

CHAPTER VI

CONCLUSIONS AND RECOMMENDATION

6.1 Conclusions

The characteristics and properties of Biomer, f-PHB1 and f-PHB2 such as functional group, molecular weight and thermal properties are measured by using FT-IR spectroscopy, GPC and DSC techniques. From the PHB characterization, it is shown that Biomer, f-PHB1 and f-PHB2 are truly PHB.

From the tensile properties testing, it is shown that the maximum tensile strength and the modulus of elasticity of all of the PHB/modifying agent blends gradually decreases with an increasing of the modifying agent content. At 10-50% of modifying agent, the %elongation at break of the Biomer/modifying agent blends is improved but not more than 9% except the %elongation at break of the f-PHB1/50%PPG blend which is most improved up to 58.82%. This maybe due to many reasons such as the good dispersion of PPG with f-PHB1 and the fundamental characteristics of PHB caused from different synthesis methods.

From SEM micrographs, it was shown that the morphology of Biomer/PPG and f-PHB1/PPG blends is changed with an increasing of PPG content. The surface of pure f-PHB1 and Biomer are similar. The cracking lines are observed on the surface of f-PHB1/30%PPG, f-PHB1/50%PPG and Biomer/50%PPG blends after the tensile testing. The cracking lines noticed in the surface of f-PHB1/50%PPG blends are much more than those seen in the surface of Biomer/50%PPG blends. Different surface morphology of Biomer/50%PPG and f-PHB1/50%PPG blends corresponds to the different in the %elongation at break of the blends.

6.2 Recommendation

Although several points concerning about studying the effect of the modifying agent on the mechanical properties of PHB have been dealt with in this work, there still be some interesting points which can be further investigated. These are some recommendation.

1. It is accepted that the molecular weight of PHB is one of the most important characteristics which can affect the mechanical properties of PHB. Care must be taken in the PHB extraction and purification process to minimize the difference in the weight average molecular weight and the molecular weight distribution.
2. In this work, FT-IR spectroscopy is used to determined the functional group of Biomer and f-PHB and the result is used to assured that Biomer and f-PHB is truly PHB. The data of %purity of Biomer and f-PHB is absent in this work. The quantitative measurement of FT-IR spectroscopy can determine the %purity of PHB if the 100% purity of PHB is provided as reference.
3. The thermal properties of all PHB/modifying agent blends have to be further measured because the effect of the modifying agent on the crystal structure of PHB can be determined by DSC method
4. Due to all of modifying agents used in this study are liquid, none of mechanical properties of the modifying agents can be obtained. The material selection has to be made carefully. For the further experiments, the modifying agents which have been proved that can effectively modify the mechanical properties of other polymers will be selected.