



SYNTHESIS AND ANTIBACTERIAL ACTIVITY OF AZO AND ASPIRIN-AZO DERIVATIVES

(Sintesis dan Aktiviti Antibakteria Terhadap Azo dan Terbitan Azo-Aspirin)

Zainab Ngaini and Ho Boon Kui*

Department of Chemistry,
Faculty of Resource Science and Technology,
Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

*Corresponding author: boonkui98@hotmail.com

Received: 21 August 2016; Accepted: 27 July 2017

Abstract

A series of azo derivatives (**1a-e**) were synthesized *via* coupling reaction with of overall yield 58 – 72% while aspirin-azo derivatives (**2a-e**) were prepared by esterification reaction of aspirin and azo derivatives (**1a-e**) with overall yield 38 – 75%. In this study, the structures of synthesized compounds were characterized using elemental analysis (CHN), nuclear magnetic resonance (¹H NMR and ¹³C NMR) and Fourier Transform Infrared (FTIR) spectroscopy. The synthesized compounds were tested on antibacterial activity against *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* S48/81 *via* turbidimetric kinetic method. The azo derivative–substituted fluorine, **1d** showed the highest antibacterial activities against *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* S48/81 compared with other synthesized compounds. However, synthesized aspirin–azo derivatives (**2a-e**) showed weak antibacterial activity against tested bacteria due to bulky molecular structure thus hindered the penetration into bacterial cell wall.

Keywords: aspirin, azo derivatives, turbidimetric kinetic, *Escherichia coli* ATCC 25922, *Staphylococcus aureus* S48/81

Abstrak

Satu siri terbitan azo (**1a-e**) telah dihasilkan melalui tindak balas gandingan dengan hasil keseluruhan 58 – 72% dan terbitan azo-aspirin (**2a-e**) telah disediakan melalui tindak balas esterifikasi aspirin dan terbitan azo (**1a-e**) dengan hasil keseluruhan 38 – 75%. Dalam kajian ini, struktur sebatian yang dihasilkan dicirikan menggunakan analisis unsur (CHN), resonans magnetik nukleus (¹H NMR dan ¹³C NMR) dan spektroskopi inframerah transformasi Fourier. Kesemua sebatian yang dihasilkan telah diuji pada aktiviti anti-bakteria terhadap *Escherichia coli* ATCC 25922 dan *Staphylococcus aureus* S48 / 81 melalui kaedah kinetik turbidimetrik. Terbitan azo tertukarganti fluorin **1d** menunjukkan aktiviti antibakteria tertinggi terhadap *Escherichia coli* ATCC 25922 dan *Staphylococcus aureus* S48/81 berbanding dengan sebatian lain. Walau bagaimanapun, terbitan azo aspirin (**2a-e**) menunjukkan aktiviti anti-bakteria yang lemah terhadap bakteria diuji disebabkan oleh struktur molekul yang besar itu telah menghalang penembusan ke dalam dinding sel bakteria.

Kata kunci: aspirin, terbitan azo, kinetik turbidimetrik, *Escherichia coli* ATCC 25922, *Staphylococcus aureus* S48/81

Introduction

Aspirin is a white crystalline weak acidic product that has analgesic and anti-inflammatory properties [1, 2]. It is also used to prevent cardiovascular disease and cancer. The compound has an antiplatelet effect by inhibiting the production of thromboxane, which under normal circumstances binds platelet molecules together to create a patch over damaged walls of blood vessels [3]. However, aspirin may cause some side effects such as vomiting and