Research Article **ISSN: 2349 – 7114**

Asian Journal of Research in Pharmaceutical Sciences and Biotechnology

Journal home page: www.ajrpsb.com

SYNTHESIS AND EVALUATION OF ANTI-OXIDANT ACTIVITY OF N-PHENYLPIPERAZIN-1-AMINE DERIVATIVES

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ABSTRACT

Aim of the present study to the synthesis of different piperazine derivatives by using different aldehydes. Anti-oxidant contains vitamin E, C, A and Beta – carotene. They are present in some fruits, vegetables, fixed oils and fish. The Anti-oxidant present in them act by one of two mechanisms. They either prevent the synthesis of oxygen-free radicals or have scavenging effect to trap this radicals. Structure of the synthesized compounds will be confirmed by spectral analysis like IR, NMR and Mass spectrum. The synthesized compounds will be subjected for Anti-oxidant evaluation.

KEYWORDS

Synthesis, Physical characterizations, Piperazine derivatives and Anti-oxidant evaluation.

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INTRODUCTION

Anti-oxidant

An antioxidant is a substance capable of inhibiting oxidation and this may be added for to pharmaceutical products subject to deterioration by oxidative processes. For Example, the development of rancidity in oils and fats or the inactivation of some medicinal products in the environment of their dosage forms[1].

Antioxidants function as:

1. Reducing agents
2. Capable of inhibiting oxidation.

Antioxidants are among the most important candidates in controlling or preventing the free-radical reaction. An antioxidant, if present in low concentration can prevent oxidation of substances like proteins, lipids and DNA. The major biological antioxidants are ascorbyl palmitate, tocopherol (vitamin E), Beta

carotene, plant phenolics and thiol containing compounds.

Most recently the use of antioxidants has been enlarged to greater areas of therapeutic importance. They have been used to treat neurodegenerative disorders such as Alzeimer's and Parkisonian's disease and also cognitive dysfunctions. Selegine although MAO inhibitor, may have neuroproctective effects through its antioxidants activity. Vitamin E is free radical scavenger and immune enhancer and can be combined with existing drugs for treatment of patients with HIV or AIDS[2].

MATERIAL AND METHOD

Materials

The following materials are used. Methanol, Sodium phosphate buffer (pH 6.6), Potassium ferric cyanide, Trichloroacetic acid and Ferric chloride.

Method[3-6]

Antioxidant activity

In the present study, anti-oxidant evaluation methods such as reducing power, Phosphomolybdenum method were chosen to determine the antioxidant potential of three compounds. The three compounds were dissolved in methanol and makeup to 1000 µg/ml solution and prepare different concentration. Solutions of different concentrations (50 µg/ml, 100 µg/ml and 150 µg/ml) were prepared by serial dilution and the antioxidant activity evaluation was studied (Table No.1).

Reducing Power Assay

The reducing power was determined to the method of various concentration of samples were mixed with 1ml of 200 ml mol/L of sodium phosphate buffer (pH 6.6) and 1% of potassium ferric cyanide. The mixture was incubated at 50°C for 20minites. After 1ml of 10% trichloroacetic acid was added and the mixture was centrifuged at 2000 rpm for 10 minutes. The upper layer solution (2.5ml) was mixed with 2.5ml of deionised water and 0.3ml of fresh 0.1% of ferric chloride solution. The absorbance was measured at 700nm.

Determination of Total Antioxidant Capacity

The total antioxidant capacity (TAOC) was evaluated by the method of prieto *et al*. An aliquot of 0.1ml of sample solution (1mg/ml) was combined with 1 ml of reagent solution (600mm H_2SO_4, 28mm sodium phosphate and 4mm ammonium molybdate). The tubes were capped and incubated in a boiling water bath at 95°C for 90min. After the sample had cooled at room temperature. The absorbance of the aqueous solution of each was measured at 695nm against a blank. A typical blank solution contained 1ml of reagent solution and the appropriate volume of the same solvent used for the sample and it was incubated under the same concentrations. The antioxidant capacity was expressed as the number of equivalents of Ascorbic acid[3-6] (Table No.2).

