UNIVERSITI TEKNOLOGI MARA

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

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TABLE OF CONTENTS

ABSTRACT

Schiff base complexes are highly potential candidates for new antibacterial agents. Novel free Schiff base ligands (PDI & PII) as well as hydrazide-derived Schiff base metal complexes (NiL_2 & CoL_2) were synthesized by the students from Faculty of Applied Sciences, UiTM Shah Alam. The synthesized free Schiff-base ligands and the Schiff-base metal complexes were screened *in vitro* for their potential antibacterial activity against a Gram-negative bacteria strain, *Pseudomonas aeruginosa* (ATCC® 9721™) and Gram-positive bacteria strain, *Bacillus subtilis* (ATCC® 23857™). All the test samples were tested to determine their minimum inhibitory concentration (MIC) and to investigate their antimicrobial sensitivity. As compared to the free Schiff base ligands, Schiff base metal complexes showed slightly lower MIC value and greater inhibition zone when tested against *B. subtilis* (ATCC® 23857™). However, there is no inhibition zone observed when both, free Schiff base ligands and Schiff base metal complexes tested against *P. aeruginosa* (ATCC® 9721™). This indicates that Schiff base metal complexes have higher antibacterial activity against Gram-positive strain than Gram-negative strain. A comparative measure on the inhibition zone showed that Schiff base metal complexes have smaller inhibition zone as compared to commercialized antibiotic, Gentamycin. Further studies are needed to investigate the underlying mechanism of bacterial inhibition and toxicity of the Schiff base metal complexes.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Schiff bases are organic compounds that formed under specific conditions, from the reaction of primary amine with an aldehyde or a ketone. Schiff bases and its transition metal complexes have a wide range of applications in biological activities and biological modelling applications (Ramadan, Abu Al-Nasr, & Noureldeen, 2014). As reviewed by Aazam and El-Said, these complexes have broad spectrum of biological activities including antiviral, antifungal, antibacterial, antiparasitic, anti-inflammatory, antitumor, anti-HIV and anticancer. Previous study have proved that copper complex have wide anticancer activity because of the selective permeability of cancer cell membranes to copper compound (Aazam & El-Said, 2014).

As cited in (F. Santos, 2013), according to WHO, millions of people die due to infections caused by microorganisms resistant to current antibiotics. Thus, many researchers are interested in the design and synthesis of Schiff bases complexes.