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SYNTHESIS, MODIFICATION, CHARACTERIZATION AND BIOLOGICAL ACTIVITY OF 3-HYDROXYBENZALDEHYDESALICYLHYDRAZIDE

(Sintesis, Modifikasi, Pencirian dan Aktiviti Biologi 3-Hidroksibenzaldehidesalisilhidrazida)

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Abstract

A series of hydrazone Schiff base (compounds **S**, **S8**, **S10** and **S12**) were synthesized by condensation reaction of salicylhydrazide with 3-hydroxybenzaldehyde, 3-(octyloxy)benzaldehyde, 3-(decyloxy)benzaldehyde and 3-(dodecyloxy) benzaldehyde, respectively. Herein, the addition of alkane numbers are reported using successful Williamson etherification method by reacting 3-hydroxybenzaldehyde with bromooctane, bromodecane and bromododecane, respectively. All compounds were characterised using Fourier Transform Infrared and ^{1}H Nuclear Mangnetic Resonance spectroscopic. The compounds were assayed to antibacterial activity against Gram-positive and Gram-negative bacteria using *Bacillus cereus* and *Escherichia coli* by disc diffusion method. Interestingly, among the compounds tested **S8** showed a strong inhibition against *Escherichia coli* and none of the compounds tested show significant result against *Bacillus cereus*.

Keywords: 3-hydroxybenzaldehyde, Williamson etherification, hydrazone Schiff base, antibacterial activity

Abstrak

Satu siri bes Schiff hidrazon (sebatian **S**, **S8**, **S10** dan **S12**) telah disintesis mengunakan tindakbalas pemeluwapan oleh salisilhidrazida dengan 3-hidroksibenzaldehid, 3-(oktiloksi)benzaldehid, 3-(deciloksi)benzaldehid dan 3-(dodeciloksi) benzaldehid. Di sini, penambahan nombor alkana juga telah dilaporkan menggunakan kaedah pengeteran Williamson yang berjaya daripada tindak balas 3-hidroksibenzaldehid dengan bromooktana, bromodekana dan bromododekana. Semua sebatian telah dicirikan menggunakan spektroskopi inframerah transformasi Fourier dan ^{1}H nukleus magnetik resonan. Sebatian yang terhasil telah diuji dengan aktiviti antibakteria terhadap bakteria Gram-positif dan Gram- negatif menggunakan *Bacillus cereus* dan *Escherichia coli* dengan kaedah cakera resapan. Menariknya, diantara sebatian yang telah diuji, **S8** menunjukkan perencatan yang kuat terhadap *Escherichia coli* dan tiada sebatian menunjukkan hasil yang ketara terhadap *Bacillus cereus*.

Kata kunci: 3- hidroksibenzaldehid, pengeteran Williamson, bes Schiff hidrazon, aktiviti antibakteria

Introduction

Hydrazone Schiff base compounds have been widely reported regarding its effectiveness in biological activities including antibacterial [1], antifungal, antituberculosis [2], anticancer and antimalarial activities [3]. This is due to the presence of azomethine C=N group. The nitrogen atom of the schiff base contains a lone pair electron with sp^2 hybridised orbital that contributes to various biological and chemical properties [4]. In most cases, the structure of hydrazone Schiff base is the main factor in controlling the biological activites. As some reports demostrated that the antibacterial activity of some compounds enhanced by controlling the lipophilicity [5, 6], stereochemistry and the