

Extraction of 'Pandanus Utilis' Leaf Fibre and its Potential for Eco Friendly Product Development

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In the tropics, natural fibres are fairly abundant and proper utilisation of these renewable and eco-friendly resources can open up fresh economic opportunities for island states such as Mauritius. This project has explored the technological as well as the commercial prospects of '*Pandanus utilis*', a plant commonly known as 'Vacoas', which to the best of our knowledge is an indigenous plant of Mauritius. Currently, its green leaves find limited application for making baskets and low value decorative items while the dry leaves form an agro waste. The leaf is the main part of the plant that contains the fibres.

The research has focused on various techniques and procedures for fibre extraction from both dry and fresh leaves. Each method presented advantages and drawbacks with respect to percentage fibre yield, length and quality of fibre extracted and properties of fibre bundles.

The research has investigated water retting method for dry leaves. Extraction of *Pandanus utilis* fibres by water retting was possible between four to eight weeks. The study also explored unconventional fibre extraction methods using 'solar energy for retting' as practical technique to expedite retting in rural and/or micro-enterprise settings.

The research has entailed the modification of a sisal decorticator machine for extracting fibres from fresh *Pandanus utilis* leaves. Some mechanical parts of the sisal decorticator were re-engineered to make it suitable for extraction of *Pandanus utilis* fibres and ensure that the customised machine operated correctly and safely. Observations showed that the fibres extracted were clean and comparable to retted fibres in terms of length, softness and colour, making them suitable for the manufacture of rope and cordage.

Morphology, physical characteristics and properties of the extracted fibres were studied. Their performance tests for natural dyes and anti bacterial properties gave positive results. The suitability of *Pandanus utilis* as a textile fibre has been confirmed owing to a wide range of optimistic attributes.

In the product development phase, the *Pandanus utilis* fibres were used to make yarns and products such as fashion accessories, utility products and souvenirs. Alternative procedures and techniques were experimented to convert fibres into yarns using various tools such as drop spindles, hooked drill and Leonardo rope maker, thus demonstrating a range of tools and techniques that can be easily accessible. 'Design through making' approach was adopted for prototyping. Novel souvenirs were developed and designed to cater for the tourist industry which is an important component of the Mauritian economy. The research paves the way to empower craftsmen who are involved in handicraft industry and ensures the sustainability of traditional crafts to optimise the use of this local resource. It can catalyse innovation in small and medium industries dealing with crafts and textiles. Besides supporting the community-based socio-economic activities, the project also opens up new avenues for exploiting the fibres for geo textiles. It can make a valuable and practical contribution to the use of organic materials. At the same time, it hopes to reduce the carbon footprint of manufactured products by lending itself readily to its effective use in various untapped applications.