Republic of Iraq
Ministry of Higher Education
& Scientific Research
AL-Muthanna University
College of Science
Department of Chemistry

Synthesis of 1,2,3-Triazole Derivatives Containing Pyrimidine Ring and Their Molecular Docking Study

A Thesis Submitted to the Council of College of Science/Al-Muthanna University as a Partial Fulfillment of the Requirements for the Degree of Master of Science in Chemistry

By:

Ahmed Abdulyemmah Kozan

B. Sc. In Chemistry 2020

Supervised by:

Prof. Dr. Riyadh Jaleel Nahi

2023 A.D 1445 A.H

Summary

In general, this thesis describes the synthesis, characterization and molecular docking study of new 1,2,3-triazole derivatives containing pyrimidin-2-one and pyrimidin-2-thione ring system. Firstly, 4-azidobenzene sulfonic acid **55** was designed as an azide component in 1,3-dipolar cycloaddition to construct 1,2,3-triaozle ring system. Compound **55** was synthesized via converting 4-amino benzene sulfonic acid to the corresponding diazonium salt, followed by reaction with sodium azide at 0-5 °C. 1,3-Dipolar cycloaddition was then achieved between compound **55** and the commercially available acetyl acetone in the presence of triethyl amine to give a 4-(4-acetyl-5-methyl-1*H*-1,2,3-triazol-1-yl) benzene sulfonic acid **56**. The efforts turned on exploiting its methyl ketonic group (H_3C-C=O) as a ketone component in Claisen–Schmidt condensation reaction via reaction a series of aromatic aldehydes to synthesize chalcones derivatives **57-62**. Compounds **57-62** were used as precursors to combine 1,2,3-traizole ring with pyrimidine derivatives; pyrimidin-2-one and pyrimidin-2-thione. This was performed via reaction of compounds **57-62** with urea and thiourea under alkaline conditions and reflux to give two new series of 1,2,3-triaozle-pyrimidinone derivatives **63-68** and pyrimidin-2-thione derivatives **69-74**. All the synthesized compounds were characterized by FT-IR, ^{1}H-NMR and ^{13}C-NMR spectroscopies. In silico molecular docking simulations, compounds **63-74** and their precursors **57-62** were conducted on two selected proteins; 7dpp and 8cx9. The results revealed that all the synthesized compounds **57-62** and **63-74** displayed a good binding affinity with the target proteins and were higher than values recorded for three selected standard antiviral drugs; Remdesivir, X77 and N3. The main aim of this work was to use compounds **57-62** as precursors to combine 1,2,3-traizole ring with pyrimidine derivatives; pyrimidin-2-one and pyrimidin-2-thione.