A Convenient Synthesis, Reactions and Biological Activities of Some Novel Thieno [3, 2-e] pyrazolo [3, 4-b] pyrazine Compounds as Anti-microbial and Anti-inflammatory Agents

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Abstract:

Aim and Objective: We reported in this manuscript, synthesis of novel pyrazolopyrazinothienopyrimidines. The o-amino-thienopyrazolopyrazine-carbonitrile 4 was used as a versatile precursor for synthesis of new heterocyclic compounds. Due to development of resistance to the current antimicrobial therapy and non-steroidal anti-inflammatory drugs (NSAIDs), continues research for more effective agents is interesting. Hence, the suspected promising biological activities of pyrazolopyrazine compounds persuaded us to study the anti-microbial and anti-inflammatory activities in comparison with standard drugs.

Materials and Methods: The chemical structures of the newly synthesized compounds were confirmed by elemental and spectral analyses. Activities of the synthesized compounds against a number of Gram-negative and Gram-positive bacterial strains were investigated. The fungal strains were obtained from some cases of human dermatophytosis. The antimicrobial activities were determined according to the Kwon-Chung and Bennett method. Anti-inflammatory activity was evaluated using carrageenan induced paw edema method. Results: The antibacterial screening of the synthesized compounds represented that the o-amino-carbonitrile 4 and triazepinone 11 have the highest activity towards E. coli & S. aureus and S. pneumonia. The amino-imino 6 was very effective against E. coli. Ring closure of 6 to triazolopyrimidine 7 increases the antibacterial activity against E. coli & K. pneumonia, their inhibition zones were higher than ciprofloxacin. Also, the triazolopyrimidines 7 and 10 exhibited high antifungal activity against all tested strains. Compounds 6 and 11 revealed high antifungal activity against S. racemosum and T. rubrum. The anti-inflammatory activity data indicated that all the tested compounds 4, 6, 7, 10 & 11 revealed the highest anti-inflammatory effect after 4 hrs. of carrageenan injection. Conclusion: we found that most of the examined novel thieno-pyrazolopyrazine compounds exhibited promising antibacterial, antifungal and anti-inflammatory activities which can be used as potential antibacterial, antifungal and anti-inflammatory drugs.

Keywords:

Thienopyrazolopyrazine; anti-inflammatory activity; antimicrobial activity; pyrimidine; synthesis; triazepine; triazole

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