

UNIVERSITI TEKNOLOGI MARA

**DESIGN AND SYNTHESIS OF RESVERATROL
ZINC(II)-CYCLEN COMPLEX (ANALOGUE I)**

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ABSTRACT

The significant of this study is to design and synthesis of resveratrol (stilbene) analogue, *trans* 4-methoxy-4'-bromomethyl stilbene appended onto Zn(II)-cyclen complex. Three established reactions had been used in order to accomplish this research study. For the first reaction, the 4-methoxy styrene and 4-iodobenzylbromide was utilized as a starting material of Heck reaction to synthesis *trans* 4-methoxy-4'-bromomethyl stilbene. The synthesis compound was then purified by silica gel column chromatography technique and sent for $^1\text{H-NMR}$ and FT-IR characterization in order to confirm the product structure. The second step is to obtain 1,4,7,10-tetraazacyclododecane (cyclen) by performing dechlorinated reaction of cyclen tetrahydrochloride and then followed by cyclen protection reaction with tert-butyloxycarbonyl (Boc anhydride) to produce 1,4,7-tris(tert-butyloxycarbonyl)-1,4,7,10-tetraazacyclododecane. Subsequently, the third reaction was performed by appending the resveratrol analogue, *trans* 4-methoxy-4'-bromomethyl stilbene onto protected cyclen, tri-Boc cyclen. Nevertheless, the outcomes of this research study did not make the grade because no final product has been produced (resveratrol Zn(II)-cyclen complex) and the research was postponed due to the time constraint.

CHAPTER 1

INTRODUCTION

1.1 Background of study

In recent years, there is increasing pattern of investigation done on natural products in respect to the potential health benefits for the drug of choice to be transported to the specific site of deoxyribonucleic acid (DNA). One of the natural products that have been widely studied and have broad therapeutic effects is resveratrol and its analogues. Resveratrol (*trans*-3, 5, 4'-trihydroxy stilbene) is a phytoalexin and a polyphenolic compound which is commonly presents in the skin of red grapes, peanuts and mulberries.¹⁵ It is of particular interest to humans because it is naturally available in the diet. However, it is not widely distributed in plants. For this reason, it is important to synthesize its derivatives.

Resveratrol (*trans*-3, 5, 4'-trihydroxy stilbene) have been isolated from Malaysian Dipterocarpaceus timber trees and reported to have biological activities that include anti-microbial, antifungal, antioxidant, a variety of anti-inflammatory, anti-platelet, anti-mutagenic effects and has been shown to be an agonist for the estrogen receptors. Furthermore, resveratrol has been shown to induce strand breakage in DNA in the presence of copper ions by the formation of 'oxidized product(s)'. It has also been implicated as a cancer chemopreventive agent capable to inhibit all three stages of chemical carcinogenesis (tumor initiation, promotion and progression).