

Development and characterization of crab-based chitosan filler–reinforced polymer composites

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Mohd Saiful Asmal Rani^{1,2}, Ahmad Salihin Samsudin³, Mohd Nor Faiz Norraahim⁴, N.M. Nurazzi⁵, Muhammad Khalis Abdul Karim¹, Mohd Hafiz Mohd Zaid¹, Muhammad Kashfi Shabdin¹, Mohd Mustafa Awang Kechik¹ and Khalina Abdan²

¹Department of Physics, Faculty of Science, Universiti Putra Malaysia, Serdang, Malaysia, ²Institute of Tropical and Forest Products (INTROP), Universiti Putra Malaysia, Serdang, Malaysia, ³Ionic Materials Team, Faculty of Industrial Sciences and Technology, University of Malaysia Al-Sultan Abdullah, Pahang, Kuantan, Malaysia, ⁴Research Center for Chemical Defence, Universiti Pertahanan Nasional Malaysia, Kuala Lumpur, Malaysia, ⁵Bioresource Technology Division, School of Industrial Technology, Universiti Sains Malaysia, Gelugor, Penang, Malaysia

9.1 Introduction

Over the last few decades, the global environmental problem has attracted significant awareness from the research community and policymakers for the development of polymeric materials that are degradable in a natural environment. Recyclability and environmental safety are becoming increasingly crucial in the pursuit of a more sustainable future. The production of biodegradable polymers that are decomposed by microorganisms and photodegradable polymers that are decomposed by sunlight is a priority among researchers. As a result of the increased need for more adaptable polymer-based materials, there is growing interest in polymer composites filled with natural, organic fillers, such as biodegradable and renewable fillers. An ideal biodegradable polymeric material is one that after being disposed of can be recycled many times before promptly being decomposed by microorganisms or sunlight providing carbon dioxide and water (Ahmed & Ikram, 2015; Samir et al., 2022). In recent years, there has been a growing interest in developing sustainable and eco-friendly materials for various applications, including polymer composites. Polymer composites offer improved mechanical properties and can be tailored for specific applications by incorporating fillers or reinforcements (Ahmad et al., 2020; Rani et al., 2021; Sadasivuni et al., 2020).