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Synthesis and Antimicrobial Studies of (*E*)-3-(4-Alkyloxyphenyl)-1-(2-hydroxyphenyl) prop-2-en-1-one, (*E*)-3-(4-Alkyloxyphenyl)-1-(4-Hydroxyphenyl)prop-2-en-1-one and their Analogues

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Abstract: A series of (*E*)-3-(4-alkyloxyphenyl)-1-(2-hydroxyphenyl)prop-2-en-1-one **(2a-c)** and (*E*)-3-(4-alkyloxyphenyl)-1-(4-hydroxyphenyl)prop-2-en-1-one **(3a-c)** have been synthesized *via* Claisen-Schmidt condensation. The compounds differ in the length of alkyl groups, $C_nH_{2n+1,}$ where n= 10, 12 and 14. The structures of the synthesized compounds were defined by elemental analysis, IR, ^{1}H and ^{13}C NMR. Antimicrobial studies were carried out against *E. coli* ATCC 8739 to evaluate the effect of the hydroxyl and alkyl groups of the synthesised chalcones. All the synthesized compounds have shown significant antimicrobial activities. Chalcones **(2a-c)** showed better antimicrobial activities compared to chalcones **(3a-c)** respectively, with (*E*)-3-(4-decyloxyphenyl)-1-(2-hydroxyphenyl) prop-2-en-1-one showed the highest antimicrobial activity among the compounds tested.

Key words: Chalcones % Hydroxyl group % Alkyl chains % Antimicrobial activities

INTRODUCTION

Chalcone is a common natural pigment and one of the important intermediate in the biosynthesis of flavonoid. Synthetic and naturally occurring chalcones have been extensively studied and developed as one of the pharmaceutically important molecules. Chalcones has been reported to possess broad spectrum of biological properties such as an anticancer [1,2], antimalarial activities [3], anti-inflammatory [4], antioxidant and antimicrobial activity [5], antiplatelet activity [6], antiangiogenic and antitumour [7], as well as antihyperglycemic [8]. One of the most convenient and applied methods to synthesize chalcone is *via* Claisen-Schmidt condensation, which involves cross aldol condensation of appropriate benzaldehyde and acetophenone in presence of base as catalyst.

Many conditions have been employed in synthesizing chalcones due to ease of chalcone structure itself to be substituted [1,9]. The arrangement of hydroxyl groups as the substituents on chalcones was claimed to be vital in antimicrobial studies [10-12]. Apart from hydroxyl groups, the effect of hydrocarbon chain-length has also been reported to contribute in antimicrobial activity. It was envisaged that different length of hydrocarbon chains would produce lipophilic properties to disrupt microorganisms' cell wall [13].

In this paper, we report on the synthesis of (*E*)-3-(4-alkyloxyphenyl)-1-(2-hydroxyphenyl)prop-2-en-1-one **(2a-c)** and (*E*)-3-(4-alkyloxyphenyl)-1-(4-hydroxyphenyl) prop-2-en-1-one **(3a-c)** possessing alkyl chains of varying length from C_{10} to C_{14}. The antibacterial study of chalcone derivatives was performed towards *E. coli* ATCC 8739 to evaluate the effect of hydroxyl group arrangement at the *ortho* and *para* position as well as the optimum length of the alkyl chain in the synthesized chalcones.

MATERIALS AND METHODS

Materials: 4-hydroxybenzaldehyde, 4-hydroxyacetophenone and 1-bromoalkanes were obtained from Merck Company and used without further purification. All other reagents and solvent were used as received.

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