Table No.1: Evaluation of Antioxidant Capacity by Phospho Molybdenum Method

S.No	Compound code	Concentration		
		50 µg/ml	100 µg/ml	150 µg/ml
1	$3a_1$	2.26 ± 0.01	2.21 ± 0.10	2.24 ± 0.01
2	$3a_2$	0.41 ± 0.16	0.83 ± 0.12	0.91 ± 0.14
3	$3a_3$	1.33 ± 0.04	1.30 ± 0.03	1.49 ± 0.08
4	BHT	2.26 ± 0.11	2.28 ± 0.03	1.55 ± 0.11

Table No.2: Reducing power assay (iron reducing activity)

S.No	Compound code	Concentration		
		50 µg/ml	100 µg/ml	150 µg/ml
1	$3a_1$	2.526 ± 0.29	3 ± 0	3 ± 0
2	$3a_2$	0.87 ± 0.18	1.00 ± 0.39	0.35 ± 0.07
3	$3a_3$	2.87 ± 0.22	2.92 ± 0.14	3.00 ± 0
4	Ascorbic acid	2.25 ± 0.11	2.24 ± 0.03	2.667 ± 0.04

Spectral Studies

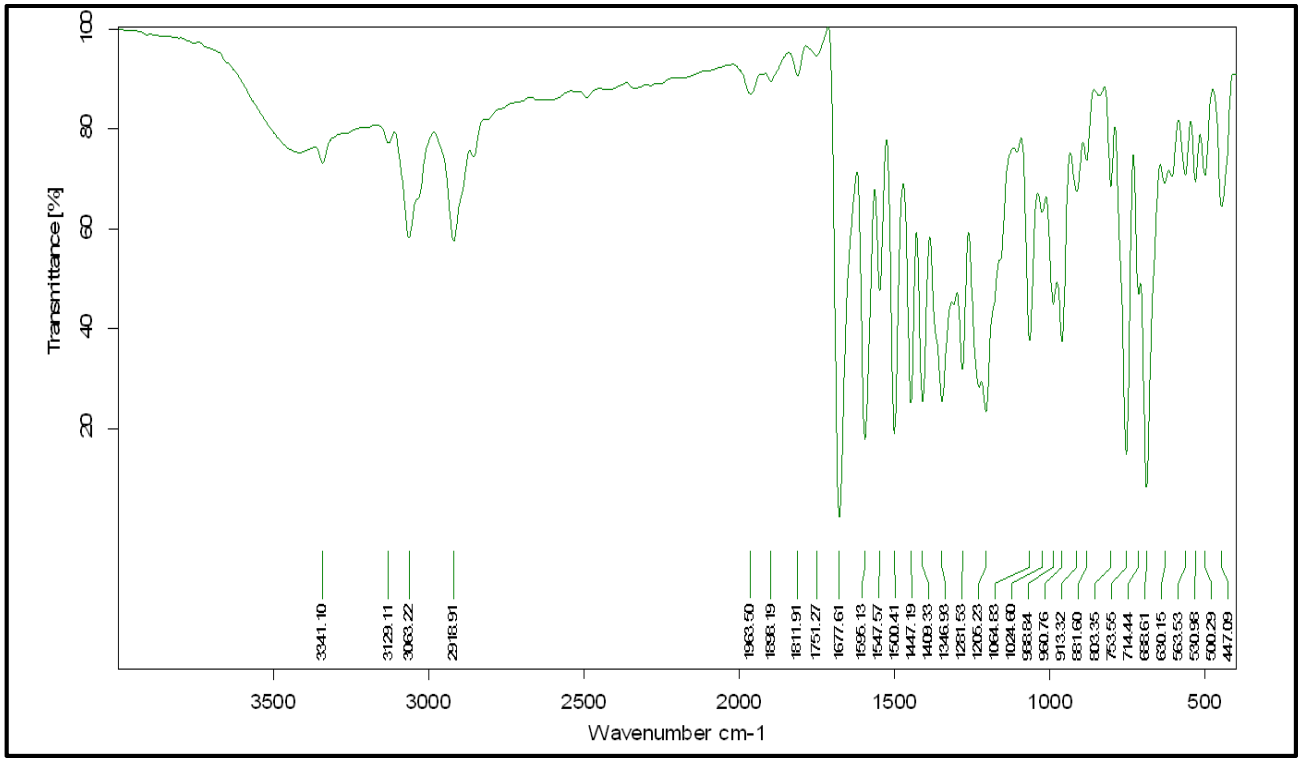

Figure No.1: IR Spectrum of the Compound $3a_1$

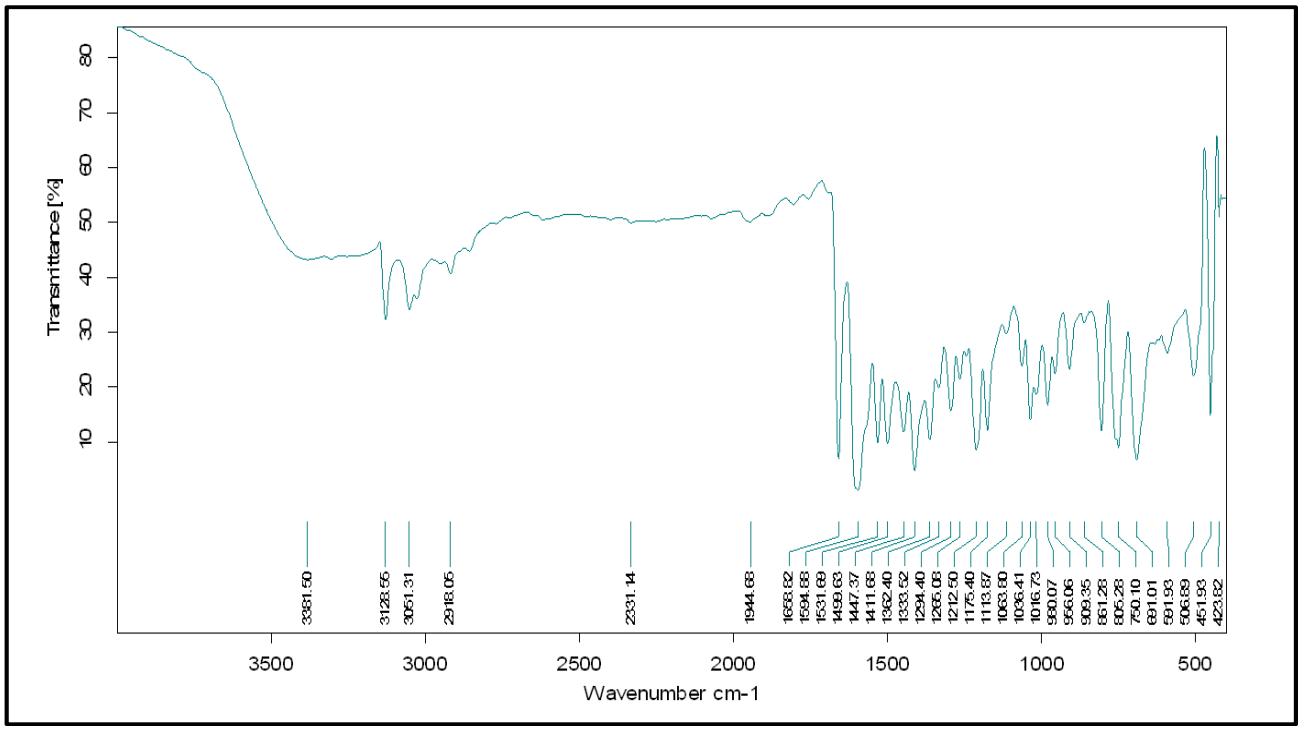

Figure No.2: IR Spectrum of the Compound $3a_2$

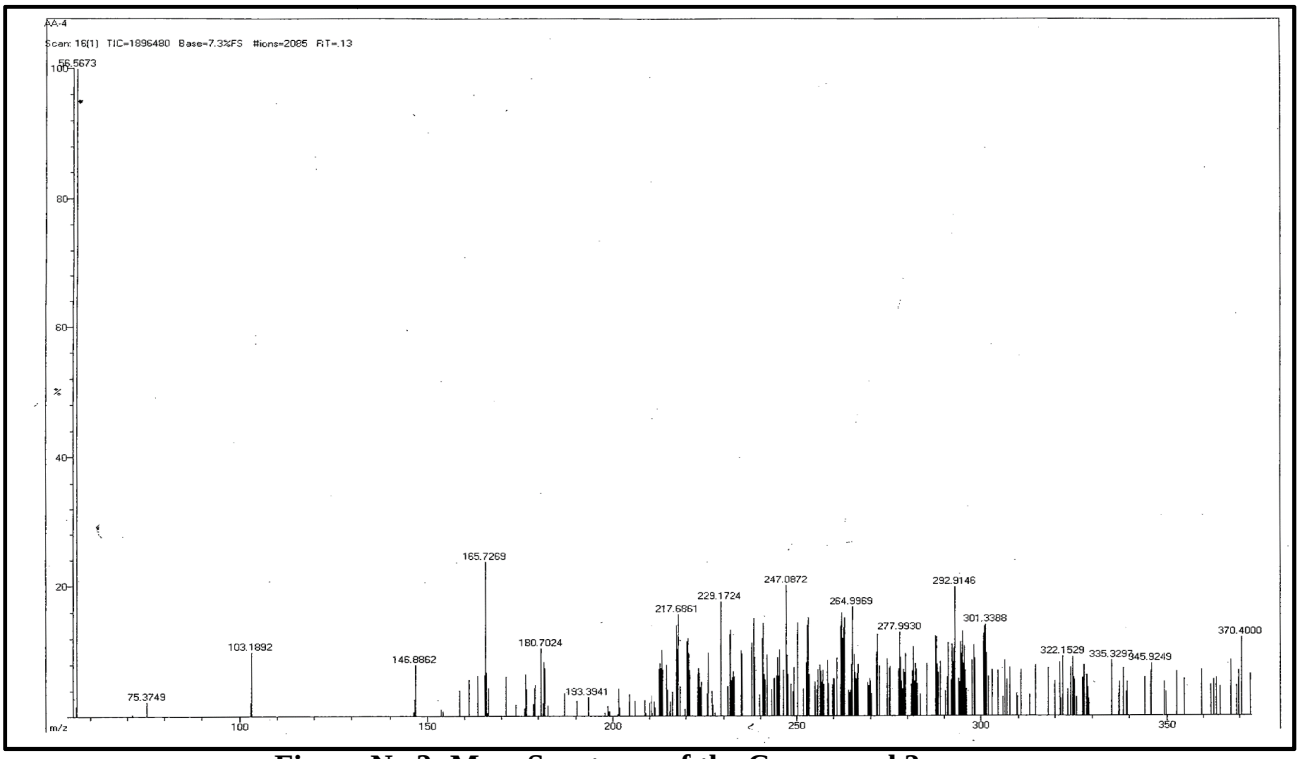

Figure No.3: Mass Spectrum of the Compound $3a_1$

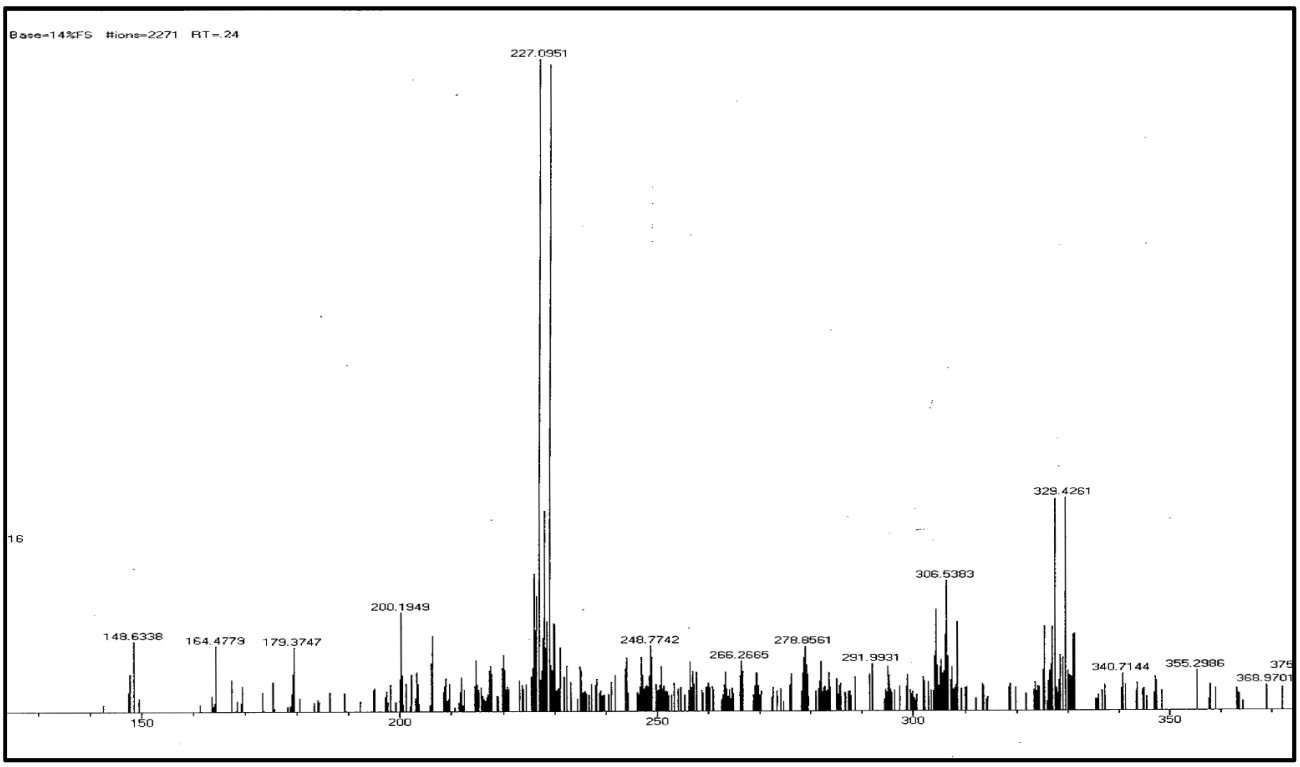

Figure No.4: Mass Spectrum of the Compound $3a_2$

