UNIVERSITI TEKNOLOGI MARA

FORMATION OF ENCAPSULATED MEFENAMIC ACID-BETA CYCLODEXTRIN AND UNENCAPSULATED MEFENAMIC ACID USING ELECTROSPRAY TECHNIQUE

NURUL KARIMAH BINTI ZOLKEPALI

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of the requirements for the degree of
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Faculty of Chemical Engineering

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CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 2nd December 2015 to conduct the final examination of Nurul Karimah Zolkepali on her Master of Science thesis entitled " Formation of Encapsulated Mefenamic Acid-Beta Cyclodextrin and Unencapsulate Mefenamic Acid using Electrospray Technique" in accordance with Universiti Teknologi Mara Act 1976 (Akta 173). The panel of Examiners recommends that the student be awarded the relevant degree. The panel of Examiners was as follows:

Ruzitah Mohd Salleh
Associate Professor Dr
Faculty of Chemical Engineering
Universiti Teknologi MARA
(Chairperson)

Ibtisam Abdul Wahab
Senior Lecturer Dr
Faculty of Pharmacy
Universiti Teknologi MARA
(Internal Examiner)

Siti Masrinda Tasirin
Associate Professor Dr
Faculty of Engineering & Built Environment
Universiti Kebangsaan Malaysia
(External Examiner)

SITI HALIJJAH SHARIFF,PhD
Associate Professor
Dean
Institute of Graduate studies
Universiti Teknologi MARA
Date: 19 January 2016

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and the result of my own work, unless otherwise indicated or acknowledged as reference works. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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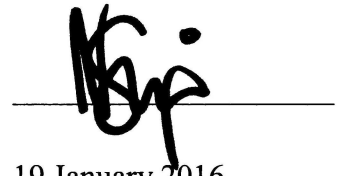
Name of student	:	Nurul Karimah binti Zolkepali
Student ID. No	:	2012210652
Programme	:	Master of Science (Chemical Engineering by Research)
Faculty	:	Chemical Engineering
Thesis title	:	Formation of encapsulated mefenamic acid-beta cyclodextrin and unencapsulated mefenamic acid using electrospray technique
Signature of student	:	
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ABSTRACT

The potential of using electrostatic atomizer or electrospray in producing fine and encapsulated particle of Mefenamic Acid (MA) form I with β-cyclodextrin (βCD) was demonstrated in this study. Encapsulated MA-βCD with a molar ratio of 1:2 was prepared in water-ethanol suspension, followed by the electrospray process to atomize the droplet into fine dried particles. The working distance (WD) between the electrospray needle tip and the substrate were varied from 15 to 25 cm. Using FE-SEM and ImageJ software, the sizes of encapsulated MA-βCD particles were found to decrease from 91±26 to 42±35 nm as the WD increased. The dissolution rate of encapsulated particles of MA-βCD was found to be higher compared to the particles of as-received MA and the unencapsulated MA. The presence of the encapsulated MA-βCD was proven by the DSC result with the disappearance of MA peak after the atomization process. The XRD and FTIR analysis showed that the encapsulation occurred with the existence of new solid phase that was expected from the interaction between MA and βCD at 11.30°, 17.60°, 18.18°, 20.36°, 31.32° (2θ) and the appearance of C=C at wavelength 1513 cm^{-1} to 1642.26 cm^{-1}. Further analysis by TEM showed the size and morphology of MA- βCD particles when immersed in water and acetone. Encapsulated MA-βCD particles were solubilized in water but suspended as a spherical shape in acetone.

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