

## Summary

An overview of used molecules in medicinal chemistry and as well biochemistry leads to achieving an actual conception of the fundamental role of bio-compounds for human survival, and since the presence of heterocyclic compounds in bio-compounds as an essential part of them have proved, hence, during independent parts in this research, synthesizing and afterward biological properties of approximately 150 heterocycle compounds derived of 1,3,4-thiadiazolo pyrimidones, benzothiazolo pyrimidones, benzothiazolo quinazolinones, and imidazo thiadiazoles in quite properly ways were reviewed. Due to achievements of these researches, should mention that in addition to nucleophilic reactions which led to the access of new compounds, a wide spectrum of Palladium-Catalyzed reactions including Suzuki-Miyamura, Sonogashira, and Buchwald-Hartwig cross-coupling reactions based on the 1,3,4-thiadiazolo pyrimidones, benzothiazolo pyrimidones, benzothiazolo quinazolinones, and imidazo thiadiazoles was employed for the first, and notable that all biological methods including vitro, vivo, and silico which in fields of nucleotide pyrophosphatase inhibitors, alkaline phosphatase inhibitors, potential cytotoxic and pro-apoptotic potential activities, and inhibitor activities towards or against monoamine oxidase A and B were employed to assay which have shown also acceptable results for newly synthesized compounds.