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SHORT COMMUNICATION

Synthesis and Antibacterial Study of Aspirin-Chalcone Derivatives

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ABSTRACT

The chemistry of aspirin and chalcone derivatives has been extensively studied and developed as one of the pharmaceutically important molecules. In this study, new aspirin-chalcone derivatives have been successfully synthesized and characterized *via* FTIR, ^{1}H and ^{13}C NMR spectroscopy. The antibacterial activities of synthesized compounds were investigated towards *Escherichia coli* ATCC 8739 *via* turbidimetric kinetic method. The newly synthesized aspirin-chalcone derivatives, however showed poor antibacterial activity against *E. coli* ATCC 8739 at the concentration of 50, 80 and 100 ppm. The effect of the molecular structure of the synthesized compounds on the antibacterial activity is discussed.

Keywords**:** Aspirin, chalcone, antimicrobial, *E. coli*

Aspirin is a well-known salicylate drug, which has been used as an analgesic and anti-inflammatory medication. Modifications of aspirin have been carried out widely and many aspirin derivatives were reported to show various biological activities such as antibacterial (Al-Bakri *et al*. 2009), antithrombic and antiplatelet (Lechi *et al*., 1996) and also anticancer properties (Lechi *et al*., 1996; Zheng *et al*., 2007).

Our group has recently reported on the incorporation of aspirin with thiourea moiety with excellent antibacterial property against *E. coli* (Ngaini *et al*., 2012). Besides thiourea, chalcones which belong to the flavonoid family has also been identified as an interesting compound to display a diverse array of pharmacological activities. Chalcones show many biological properties including anticancer, antimalaria, antimicrobial, anti-inflammatory and antibacterial (Hsieh *et al*., 1998; Ram *et al*., 2000). Novel 2,4,2'-trihydroxy-5-methylchalcone, for instance, was reported to inhibit the growth of different Gram-positive bacteria (Sato *et al*., 1996)

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This finding has stimulated our interest in the synthesis of a series of chalcone compounds containing aspirin moiety. In this paper, we report on the synthesis of aspirin-chalcone compounds **2a-b** *via* incorporation of hydroxychalcone onto aspirin moiety. The hydroxychalcones **1a-b** were earlier prepared *via* Claisen-Schmidt condensation prior to incorporation onto aspirin derivatives. The antibacterial property of the synthesized aspirin-chalcone derivatives were also studied against wild-typed *E. coli* ATCC8739.

Aspirin, oxalyl chloride, 4-hydroxybenzaldehyde, acetophenone, benzaldehyde and 4-hydroxyacetophenone were obtained from Merck and used without further purification. All the other reagents and solvents were used as received.

Measurements: Melting points were determined by the open tube capillary method and are uncorrected. Infrared (IR) spectra (ν/cm^{-1}) were recorded as KBr pellets on a Perkin Elmer 1605 FTIR spectrophotometer. ^{1}H and ^{13}C NMR spectra were recorded on a JEOL ECA 500 spectrometer at 300 MHz (^{1}H)