Abstract

Microencapsulation technique is widely used in pharmaceutical industries to control the release of a drug. Biodegradable polymer such as Polyethylene glycol (PEG) is frequently used as encapsulation material. This study has tried to produce microencapsulation product of Imipenem antibiotics in Polyethylene Glycol. Commercially available product called Tienam® was used as a major source of Imipenem. We used freeze-drying method to produce the microencapsulation products. The successful of producing of this product is confirmed by the yellowish appearance of the product whereby it shows the colour properties of Tienam®

Thermal analysis using Differential Scanning Calorimeter (DSC) was used to characterize pure materials of Imipenem, PEG 2000 and PEG 35000, the microencapsulated product of Tienam with PEG 2000(Sample A and Sample C) and microencapsulated product of Tienam with PEG 35000(Sample B and Sample D). The study have shown that crystallization temperature, T_C of Imipenem is 171.77 ± 1.14 ^{o}C and the T_C have changed to 157.36 ± 5.64 ^{o}C decrement by 14.41 ^{o}C due to the present of Cilastatin component coupled with Imipenem to produce a Tienam® antibiotic product.

In this study, we can see the melting profile of PEG2000 has changed from 52.77 ± 1.26 ^{o}C to 60.99± 0.30 ^{o}C with about 8.22 ^{o}C increment. This change occurred when we encapsulate the Tienam® antibiotic inside the PEG 2000. However the changes in melting profile cannot be seen clearly when we encapsulate the Tienam® antibiotic inside PEG35000. Its profile only shifts less than 5 ^{o}C. It means that, introduction of Tienam® antibiotic into the low molecular weight PEG does change the melting profile of the PEG but only minor change on the melting profile of PEG for high molecular weight.

On conclusion, this study had proved to us that Imipenem can be encapsulated in the PEG for certain application that required delay released of that antibiotic. Furthermore, it is shown in the study that PEG is compatible and reliable to be used in the microencapsulation process but higher molecular weight must be use in order to create more stable product which will not have an effect on temperature change.