Natural Product Research
Vol. 26, No. 10, May 2012, 892–902

Synthesis and antimicrobial studies of hydroxylated chalcone derivatives with variable chain length

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(*Received 1 February 2010; final version received 23 May 2010*)

A series of (E)-1-(4-alkyloxyphenyl)-3-(hydroxyphenyl)-prop-2-en-1-one have been successfully synthesised *via* Claisen–Schmidt condensation. The synthesised chalcone derivatives consisted of hydroxyl groups at either *ortho*, *meta* or *para* position and differed in the length of the alkyl groups, C_nH_{2n+1}, where $n = 6$, 10, 12 and 14. The structures of all compounds were defined by elemental analysis, IR, ^{1}H- and ^{13}C-NMR. The antimicrobial studies were carried out against wild-type *Escherichia coli* American Type Culture Collection 8739 to evaluate the effect of the hydroxyl and the alkyl groups of the synthesised chalcones. All the synthesised compounds have shown significant antimicrobial activities. The optimum inhibition was dependent on the position of the hydroxyl group as well as the length of the alkyl chains.

Keywords: chalcones; hydroxyl group; alkyl group; antimicrobial activities

1. Introduction

Chalcone is a natural pigment which is commonly found in plants. It is one of the important intermediates in the biosynthesis of flavonoid. A large number of chalcones have been studied in the recent decades mainly due to their numerous biological properties such as anticancer, antioxidant (Aichaoui et al., 2009; Echeverria, Santibañez, Donoso-Tauda, Escobar, & Ramirez-Tagle, 2009) as well as antimicrobial activities (Prasad, Rao, & Rambabu, 2008). Claisen–Schmidt condensation is a common method for the synthesis of chalcone, which involves cross aldol condensation of appropriate benzaldehyde and acetophenone in the presence of a base as a catalyst.

Chalcone with the presence of hydroxyl groups has been claimed to have antimicrobial activities (Devia, Pappano, & Debattista, 1998; Ngaini, Haris-Fadzillah, Hussain, & Kamaruddin, 2009; Oyedapo, Makanju, Adewunmi, Iwalewa, & Adenowo, 2004). Naturally occurring chalcones are mostly found in hydroxylated form and many reports have documented their biologically active

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ISSN 1478–6419 print/ISSN 1478–6427 online

http://dx.doi.org/10.1080/14786419.2010.502896
http://www.tandfonline.com