Regioselective Reactions, Spectroscopic Characterization, 
and Cytotoxic Evaluation of Spiro-pyrrolidine Thiophene

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Abstract

Spiro-oxo-indole/pyrrolidine-thiophene base possessed significant pharmacological activity. The \([3 + 2]\)
cycloaddition reactions of thia-methine ylide respected through multi-component reaction affording regioselective 
and stereoselective spiroindoline-3,20-tetrahydrothiophene derivative 3. Reaction of such compound 
with different electrophilic and nucleophilic reagents afforded bioactive heterocyclic compounds 4–16. Biological 
evaluation showed that these synthesized spiro-pyrrolidine exhibited moderate to good cytotoxic activity. 
Among them, compounds 7 and 14 displayed the best cytotoxic activity against MCF-7 and WI-38 
cells with the IC50 values of 7.02 ± 0.6 and 8.97 ± 0.9 µm (very strong), respectively. Compounds 4, 5, 
and 12 exhibited strong cytotoxicity’s with IC50 16.28 ± 1.7, 11.16 ± 1.1, and 19.14 ± 1.7 µm, respectively, 
against MCF-7 mammary gland cell line. All compound structures were supported by spectroscopic data and 
elemental analysis.

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