International Journal of Early Childhood Special Education (INT-JECSE)
DOI:10.9756/INTJECSE/V14I5.13 ISSN: 1308-5581 Vol 14, Issue 05 2022

ANTIOXIDANT STUDIES OF LEAF EXTRACTS OF ONE MEDICINAL PLANT, PLUMARIA PUDICA

Sharmila.D and Dr.L.Jeyanthi Rebecca

Department of Biotechnology,BIHER,

Abstract

In this work the antioxidant assays, namely, DPPH and ABTS of polar and non-polar leaf extracts of *Plumariapudica*was conducted. The leaves of *Plumariapudica*was collected locally from Chennai, India and were soaked for 48 hrs. in ethyl acetate and n-hexane separately and the extract were collected. These extracts were subjected to DPPH an d ABTS assays by standard protocols. The results indicated that there was very good antioxidant capacity in the extracts of *Plumariapudica* leaf extracts indicating its medicinal quality.

Key words

Plumariapudica, Antioxidant, DPPH, ABTS, Polar, Non-polar

INTRODUCTION

Although the history of medicinal plants is as old as mankind itself, their scientific role and mechanism of action are being probed only recently. This knowledge helps one to understand the clinical aspects of such medicines such as the molecules present, the half-life of such molecules, their bio-availability, short- and long-term side effects if any, target cells or organs, their overall role on the homeostasis of the body etc. The reports on these aspects on plants, their phytochemicals and their roles are slowly increasing, which is a welcome sign. (Sharmila and Banu, 2015; Nair *et al*, 2016; Suh*et al*, 2012; Rao and Kumar, 2017; Kumar *et al*, 2018; Rao and Vijayalakshmi, 2018; Rao and Anisha, 2018; Rao and Shil, 2018).In this work the antioxidant assays of polar and nonpolar extracts of the leaves of one medicinal plant, *Plumariapudica*.

MATERIALS AND METHODS

Sample collection

Fresh leaves of *Plumariapudica* was obtained from herbal garden at Chennai, Tamil Nadu, India and were shade dried. The ethyl acetate and n-hexane extracts of the dried leaves of *Plumariapudica* was collected after soaking the leaves for 48 hrs. in the extraction solvents. The extracts were subjected to antioxidant assays such as DPPH and ABTS assays.

Estimation of free radical scavenging activities

DDPH Antioxidant Assay

The study was conducted following the protocol of Von Gadow*et al*,1997). All estimations were in triplicate. The percentage inhibition of the DPPH radical by the samples was calculated according to the formula of Yen and Duh (1994).

IP = [(A C (0) - A A(t) / A C (0))] × 100

Where A C (0) is the absorbance of the control at t = 0 min; and A A(t) is the absorbance of the antioxidants at t = 16 min.

ABTS Antioxidant Assay

ABTS assay was done following protocol of Re *et al,* 1999.

All estimations were in triplicate. The percentage inhibition of absorbance at 734 nm was calculated using the above formula and decrease of the absorbance between A 0 and A t.

PI = [(A C (0) – A A(t)) /A C (0)] × 100

where A C (0) is the absorbance of the control at t = 0 min; and A A(t) is the absorbance of the antioxidant at t = 6 min.

RESULTS AND DISCUSSION

DPPH Assay

The crude extracts from *Plumeriapudica*have been examined for free radical scavenging (DPPH). The scavenging activities of both the ethyl acetate extract and hexane extracts were compared with standard, ascorbic acid. Since it reaches maximum free radical scavenging activity around 0.5 mg itself, so, the concentration taken for both assays are 0.1-0.5mg. In case of *Plumeriapudica* plant extract the varying concentration are taken from 0.2-1 mg. The results indicated that IC50 of DPPH assay for standard ascorbic acid is 0.1mg. The IC50 value of *Plumeriapudica* plant polar extract and non-polar extract are 0.48 mg an 0.88 mg, respectively.

Figur1 1 to Figure 6 represent the DPPH assay results of *Plumariapudica* leaf extracts.

