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FUNGAL TRANSFORMATION OF CARBAMAZEPINE AND STUDY THEIR METABOLITES THROUGH NMR AND LCMS METHOD

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ABSTRACT

Carbamazepine is an anticonvulsant and mood stabilizing agent that used primarily in treatment epilepsy and bipolar disorder, as well as trigeminal neuralgia. Microbial transformation is an effective tool for the structural modification of bioactive natural and synthetic compounds. Its application in asymmetric synthesis is increasing due to its versatility and ease. Thus, four months of study was carried out to analyze any biotransformation of Carbamazepine. In order to see the structure modification of bioactive compound using microorganisms, we investigated the metabolism of Carbamazepine (1), using *Trichothecium roseum* and *Cunninghamella elegans.* In this research, two-stage production of secondary metabolites were being employed which are primary screening and large scale production. TLC method was applied in order to do qualitative analysis of biotransformed products and HPLC was the major step that was used in identifies the presence of metabolites. On the basis of HPLC chromatogram, series of unique peaks produced, indicated biotransformation has taken place at both 6 and 12 days. *Trichothecium roseum* and *Cunninghamella elegan* biotransform Carbamazepine into various hydroxylated and oxidative metabolites.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Biotransformation is the chemical modification (or modifications) made by an organism on a chemical compound. Transformation or chemical modification by microorganism is called microbial transformation.

Carbamazepine ("CBZ") is an anticonvulsant drug which received approval for use as an anti-epileptic agent in the United State in 1974 and it also used in mood stabilizing in the treatment of bipolar disorder. Carbamazepine is now established antiepileptic drug which classified under iminostilbene group. However, it associated with variety of idiosyncratic adverse effects due to the formation of chemically reactive metabolites formed in the body. Thus, it may cause cardiovascular effect, immunologic effect and hematologic malfunction.

Carbamazepine can induce its own metabolism. It is metabolized in the liver to an epoxide and several other metabolites. A major metabolic pathway is oxidation by microsomal enzymes to form carbamazepine 10, 11 epoxide.