

Abstract

In general, this thesis describes the design, synthesis and characterization of heterocyclic compounds containing antipyrine structure combined with 1,3-oxazepine or thiazolidin-4-one rings. To achieve this aim, a series of Schiff bases **54-59** were prepared as starting materials via a condensation reaction of 4-aminoantipyrine with a series of aromatic aldehydes. Having the target Schiff bases **54-59**, the efforts were turned toward tested their reactivity with mercaptoacetic acid in 1,4-dioxane under reflux for 7 hours. This attempt was successful to give the target antipyrine derivatives containing thiazolidin-4-one structure **60-64** in a good yield. Encouraging by the synthesis of compounds **60-64**, the emphasis was then placed on using the synthesized Schiff bases **54-58** for constructing of 1,3-oxazepine ring system. In the current project, phthalic anhydride was used as precursor to construct the target 1,3-oxazepine ring system under reflux conditions in benzene for 24 hours to give the target compounds **65-69**. The final synthesized compounds were characterized by FT-IR, NMR and Mass spectroscopies. For biological applications, the antioxidant and anticancer activities of compounds **60-64** were studied. The antioxidant activity was assessed using free radical scavenging assay 2,2-diphenyl-1-picrylhydrazyl (DPPH). The practical result showed the antioxidant activity of these compounds varies between high, medium and weak depending on their structures. For anticancer activity, the synthesized compounds (**60-64**) were evaluated against breast cancer cell line (MCF-7) by MTT assay. In general, compounds **60-64** displayed a promising activity as anticancer agents.

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List of Abbreviations

| | |
|----------------------|--|
| ^{13}C -NMR | Carbon nuclear magnetic resonance |
| ^1H -NMR | Proton nuclear magnetic resonance |
| $^{\circ}\text{C}$ | Degrees Celsius |
| cm | Centimeter |
| DMSO | Dimethyl sulfoxide |
| DPPH | 2,2-diphenyl-1-picrylhydrazyl |
| FT-IR | Fourier transforms infrared |
| GC-MS | Gas chromatography-mass |
| HIV | Human immunodeficiency virus |
| IC_{50} | The half-maximal inhibition concentration |
| m | Multiple |
| m.p. | Melting point |
| MCF-7 | Michigan Cancer Foundation-7 (Breast cancer cell line) |
| min | Minutes |
| mL | Mili Liters |
| mmole | Mili Mole |
| MTT | 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide |
| <i>P</i> | Para |

| | |
|-------|---------------------------------|
| S | Single |
| SAR | Structure activity relationship |
| WRL68 | The human hepatic cell line |