Figure 1. DPPH (control - ascorbic acid)

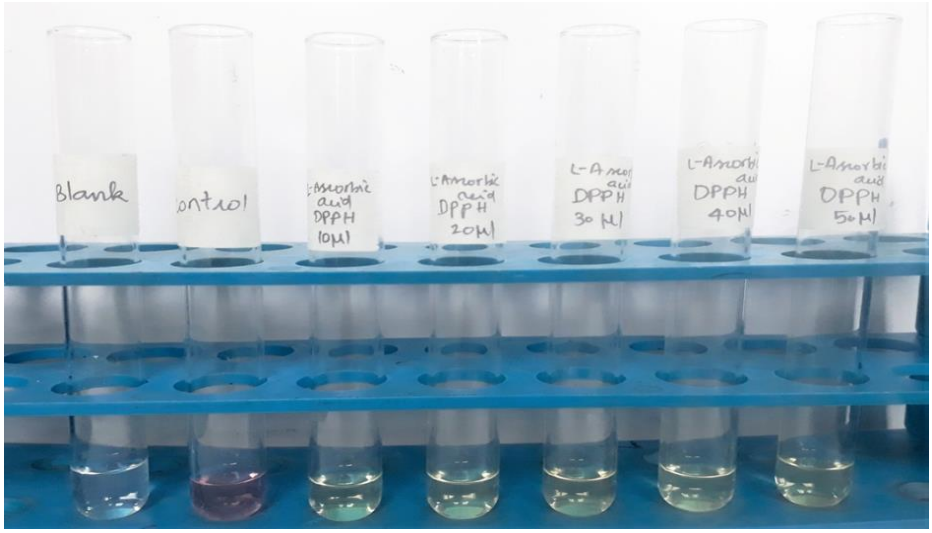


Figure 2: DPPH Graph (control - ascorbic acid)

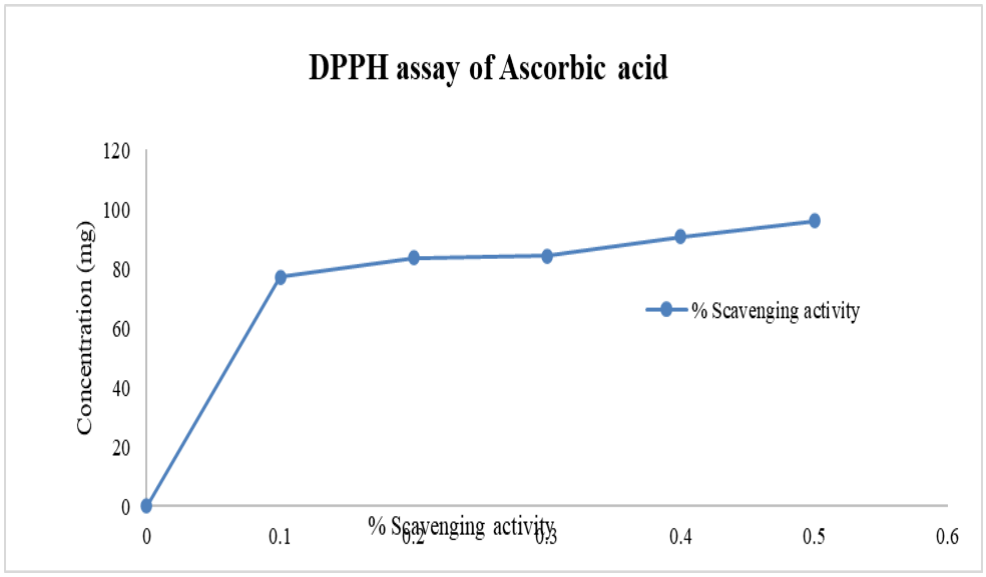


Figure 3.DPPH (ethyl acetate extract of *P. pudica*)

