



Synthesis and Biological Activity Studies of Methyl-5-(hydroxymethyl)-2-furan Carboxylate and Derivatives

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ABSTRACT

Methyl-5-(hydroxymethyl)-2-furan carboxylate and derivatives were prepared from furfuryl alcohol and their biological activities were studied for cytotoxicity against cancer cell lines HeLa, HepG2 and Vero, and *Gram (+)* and *Gram (-)* bacteria. The amine derivative, (5-(((2-(1H-indol-3-yl)ethyl)amino)methyl)furan-2-yl)methyl acetate was found to have the most potent biological activity with IC_{50} 62.37 μ g/mL against the HeLa cell line and MIC 250 μ g/mL against the photogenic bacteria.

Keywords: Furans, Methyl-5-(hydroxymethyl)-2-furan carboxylate, Tryptamine, Antibacterial activities, Anticancer activities.

INTRODUCTION

Infectious diseases have been serious public health problems in previous decades.¹⁻² As drug resistance has evolved against antimicrobial and antineoplastic agents, the search for novel and potent antibacterial agents is necessary.³ Furans are an important heterocyclic class that possess variety of bioactivities.⁴⁻⁸ The furan moiety is considered to be a common structural motif in many natural products, and many research groups have reported the synthesis of substituted furans for biological

assay. Methyl-5-(hydroxymethyl)-2-furan carboxylate (1) was first discovered in 2009 from *Curvularia lunata* and reported as a toxin from fungal caused curvularia leaf spot of maize.⁹⁻¹⁰ In 2014, Yu-Tang Tung and co-workers isolated methyl-5-(hydroxymethyl)-2-furan carboxylate (1) from *Antrodia camphorate*¹¹ and found it to possess anti-inflammatory activities.¹² Recently the extraction of bacteria *Streptomyces sp.*¹³ from *Zingiber zerumbet* (L.) Smith¹⁴ in Chantaburi province, Thailand was reported to contain methyl-5-(hydroxymethyl)-2-furan carboxylate (1) together with many other biological compounds.¹⁵ This

