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ANTIOXIDANT ACTIVITY OF PLANTS AT CHINNATIRUPATHI, SALEM, TAMIL NADU, INDIA

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ABSTRACT: This study was carried out during March - April 2013. The fresh leaves collected were extracted with water and used for antioxidant assay. Nitric oxide scavenging activity, Reducing power assay, Metal chelating activity, Phosphomolybdenum activity was assayed and also secondary metabolites such as phenol, flavonoid was estimated. These metabolites play a major role in antioxidant activity. Here, the flavonoid content was found to be more in most of the plants selected thus having significant total antioxidant activity. Likewise, total antioxidant, metal chelating activity was high with *Nerium oleander*, whereas all the other plant showed moderate amount of antioxidant activity. But the phenol content was low in selected plants.

INTRODUCTION: Plants are the richest source of bioactive molecules, its constancy makes the plant to be used as drug after critical evaluation, thereby protects human health by acting as a functional food.

Hence, it is essential to preserve and protect plants from pollution. Most of the antioxidants are from plant origin and play a significant role in protecting plants when they are exposed to strong sunlight, severe oxygen stress.

The antioxidant nature of plants is evidenced through many reports [1]. Hence, an attempt has been undertaken to study the secondary metabolites and antioxidant properties of the plants located at Chinnatirupathi, Salem, Tamil Nadu, India.

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MATERIALS AND METHODS:

Sample collection and extract preparation: Fresh leaves were collected from the study site, Chinnatirupathi, Salem during the month of March – April 2013. Aqueous extract was used for the analysis. 100 mg of leaf sample was used for the extraction process.

Secondary metabolites: Phenol [2, 3] and flavonoid [4] content of aqueous leaf extract was analyzed for the collected plants. Total phenol values are expressed in terms of gallic acid equivalent (mg/g sample) a common reference compound. Similarly, the concentrations of flavonoid in aqueous extract was calculated from the calibration plot and expressed as mg quercetin equivalent/g sample.

Antioxidant assay: Nitric oxide scavenging assay [5], Reducing power [6], Metal chelating activity [7], and Phosphomolybdenum antioxidant assay [8] were performed. Quercetin, Vitamin C, Ethylene diamine tetra acetic acid was used as a positive control and calibration curve was plotted to know the amount present in the extract.

RESULTS AND DISCUSSION:

Secondary metabolites: The results of secondary metabolites studied in plants are shown in **Table 1**. Phenol and flavonoid was found to be high in *Nerium oleander, Pongamia pinnata, Azadirachata indica* but it was found to be low in *Phyllanthus Niruri, Tamarindus indica, Calotropis Gigantea* (Table 1) whereas the flavonoid content was found to be moderate with *Casuarina Equisetifolia, Acacia nilotica, Phyllanthus Niruri, Polyalthia longifolia* (Table 1).

TABLE 1: Depicting secondary metabolites

S. No.	Medicinal Plants	Phenols (mg/g)	Flavonoids(mg/g)
1	*Nerium oleander*	0.44	8.25
2	*Calotropis Gigantea*	0.20	3.1
3	*Pongamia pinnata*	0.25	9.90
4	*Azadirachata indica*	0.31	9.7
5	*Tamarindus indica*	0.10	3.0
6	*Polyalthia longifolia*	0.10	6.05
7	*Acacia nilotica*	0.16	6.5
8	*Phyllanthus Niruri*	0.09	6.1
9	*Casuarina Equisetifolia*	0.14	6.8
10	*Moringa oleifera*	0.35	4.4

Antioxidant assays: The results of various antioxidant tests are depicted in **Table 2.** Phosphomolybdenum activity, Metal chelating activity, reducing power assay was found to be significant when compared to nitrous oxide radical scavenging activity of plants. Antioxidant effect of *Nerium oleander* was found be significant for various antioxidant assays performed except nitric oxide radical scavenging assay, whereas variation was observed with phosphomolybdenum activity in all plants. Metal chelating activity was least with *Phyllanthus Niruri, Moringa oleifera*, all the other plant showed values in the range of 3.2 to 4.4 mg/g (Table 2). Similarly, Nitrous oxide radical scavenging activity was high with *Azadirachata indica, Moringa oleifera* but low activity was observed with rest of the plants (Table 2). Increased antioxidant activity especially with specific antioxidant tests in certain plants depends on the presence of secondary metabolites and also quantity contained in it. Solvent plays a major role in extraction process as the ability to drag the components depends on the polarity of the solvent.

TABLE 2: SHOWING ANTIOXIDANT ASSAYS

S. No.	Medicinal Plants	Nitric oxide Scavenging assay (mg /g)	Reducing Power assay (mg/g)	Metal chelating assay (mg/g)	Phosphomolybdenum assay (mg/g)
1	*Nerium oleander*	1.5	2.60	6.4	25.5
2	*Calotropis Gigantea*	1.1	3.00	4.0	19.2
3	*Pongamia pinnata*	1.2	2.65	4.4	15.6
4	*Azadirachata indica*	7.0	2.50	5.8	12.6
5	*Tamarindus indica*	1.1	2.45	4.7	27.3
6	*Polyalthia longifolia*	1.8	2.45	4.2	18.5
7	*Acacia nilotica*	1.6	2.25	3.2	19.8
8	*Phyllanthus Niruri*	1.7	2.85	1.1	19.5
9	*Casuarina Equisetifolia*	1.5	2.75	4.0	18.0
10	*Moringa oleifera*	6.5	2.65	1.3	19.2

CONCLUSION: All the samples analyzed show very low levels of phenol but significant quantities of flavonoid was observed indicating their antioxidant potential. Total antioxidant activity was found to be strong and metal chelating activity in moderate amounts but the reducing power as well as nitric oxide radical scavenging activity was seem to be low in plants collected at the study site-Chinnatirupathi, Salem.

Thus, from this study, we can conclude, that secondary metabolites are mainly responsible for the free radical scavenging activities of plants.

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