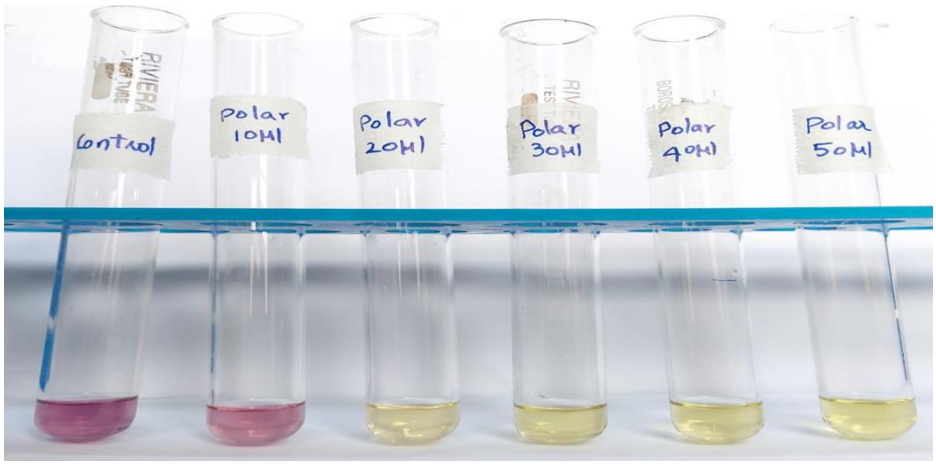


Figure 4: DPPH (hexane extract of *P. pudica*)

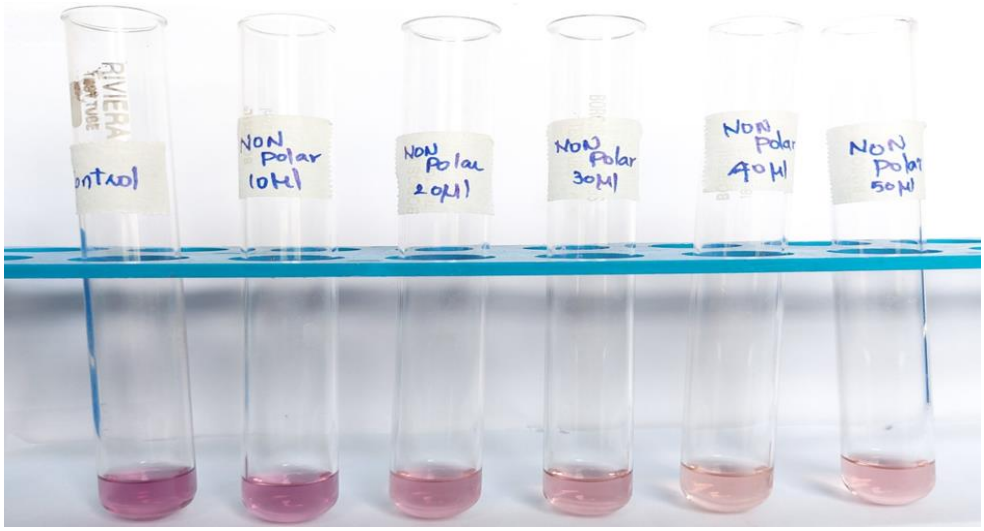


Figure 5: DPPH Graph (ethyl acetate extract and hexane extract of *P. pudica*)

