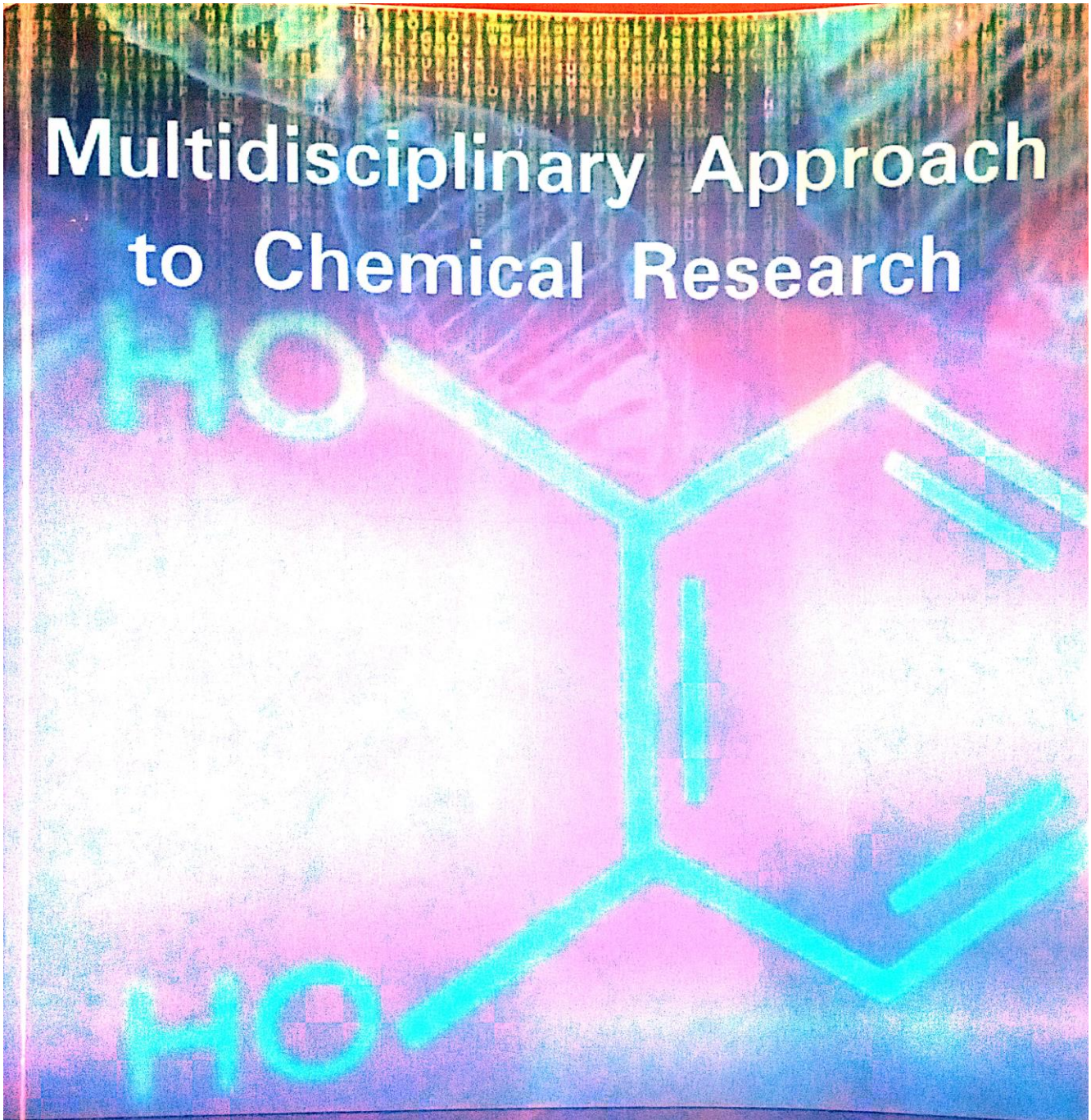
Multidisciplinary Approach to Chemical Research



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SYNTHESIS OF CYCLOPENTA[*B*]INDOLE DERIVATIVES: EVALUATION OF CYTOTOXICITY ACTIVITY AND MOLECULAR DOCKING STUDIES

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Abstract:

Tetracyclic cyclopenta[*b*]indole compounds **3(a-d)** were synthesized via Pfitzinger reaction. The structures of the compounds were investigated by spectral techniques and elemental analysis. Molecular docking studies against Human Protein Kinase CK2 inhibitor displayed potential binding affinity with the receptor. Further, *In vitro* cytotoxic activity assessment against against HeLa (cervical cancer) and MCF-7 (breast cancer) cells evidenced that the compounds with halogen substituent has strong inhibitory action than that of the reference drugs.

Keywords—cyclopenta[b]indole, In vitro cytotoxic activity, molecular docking.

I. INTRODUCTION

Cancer continues to be one of the major health problems worldwide and one of the leading causes of death despite the advances that have led to the development of new therapies. So, there is a continuing need for designing and developing new chemotherapeutic agents for cancer treatment [1-2]. The indole ring is the most ubiquitous heterocyclic substructure in nature. Owing to its great diversity in both structure and biological activity, it is not surprising that the indole ring is an important structural component in many pharmaceuticals [3-5]. Particularly fused-polycyclic indole framework is potential candidates for drug discovery because this structural motif is present in a wide variety of biologically active alkaloids [6]. It is known for its variety of pharmacological characteristics as e.g. anti-fungal, anti-bacterial, anti-tumor, anti-HIV and DNA interaction properties [7-10]. The development of an efficient synthetic method of cyclopenta[*b*]indole derivatives has attracted broad attention in medicinal chemistry and synthetic organic chemistry. Extensive efforts are therefore focused on this topic [11-13]. Prompted by the findings from the literature studies, we set out to explore and synthesize new cyclopenta[*b*]indole derivatives.