Journal of Civil Engineering, Science and Technology
Volume 6, Issue 2, September 2015

EFFECT OF GLYCIDYL METHACRYLATE ON WATER ABSORPTION PROPERTIES OF SAGO HAMPAS BIOCOMPOSITE

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Date received: 13/08/2015, Date accepted: 25/08/2015
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Abstract – This study examines the water absorption of sago hampas biocomposite utilizing glycidyl methacrylate as its matrix. Composites were fabricated with 25, 30, 40 wt% sago hampas content and another sample of pure sago hampas using hydraulics hot press machine. The water absorption properties of composites with different sago hampas composition were investigated according to Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials of ASTM D570. Water absorption of pure sago hampas composite have the highest average water absorption percentage with 59.1 wt% as compared to the lowest average water absorption percentage recorded for 30 wt% sago hampas content biocomposite with 16.8%. However sago hampas loading was increased resulting in the increased in average water absorption on biocomposite for 40 wt% sago hampas content which is 33.1%.

***Keywords*:** Glycidyl mehacrylate, sago hampas, biocomposite, water absorption test

1.0 INTRODUCTION

Most composites produced nowadays uses non-degradable fibers made from non-renewable resource. This is to produce high durability product and to ensure product longevity. However the use of plastic materials in agriculture causes serious hazards to the environment [1]. The introduction of biodegradable materials, which can be disposed directly into soil can be one possible solution to this problem. Sago hampas (SH) is an abundantly available agricultural waste which has contributed to environment pollution. From previous study, it has been proven that sago hampas contains cellulose, hemicellulose and lignin [2]. The production of natural biocomposite is formed by matrix (resin) and reinforcements (fiber) mainly formed by cellulose [3] and which is available in SH. Natural biocomposite can be define as composites made up of natural fibers and is readily degradable.

Natural fibers are produced by plants and animals. Plants fibers include seed hair (eg. cotton), stem, (eg. hemp), leaf fibers (eg. sisal) and husk fibers (eg. sago). Animal fibers include wool (eg. angora wool and alpaca wool) and secretions (eg. silk). Natural biocomposite research areas are divided into three which are short natural fiber research, long natural fiber research and biopolymer development research [4]. The interest on the usage of natural fibers as fillers is very high due to its low density, more biodegradable and non-abrasiveness during processing [5]. This research will focus on short natural fiber research which utilizes 'waste' cellulose fiber which is sago hampas

In this study, glycidyl methacrylate (GMA) were used as it is less harmful to human body compared to other reagent [6] and have balance chemical and mechanical properties. GMA is selected as the matrix due to the ease of handling it in room temperature [6]. GMA was utilized in many studies to facilitate chemical reaction between components (polypropelene and fiber) during melt mixing [6]. GMA will be utilized directly with sago hampas (SH) to produce composite. This research mainly focuses on formulating composite material utilizing sago hampas and glycidyl methacrylate (GMA) and testing its water absorption test was conducted. Based on Sahari et al, (2012) water absorption test on biocomposite is done for quality control as water absorption affects the mechanical properties of