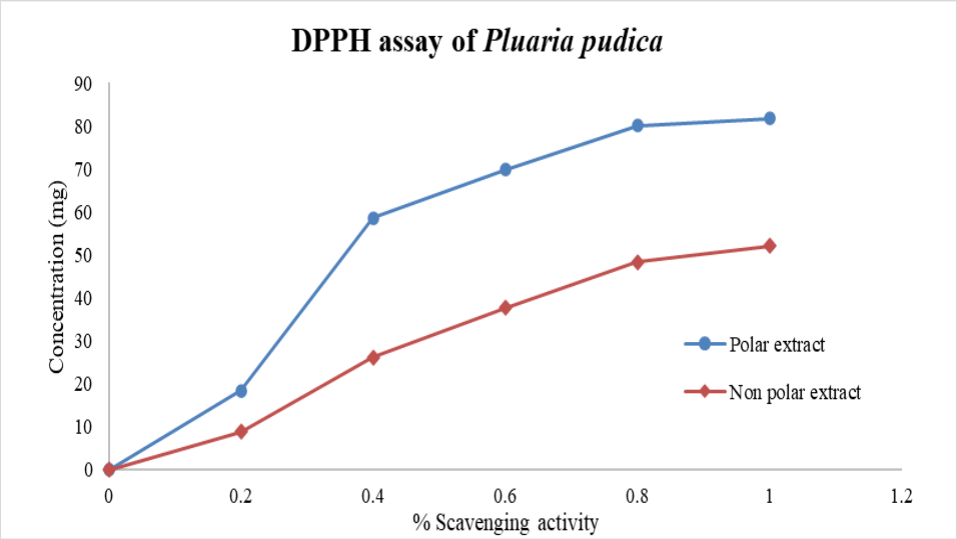
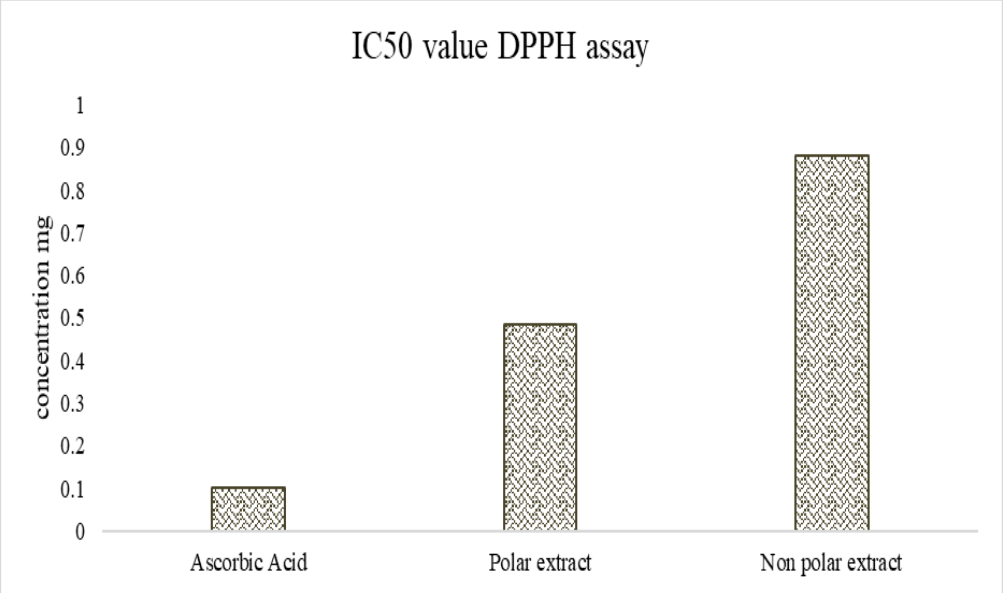


Figure 6.The IC50 value of DPPH assay



ABTS assay

The crude extracts from *Plumeriapudica* have been treated against free radical scavenging ABTS radical cationdecolorization assay. In addition, the IC50 of ABTS assay for ascorbic acid, *Plumeriapudica* plant ethyl acetate extract and hexane extracts are 0.09, 1.12 and 1.23. From the results it can be inferred that the polar solvent has biomolecules which have good free radical scavenging antioxidant activity than non-polar solvents. Figure 7 to Figure 12 represent the results of ABTS assay of *Plumariapudica* leaf extracts.

Figure 7. ABTS (control - ascorbic acid)

