

UNIVERSITI TEKNOLOGI MARA

**SYNTHESIS OF ANTHRACENE ZINC (II) CYCLEN
COMPLEX FOR RECOGNITION OF
CARBAMAZEPINE**

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ABSTRACT

9,10-Bis(1,4,7,10-tetraazacyclododecane-1-ylmethyl)anthracene or anthracene Zn^{2+} -cyclen complex is synthesized through three step chemical reaction as a complex compound that will form π - π stacking with carbamazepine. The aim of the study was to evaluate the π - π interaction between anthracene Zn^{2+} -cyclen complex with carbamazepine through fluorescence intensity. The fluorescence activity will be assessed using fluorescence spectrometer. The first step was protection of cyclen with di-*tert*-butyl dicarbonate forming 1,4,7-tris(*tert*-butoxycarbonyl)-1,4,7,10-tetraazacyclododecane. The second step was formation of 9,10-bis(3Boc-cyclen)anthracene by reacting 3Boc-cyclen with 9,10-bis(bromomethyl)anthracene. The last step was deprotection of 9,10-bis(3Boc-cyclen)anthracene with concentrated HBr and MeOH to form anthracene Zn^{2+} -cyclen complex. Then, the anthracene Zn^{2+} -cyclen complex and carbamazepine will be placed in aqueous condition to allow π - π interaction. However, identification by TLC and confirmation by ^1H NMR spectroscopy of the last step does not show desired outcome. The deprotection of 9,10-bis(3Boc-cyclen)anthracene to form 9,10-Bis(1,4,7,10-tetraazacyclododecane-1-ylmethyl)anthracene was unsuccessful. Thus, the study cannot be proceed until evaluation of fluorescence intensity to demonstrate interaction between carbamazepine and anthracene Zn^{2+} -cyclen complex. Yet, there are still possibilities of anthracene Zn^{2+} -cyclen complex usage for recognition of carbamazepine.

CHAPTER ONE

INTRODUCTION

1.1 Research Background

Carbamazepine is a tricyclic compound which is used as an anticonvulsant drug for the treatment of epilepsy. Epilepsy is a condition of brain disorder described by recurrent and unpredictable disruption of normal brain function (Fisher et al., 2005). Epilepsy is a common disorder worldwide and currently, carbamazepine is recommend as the first-line antiepileptic drug treatment for this disease (Perucca & Tomson, 2011). Carbamazepine is also extensively used for the treatment of partial seizures, bipolar depression and trigeminal neuralgia (Bertilsson & Tomson, 2012). Due to its wide range of usage, carbamazepine had raised attention as it can be detected in the ground as well as in surface water and considered as an emerging pharmaceutical pollutants in treated water recycling (Pruneanu et al., 2011). Among pharmaceutical drugs, carbamazepine is one of the drugs that are found in highest frequency (Zhang et al., 2008).