CHARACTERIZATION OF NEW NATURAL CELLULOSIC FIBRE FROM *LASIA SPINOSA* (L.) THWAITES RHIZOME FOR BIODEGRADABLE TEXTILE MATERIAL

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Declaration

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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Abstract

This study presents the characteristics of *Lasia spinosa* fibres (LSFs) extracted from the rhizome of the *Lasia spinosa* (L.) Thwaites (LS), a plant which is commonly available in the Asian region as a medicinal plant which has not been investigated previously with the intension of exploring the feasibility in developing a textile material. Two common species, Lamina dissected type and Sagittate type plant rhizome fibres were investigated with the use of fibre characterization tools and methods. Mechanical extraction and Alkali extraction methods were followed in extracting fibres from rhizomes. Morphological properties of fibres such as longitudinal section and cross section views were studied using Scanning Electron Microscopy (SEM). Chemical functional groups and crystalline structure, were investigated using Fourier Transform Infrared Spectroscopy (FTIR) and X-Ray Diffraction analysis (XRD) respectively. Thermal stability of the fibre was investigated using Thermogravimetric Analyzer (TGA). In addition, fibre properties were investigated by the way of measuring tensile properties, moisture absorbency and dye uptake.

The rhizome anatomy and the fibre morphological observations through SEM reveals fibres are presents in rhizome in the form of scattered vascular bundles with crimp. Each bundle contains approximately 16-25 microfibrils. The FTIR analysis confirms the fibres are rich in cellulose and the X-RD results confirm higher amount of amorphous regions in fibres with a crystallinity index of 43% with a lower amount of crystal phases. Higher moisture regains of 12.54 -14.5%, single fibre tensile strength of 201-205 MPa, higher breaking elongation of 16.89% and 1.3 GPa of Young's modulus with a thermal stability temperature of 230℃ were the some of the values obtained in this research project. All the results obtained were compared with the characteristics of Cotton fibre.

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List of abbreviations

Abbreviation	Description
LS	*Lasia spinosa*
LD	Lamina Dissected
SG	Sagittate
LDTF	Lamina Dissected Type Fibre
SGF	Sagittate Type Fibre
EAF	*Epipremnum aureum* fibres
SEM	Scanning Electron Microscopy
TEM	Transmission Electron Microscopy
FTIR	Fourier Transform Infrared Spectroscopy
XRD	X-Ray Diffractometer
CI	Crystallinity Index
CS	Crystal size

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