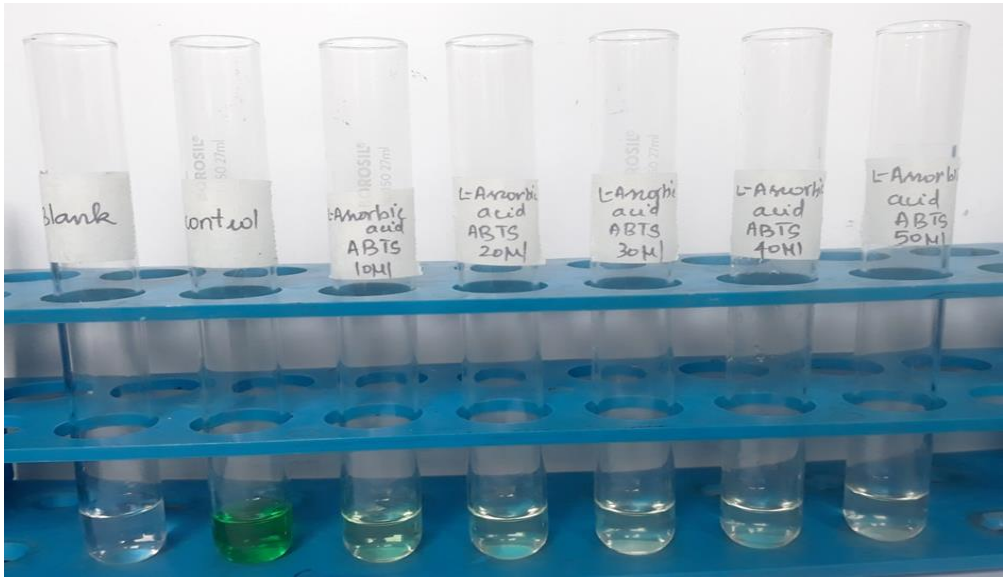


Figure8. ABTS Graph (control - ascorbic acid)

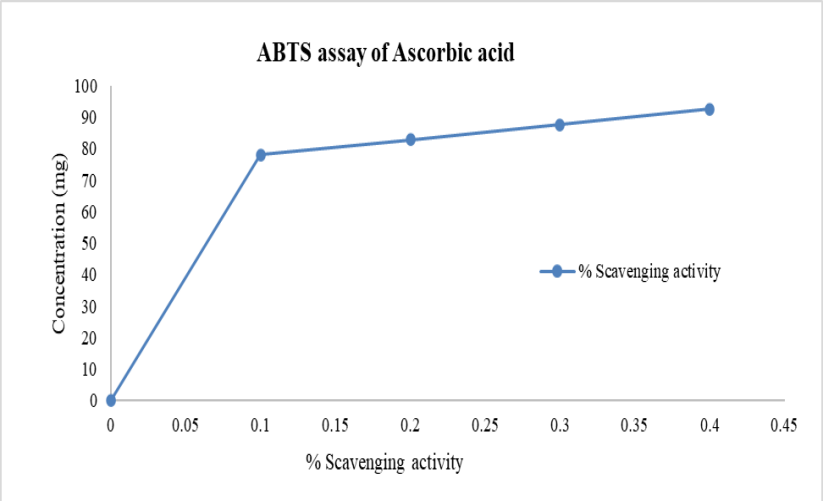


Figure 9.ABTS (ethyl acetate extract of *Plumeriapudica*)

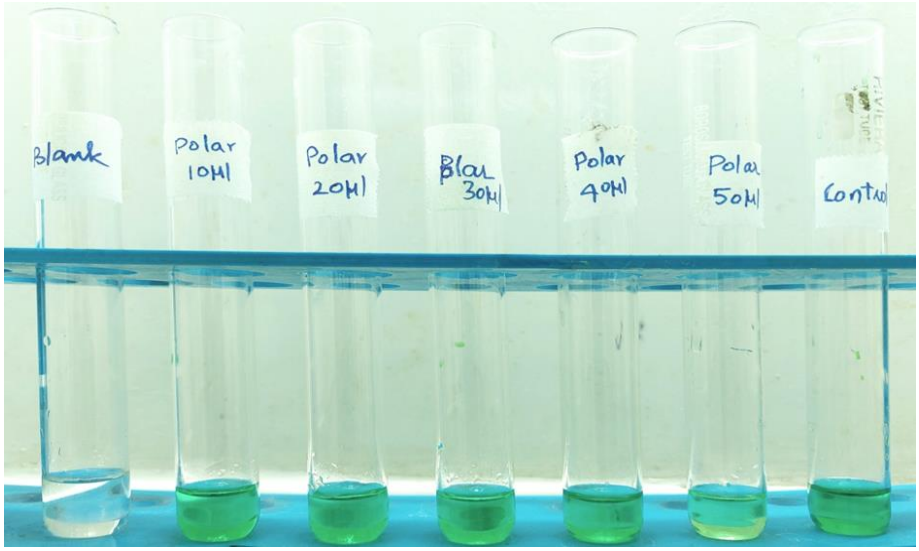


Figure 10. ABTS (hexane extract of *Plumeria pudica*)

