hint regarding their subsequent behaviour as reinforcement in composites. There is scope for further research to completely characterise the banana fibres and facilitate proper applications in natural fibre reinforced composites.

LITERATURE CITED

- Ketty Bilba, Marie-Ange Arsene and Alex Ouensanga (2007). *Bioresource Technol.*, **98** : 58.
- Reddy, Narendra and Yigi, Yang (2009). Properties of natural cellulose fibres from hop stems. *Carbohydrate polymers*. **77** : 898-902.
- Silayoy, B. (2008). Banana. *Thai Encyclopedia for Youth*. Dansutha: Bangkok, Thailand.

9TH
YEAR
★★★★★ OF EXCELLENCE ★★★★★