THE POTENTIAL OF GRATED *Cocos nucifera* L. AS BIO-COMPOSITE USING PHYSICO-CHEMICAL ANALYSIS

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ABSTRACT

THE POTENTIAL OF GRATED *Cocos nucifera* L. AS BIO-COMPOSITE USING PHYSICO-CHEMICAL ANALYSIS

Bio-composites is a term used to define reinforcement of biopolymers or synthetic polymers with natural or bio-fiber. Bio-composite product is an environmental friendly and the use of bio-composite is an alternative to decrease pollution. The study of grated *Cocos nucifera* may provide information for an alternative to non-renewable natural resources and to solve the problems of plastic waste management. Through this study, the physico-chemical components of grated coconut identified are moisture content (2.36%), turbidity content (65.28%), lignin content (5.28%), holo-cellulose content (3.92%), α-cellulose content (4.04%) and hemicellulose content (0.13%). Currently, there is no standard or control to compare bio-composite properties. Therefore, this physico-chemical data was compared to establish commercially available bio-composite products. The physico-chemical analysis revealed that the grated coconut has the potential as bio-composite because its physical and lignin analysis showed that grated coconut are comparable to hemp fiber. However, the cellulose content which are α-cellulose, holo-cellulose and hemicellulose content showed otherwise. As a conclusion, there is the potential of grated coconut as bio-composite. However, further study is needed to identify the type of product suitable to be used with grated coconut as reinforcement and to determine its strength.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Bio-composites are the combination of natural fibers (biofibers) such as wood fibers (hardwood and softwood) or nonwood fibers (rice straw and sugar cane) with polymer matrices from both of the renewable and non-renewable resources (Jamaludin *et al.*, 2010). Bio-composite is also broadly defined as composite materials made from natural or bio fiber and petroleum derived non-biodegradable polymers (PP,PE) or biodegradable polymers (PLA,PHA). Bio-composites is a term produced from reinforcement of biopolymers or synthetic polymers with natural or bio fibers (John and Thomas, 2008). According to Zarry (2007), composite itself is a multiphase material that is artificially made. It has different physical and chemical properties which are separated by a distinct interface. A lot of composite materials are composed of just 2 phases which are matrix and reinforcement (Zarry, 2007).

The growing environmental awareness initiates the development and application of natural reinforcing fibers such as flax, ramie and hemp (Matko *et al.*, 2005).