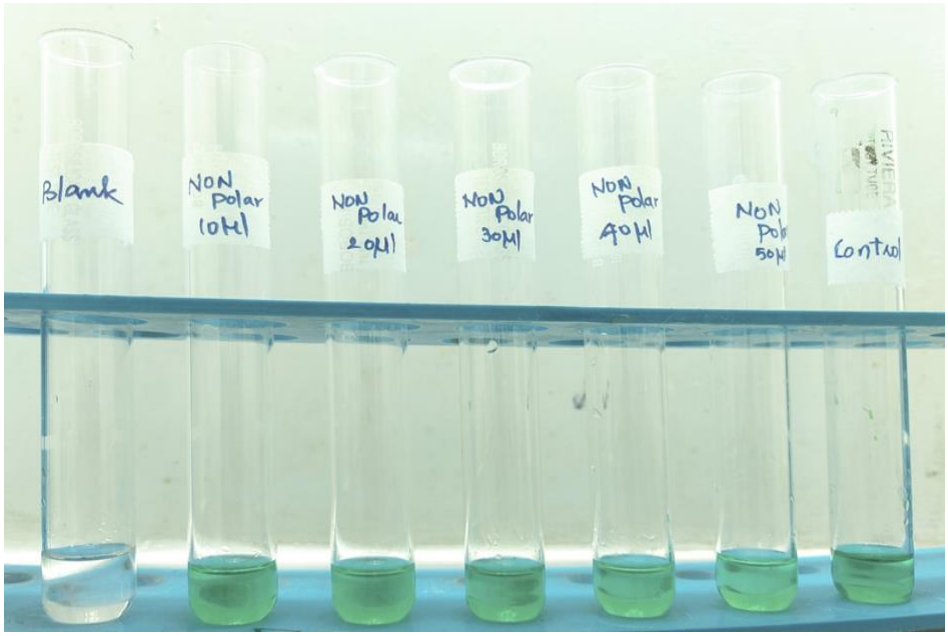


Figure 11. ABTS (ethyl acetate extract and hexane extract of *Plumeriapudica*)

