UNIVERSITI TEKNOLOGI MARA

ANTIMICROBIAL INVESTIGATION OF NOVEL MULTI-METAL COMPLEXES OF SCHIFF BASE SERIES

NUR SYAHIRAH BINTI ABU BAKAR MUSADDIK

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ABSTRACT

Schiff base had a promising application as an antibacterial agents as reported by previous studies but they are still in the discovery phase. Metal complexes with the Schiff base will increase the antibacterial properties theoretically. In the study, four samples were tested with two bacteria which were *P. aeruginosa* and *B. subtilis*. The samples were from hydrazide and isatin-derived Schiff base. There are two test conducted in the study which were minimum inhibitory concentration test and disk diffusion test. Minimum inhibitory concentration test was conducted to investigate the lowest concentration needed to inhibit the bacteria tested. Disk diffusion test was conducted to investigate the inhibition zone of the bacteria. The results obtained for the MIC test was sample 4 exhibit the best MIC value when tested against Gram positive bacteria. Sample 1 exhibit the best MIC value when tested against Gram negative bacteria. Meanwhile, the results obtained for disk diffusion test was only for sample 3 and sample 4 against *B. subtilis*. The rest of the samples showed no inhibition zone. Theoretically, the results of the disk diffusion test should be approximately the same with the minimum inhibition concentration in term of their critical concentration at the point of critical mass achieved. In the study, some error might affect the inhibition action of the samples or affect the growth of the bacteria. Sample 4 and 1 showed the convincing results to be developed as antibacterial agent in real life. However samples 4 can be improved in term of the medicinal chemistry to exhibit a better antibacterial action against Gram negative bacteria. Samples 1 which showed a moderate antibacterial action can be improved its activity by complexing it with the metal.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Schiff bases and their complexes have been studied as they have interesting and crucial properties such as ability to bind with oxygen reversibly, catalytic activity in the hydrogenation of olefins, photochromic properties and complexing ability toward some toxic metals. Furthermore, Schiff base and their transition metal complex displayed promising application in biological activity and biological modeling application (Ramadan et al., 2014). Metal complexes or coordination compound are Lewis acid because of their positive charge. Metal complexes have been practically used widely in clinics for centuries even though their molecular mechanism has not yet fully understood. Investigate systematically and designing novel molecules which are capable to interact with nucleic acid and initiates apoptosis is currently one of the most promising strategies for researcher to create new DNA-targeted anticancer drugs for chemotherapy (Qiao et al., 2011).

The synthesis of ligands and complexes of Schiff bases compounds are by following the established protocols which are condensation and insertion respectively. Schiff bases exhibit an important group of medicinal chemistry with a very good potential for antibacterial and chemotherapeutic application (Qiao et al., 2011). The antibacterial