

**UNIVERSITI TEKNOLOGI
MARA**

**SOLUBILITY ENHANCEMENT OF POORLY
WATER SOLUBLE COMPOUNDS**

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Abstract

This study was undertaken to evaluate the potential of maltodextrin to enhance solubility in drug delivery in the encapsulation of Menta x Piperita essential oil by spray drying method. Menta x Piperita essential oils was encapsulated with only combination of maltodextrin and gum Arabic (GA) in order to achieve maximum encapsulation performance. Sodium dodecyl sulfate was added to investigate the interactions with encapsulated Menta x Piperita. The performance of the Menta x Piperita essential oils encapsulation was evaluated by fourier transform infrared (FT-IR) spectroscopy and thermal transition properties (DSC). The combination of both materials (maltodextrin and gum Arabic) was considered a successful encapsulation for Menta x Piperita essential oil.

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CHAPTER 1

INTRODUCTION

1.0 Summary

The objective of this research was to evaluate the potential of maltodextrin to enhance solubility in drug delivery in the encapsulation of *Mentha x Piperita* essential oils. In this case, peppermint leaves were chosen to represent the plant sample. The selection of the sample was made based on few factors. The factors were including availability and research accessible. On the other hand, the study of characterization of the encapsulated extract can be achieved in many methods. However, the methods decided were fourier transform infrared spectroscopy (FTIR), differential scanning calorimeter (DSC). At the same time, the temperature difference and solvent concentration were investigated as parameters of the encapsulation. The encapsulation method used is spray dwith mixtures of gum Arabic (GA) and maltodextrin. In addition, sodium dodecyl sulfate was added to investigate the interactions with encapsulated Menta x Piperita. In order to obtain oil extract from peppermint leaves, Soxhlet extraction is conducted. The solvent used to extract oil from peppermint leaves is Ethanol.

2.0 Research Background

Mentha Piperita also known as Peppermint is a perennial herb native to Europe and famous as a single ingredient herbal teas (Diane L. McKay et. Al., 2006). Traditionally, peppermint leaf provides medicinal purposes to treat digestive and gallbladder disease while the peppermint oil extracted from the plant has become more popular as treatment for variety of problems (Benjamin Kligler and Sapna Chaudhary, 2007).

Oil can be extracted by using many methods. Non-conventional method is more environmental friendly while many other methods such as Microwave Heating and Super Critical Fluid have been developed to enhance the overall yield (J. Azmira et.Al., 2013). Soxhlet Extraction method has widely used in a very long time and at presence this this method is used as reference for other existing new methods (M.D. Luque de Castro and L.E. Garcõ Âa-Ayuso, 1998).