UNIVERSITI TEKNOLOGI MARA

TENSILE, FLOW AND THERMAL PROPERTIES OF BIODEGRADABLE PLA/PINEAPPLE FIBER COMPOSITE

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ABSTRACT

Human activities and food need to be pack than be transported to the worldwide especially in import export business. The materials that use was very important and had their own shelf-life to deliver most products in its required condition a specification. With regard to environment aspects, it would be beneficial if natural fibres could be used instead of synthetic fibres as reinforcement in some structural and food packaging applications. This research was conducted to determine the tensile, flow and thermal properties of biodegradable PLA/PALF composites. The properties were tested by using testing equipment such as Melt Flow Tester, Fourier Transform Infrared (FTIR), Tensile Tester and Differential Scanning Calorimetry (DSC). Different composition that used in fabrication of PLA and PALF which were 80% PLA - 15% PALF, 70% PLA – 0% PALF and 100% PLA – 0% PALF for controlled.

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Chapter 1: Introduction

1.1 Introduction

Packaging industries was very wide and many human activities and food need to be packed and product transported worldwide especially in import export business, they need materials with certain shelf life, hence packaging was very important to deliver most products in its required condition a specification. Different materials were used for packaging including metals, glass, wood, paper or pulp, polymers or combinations such as composites. All of these types of materials enter municipal waste streams at the end of their service life.

In reinforcement the strength of various regulations that used to aim at reducing the wastes generated, packaging waste forms main municipal solid waste and this will cause increasing in environmental problems. Fossil fuel polymers was currently used in packaging applications namely polyethylene (PE), polypropylene (PP) and Nylon PET etc. The polymers were mostly nonbiodegradable, and some are really difficult to recycle or reuse due to their complex composites as different blends and contamination level exists. In previous years, the packaging materials already be recycling and become increased but the recycling rates for most plastic packaging remain low (Davis & Song, 2006). There was high number of different types of polymers, each of this types of polymer may contain different processing additives such as fillers, colorants and plasticizers. All this polymer was used for packaging applications (Andrady & Neal, 2009). At a recent time, significant development had been made to develop the biodegradable plastics and largely from renewable natural resources to produce biodegradable materials with similar function as nonbiodegradable polymers such as PLA, PHA and PHBV PCL. The development in these bio-based materials had several potential benefits which were in greenhouse gas balances and other environmental impacts to the whole life cycles. After that, the use of renewable was rather than limited resources. Sustainability in the environmental effect to prevent huge destruction of oil-based polymers can be solved using biodegradable polymers.

Some products had tried to be made by using biodegradable polymers but they were expensive, lack of strength, soft lack and thermal resistance. Hence these biodegradable polymers will have high price in the market and consumers cannot afford to buy these products. Even huge supermarket does not provide biodegradable bags to replace the conventional polyethylene (PE) and