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Synthesis & Evaluation of Heterocyclic Compounds for Antioxidant Activity

Sundaram Singh*, Rohit Soni, Supyar Singh, Nishi Prakash Jain

RKDF College of Pharmacy, Bhopal
Sarvepalli Radhakrishnan University, Bhopal.

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Corresponding author: Sundaram Singh (sundaramsingh050595@gmail.com)

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Abstract:

Heterocyclic compounds are a cyclic compound which has heteroatoms along with carbons. Antioxidants play numerous vital functions in a cell and have numerous salutary goods when present in foods. The current research work seeks to pave the way for a new era in DPP-4 inhibitor discovery, addressing the difficulties of oxidation and related metabolic disorders with heightened precision and efficiency. Study concludes the synthesized compound was shown to good antioxidant activity as compared with standard.

Keywords: Heterocyclic, Oxidation, Antioxidant.

INTRODUCTION

Heterocyclic compounds are a cyclic compound which has heteroatoms along with carbons. The heteroatoms are oxygen, nitrogen, sulphur etc. Heterocycles forms the largest of the class of organic chemistry and the majority of the available pharmaceuticals and biologically active therapeutic agents are heterocycles. Among the various heterocycles, sulphur and nitrogen containing heterocycles have maintained interest for the researchers through decades of historical development of organic synthesis.[1] Antioxidants are the substances that inhibit oxidation and are able of counterbalancing the dangerous goods of oxidation in body towel. They help injury caused by free revolutionaries. Free revolutionaries are veritably unstable motes with a perfect electron and are important intercedes in natural processes involving control of vascular tone, cytotoxicity and neurotransmission. Free insurgents cause numerous mortal conditions like cancer, Alzheimer's complaint, cardiac reperfusion abnormalities, order grievance and fibrosis etc.[2] Antioxidants play numerous vital functions in a cell and have numerous salutary goods when present in foods. There are two main orders of antioxidants-primary and secondary-primary antioxidants intrude the free revolutionary chain of oxidative answers by contributing hydrogen from the phenolic hydroxyl groups, these forming stable free revolutionaries that don't initiate or propagate beyond oxidation of lipids. Secondary antioxidants trap revolutionaries, chelate essence, regenerate primary antioxidants, or act as emulsifying agents.[3] Natural antioxidants from factory passages similar as rosemary excerpts, sesame seed

excerpt, green tea excerpts have formerly been proven to increase oxidative stability in comestible oil painting during processing and storehouse. It also has similar ant oxidative exertion as synthetic antioxidants and it also stretches fresh health benefits. [4] The current research work seeks to pave the way for a new era in DPP-4 inhibitor discovery, addressing the difficulties of oxidation and related metabolic disorders with heightened precision and efficiency.

Experimental Work

In vitro anti-oxidant activity by DPPH method

The *in vitro* anti-oxidant activity was considered by hydrogen contributing or free radical scavenging capacity of the synthesized compounds by 1, 1- diphenyl-2-picryl hydrazyl radical (DPPH) method. The antioxidant prospective of test sample was measured by assessing the decrease in the absorbance of methanolic solution of DPPH. The DPPH free radical has a noteworthy absorption maximum at 517 nm and is purple in hue due to the odd electron. When the odd electron of the DPPH radical is linked with hydrogen from a free radical scavenging antioxidant to generate the reduced DPPH-H, the colour fluctuations from purple to yellow and the molar absorptivity of the DPPH radical at 517 nm. In terms of the amount of electrons trapped, the resultant decolorization is stoichiometric. [5,6]

Experimental Protocol

Test compound stock solution and standard ascorbic acid solution (1 mg ml -1) was diluted to final concentrations of 25, 50, 100, 250 and 500 µg ml -1 in methanol. DPPH methanol solution (1 ml, 0.1 mmol) was added to 2.5 ml of drug solutions of different concentrations and permitted to respond at room temperature. After 60 min, the absorbance was measured at 517 nm and converted into the percentage antioxidant activity. Methanol was used as the solvent and ascorbic acid as the reference standard. The scavenging activity was calculated in terms of inhibition employing the following formula.

Control absorbance – Sample absorbance
% anti-oxidant activity =……100
Control absorbance

Results and Discussion

All the synthesized compounds were screened for their *in vitro* anti-oxidant activity and some of the compounds exhibited significant results as compared to standard drug, Ascorbic acid. From the table 1.1, it was found that compound C5, C3 and C2 showed 61.14, 61.38 and 54 % inhibition respectively which is significant when compared to the standard drug Ascorbic acid (67.65 %). Rest of the compounds showed moderate or less activity.

Table 1.1: *In vitro* Antioxidant Activity of the Synthesized Compounds by DPPH Method

S. N.	Compound	% inhibition at various concentration (µg/ml)			
	Code	25	50	100	250
1	C1	16.34±0.80	25.55±1.04	40.1±1.01	51.93±0.80
2	C2	23.10±0.67	34.42±0.65	48.66±1.16	54.88±0.35
3	C3	19.72±0.81	22.40±0.64	35.59±0.81	61.38±1.06
4	C4	18.67±0.87	23.22±1.09	30.34±0.64	48.54±0.07
5	C5	19.02±0.71	34.21±0.65	46.44±1.95	61.14±0.83
6	Standard (Ascorbic acid)	29.11±0.49	43.74±0.96	48.66±0.55	67.65±1.06

Conclusion

This research happenings to discourse this substantial gap by retaining a methodical approach encircling the design, synthesis, and evaluation of novel heterocyclic compounds. These structural features have been associated with experimental antioxidant activity in structure-activity relationship descriptions for each compound group.

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