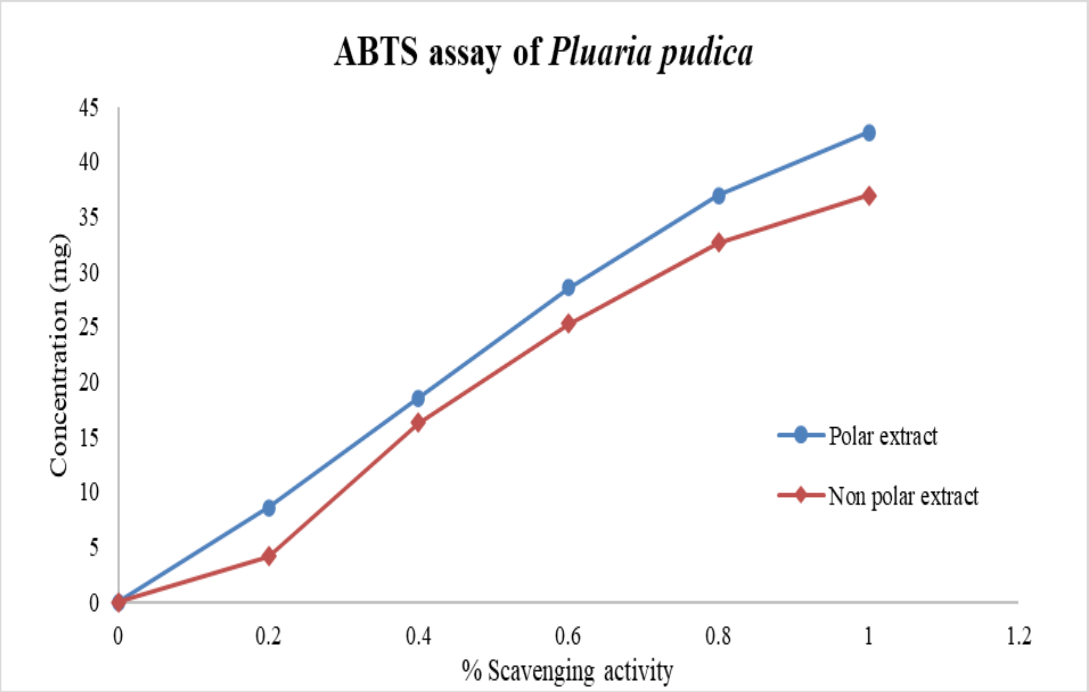
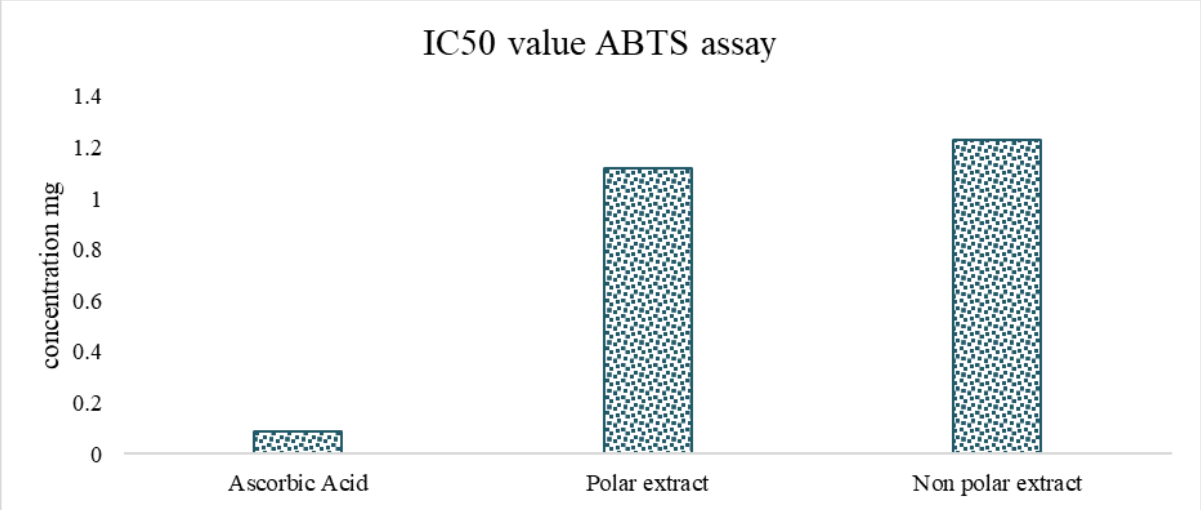


Figure 12. The IC50 value of ABTS method of antioxidant activity



DISCUSSION

The results indicate that IC50 concentration of DPPH assay for standard ascorbic acid is 0.1mg. The IC50 concentration of *Plumeriapudica* plant polar extract and non-polar extract are 0.48 mg an 0.88 mg, respectively. In addition, the IC50 of ABTS assay for ascorbic acid, *Plumeriapudica* plant polar extract and non-polar extract are 0.09, 1.12 and 1.23. From the

results it can be inferred that the polar solvent has biomolecules which have good free radical scavenging antioxidant activity than non-polar solvents.

The reactive oxygen species (ROS) damage the cells (Pham-Huy*et al*. 2008). An unpaired electron or atom from oxygen or nitrogen can damage cells. Control of free radicals' is a prevention or control of disease (Devasagayam*et al*. 2004; Rao*et al.* 2011). This kind of unpaired molecule tends to get steady through electron matching with natural macromolecules causing damage to these molecules in the cells.

The pharmacology, toxicology and biochemical mechanism of action of the ethyl acetate and hexane extract of *Plumeriapudica* will be carried out in our laboratory. The current results of quantitative research on the plant compounds in the ethyl acetate and hexane extracts of *Plumeriapudica* plant provide new insights for the characterization and development of new drug candidates, and are expected to develop new drugs for a variety of human diseases in the future (Selvakumar*et al*, 2017The IC50 value, that is half maximal inhibitory concentration was calculated from Y= mX+C value (assuming Y=50) obtained from linear line from the respective graph.

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