JOURNAL OF NATURAL FIBERS
https://doi.org/10.1080/15440478.2020.1798846

Taylor & Francis
Taylor & Francis Group

Check for updates

Physico Chemical Characterization of Fiber from Melia Azedarach Barks as an Effective Reinforcement in Polymer Matrices

P. Pandiarajan[a], P.G. Baskaran[b], M. Kathiresan[c], and S. Kanth[a]

[a]Department of Mechanical Engineering, Theni Kammavar Sangam College of Technology, Theni, India; [b]Department of Mechanical Engineering, Sri Venkateshwara College of Engineering and Technology, Thiruvallur, India; [c]Department of Mechanical Engineering, Thiagararjar College of Engineering, Madurai, India

ABSTRACT

The present study aimed to investigate the physico-chemical properties of new cellulosic fiber obtained from the bark of Melia Azedarach tree. The investigation outcomes revealed that, the cellulose content, crystallinity index and density of Melia Azedarach Fiber (MAF) were determined as 66.5 wt.%, 45.45% and 950 Kg/m^3, respectively. The MAF had thermal stability up to 220^{0}C which is evidenced from the thermo gravimetric analysis. The Fourier Transform Infra Red test clearly specified the existence of cellulosic and non-cellulosic substance in MAF. The morphological analysis showed that MAF contains smooth surfaces and its diameter is measured as 48.2 ± 2 μm. The results of this investigation on MAF were evident that it can be used as future reinforcement material to develop the green composite for potential applications.

摘要

研究了从苦楝树皮中提取的新型纤维素纤维的理化性质. 结果表明，苦楝纤维（MAF）的纤维素含量为66.5%，结晶指数为45.45%，密度为950kg/m3. 热重分析表明，MAF的热稳定性高达2200C. 傅立叶变换红外试验清楚地说明了MAF中存在纤维素和非纤维素物质. 形态分析表明，MAF具有光滑的表面，其直径为48.2±2μm. 研究结果表明，MAF可以作为未来的增强材料，开发具有潜在应用价值的绿色复合材料.

KEYWORDS

Melia Azedarach fiber; physico-chemical; thermal stability; infra-red; surface morphology; crystallinity Index

关键词

Melia Azedarach fiber, 苦楝纤维，Physico-chemical, 理化，Thermal stability, 热稳定性，Infra-red, 红外，Surface morphology, 表面形貌，Crystallinity Index结晶度指数

Introduction

In recent decades, researchers and scientist have been focusing on new fibers with the characteristics of light weight, inexpensive, easy available and particularly eco-friendly in nature to use as a reinforcement in polymer composites (Dufresne 2013; Obi Reddy et al. 2013; Pandiarajan and Kathiresan 2018; Thiruchitrambalam et al. 2010). Hence, they found that the use of natural fiber as reinforcement instead of manmade fiber such as glass, carbon, aramid in polymer composites due to their special features such as low cost, light weight, biodegradability, rich availability and non-abrasion of processing equipment, reduced wear of tooling, good working condition and no skin irritation (Ahmad et al. 2008; Buitrago, Jaramillo, and Maryory 2015; Joseph et al. 2009; Laly Pothan, Thomas, and Groeninckx 2006; Sreekala, Kumaran, and Thomas 1997; Sreekala and Thomas 2003). The use of natural fiber-reinforced composites have found in various domestic and industrial applications including aerospace engineering, gas turbines for civil and military aircraft (Balakrishnan et al. (2016)). Generally, natural fiber can be obtained from the different parts of the plant such as root (Indran, Edwin Raj, and Sreenivasan 2014), leaf (Kathiresan et al. 2016; Reddy and Yang 2008), stem (Reddy and Yang

CONTACT P. Pandiarajan pandianhero0783@gmail.com Department of Mechanical Engineering, Theni Kammavar Sangam College of Technology, Theni, Tamilnadu 625534, India

PRINCIPAL
Sri Venkateswara College of
Engineering and Technology,
Thirupachur, Thiruvallur - 631 203