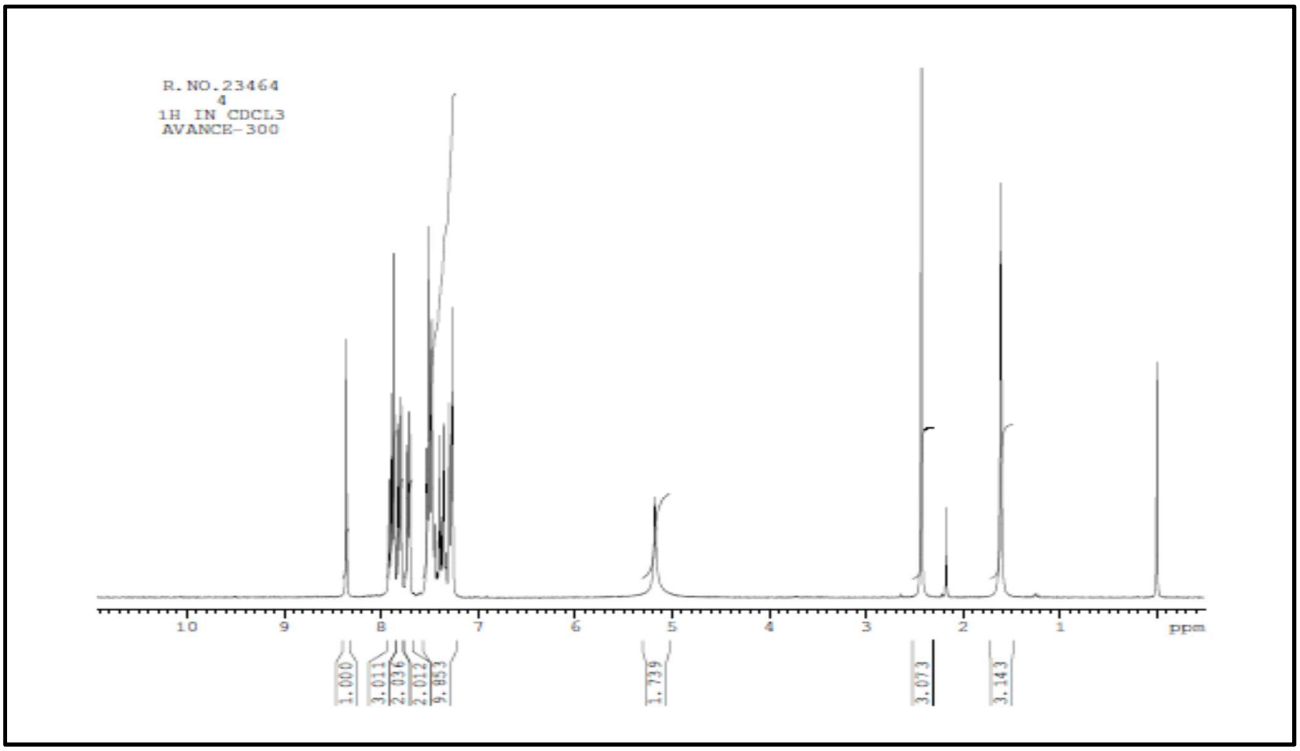

Figure No.5: NMR Spectrum of the Compound $3a_1$

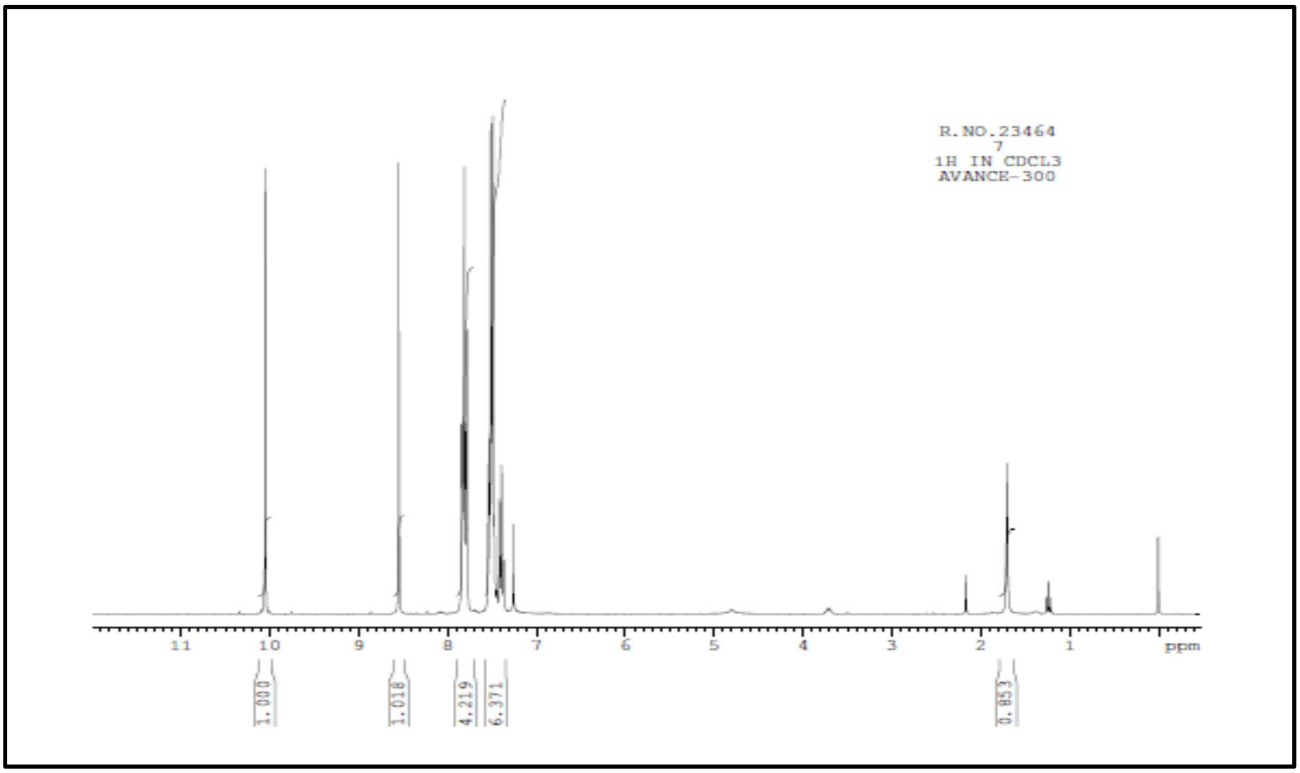

Figure No.6: NMR Spectrum of the Compound $3a_2$

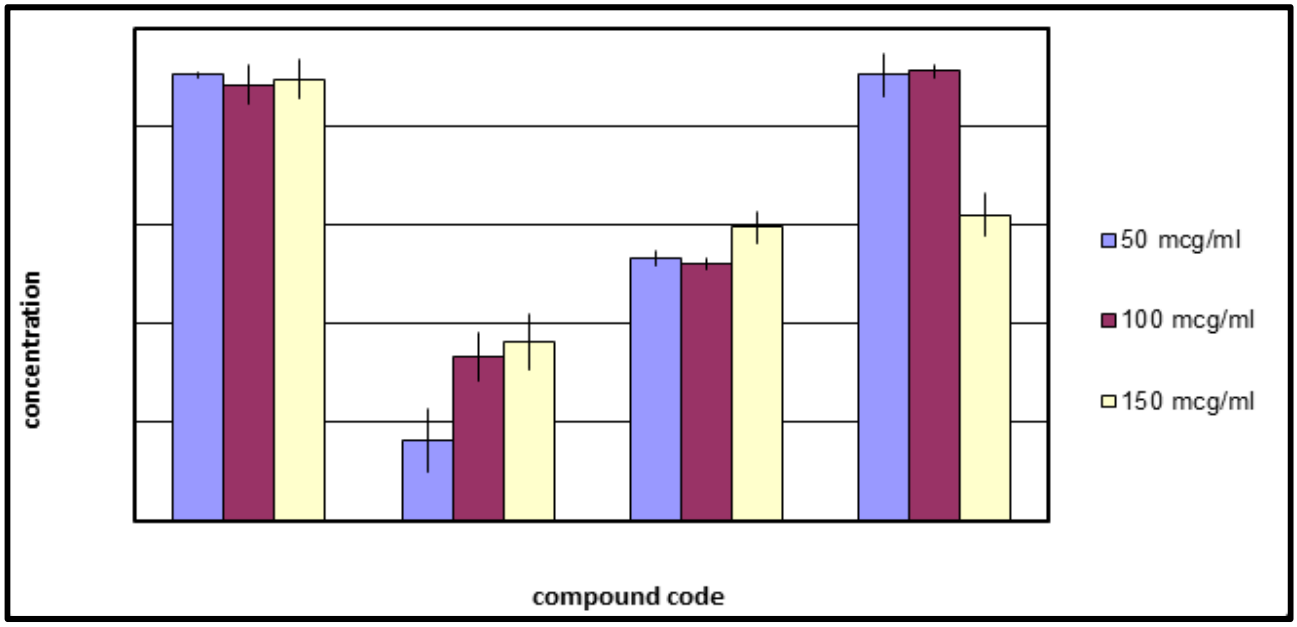

Figure No.7: Evaluation of Anti-oxidant Capacity by Phospho Molybdenum Method

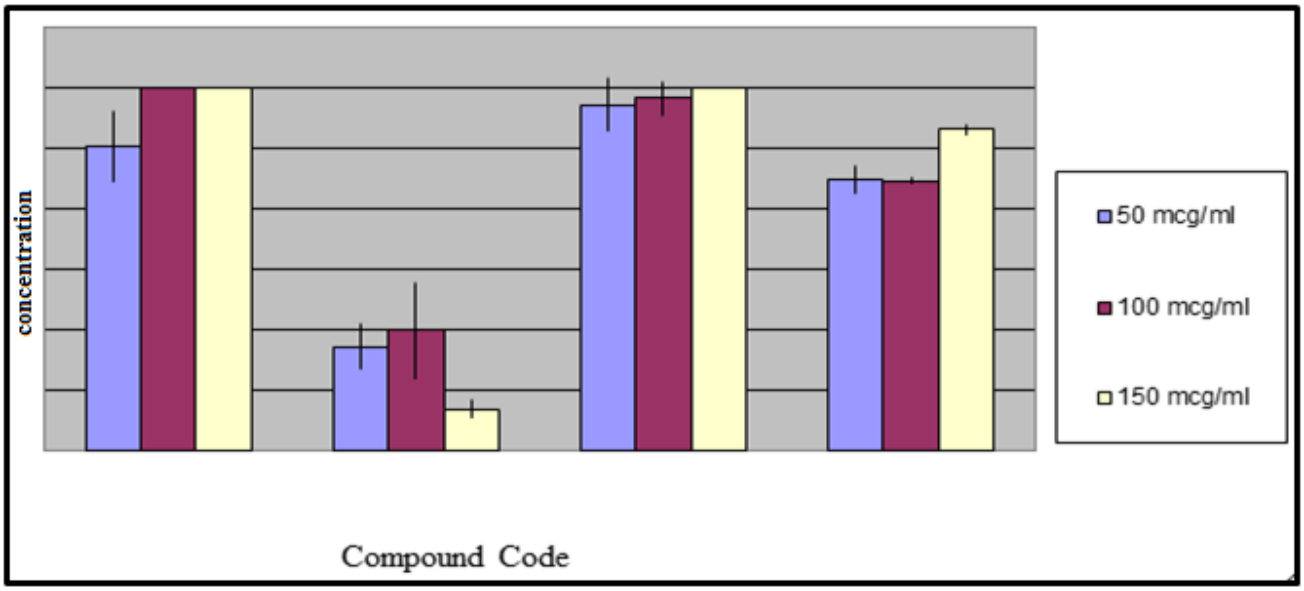

Figure No.8: Reducing Power Assay (Iron Reducing Activity)

CONCLUSION

The results of the present experiment shows that compound $3a_1$ showed more promising antioxidant activity against reducing power assay, phosphor molybdate method. The most active compounds like piperazine and its derivative have shown better antioxidant activity compared with that the standards like BHA and ascorbic acid respectively.

ACKNOWLEDGEMENT

Author is thankful to Dr. S. Ravichandran, Principal, Department of Pharmaceutical Chemistry, Sri Ram Nallamani Yadava College of Pharmacy, Nallamani Nagar, Kodikurichi, Tenkasi, Tamilnadu, India for providing necessary facilities to execute in this work.

CONFLICT OF INTEREST

We declare that we have no conflict of interest.

BIBILOGRAPY

1. Jane N Delgado and William. Wilson and Giswold's textbook of organic medicinal and pharmaceutical chemistry, *Delgado and Remers*, 9th edition, 1998, 235.
2. Surendra nath pandeya. *Text Book of Medicinal Chemistry*, 3th edition, 3, 2003.
3. Vijaykumar H, Gnanendra C R, Nagaraja Naik and Channe D Gowda. *Invitro* antioxidant activity of dibenz (b,f) azepine and it analogues, *E-J Chem.*, 5(2), 2008, 1123-1132.
4. Sonia Miladi, Mohmad Denmark. *Invitro* antioxidant activities of *aloe vera* leaf skin extracts, *Jour De Al Societe Chimique De Tunisine*, 10(1), 2008, 101-109.
5. Abu Hasanat Zulfiker M D, Farhana Alam Ripa, Mahbubur Rahman M D, Obayed Ullah M, Kaiser Hamid, Mahbubur Rahman Khan M D, Sohel Rana M D. Antidiabetic and antioxidant effect of *scoparia dulcis* in alloxan induced albino mice, *International Journal of Pharma Tech Research Coden (USA): IJPRIF*, 2(4), 2010, 2527-2534.
6. Hicham Harnafi and Souliman Amrani. Pharmacognosy review article spectro-photometry methods for determination of plant poly phenols content and their antioxidant activity assessment: an over view, *Pharmacognosy Reviews*, 2(3), 2008, 20-23.

Please cite this article in press as: Merlin Raja A and Ravichandran S. Synthesis and Evaluation of anti-oxidant activity of N-phenylpiperazin-1-amine derivatives, *Asian Journal of Research in Pharmaceutical Sciences and Biotechnology*, 4(2), 2016, 31-37.