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ANTIOXIDANT ACTIVITY (IN-VITRO) OF CALOTROPIS PROCERA EXTRACT FROM ARID REGIONS OF RAJASTHAN

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ABSTRACT

Aim: To study in-vitro antioxidant activity of *Calotropis procera*.

Methodology: The evaluation of antioxidant activity was done using 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging activity via Double Beam UV-Visible Spectrophotometer.

Result: The IC_{50} values in leaves, fruits and flowers of *Calotropis procera* were found to be 16.08, 16.06 and 10.31µg/mL respectively.

Conclusion: The results explore the strong antioxidant activity of *Calotropis procera* which can be harvested by medical and pharmaceutical industries for curing several diseases.

Key Words: *Calotropis procera*, Antioxidant activity, DPPH, Diseases

INTRODUCTION

Calotropis procera is a wild shrub found in tropics of Asia and Africa. It is commonly called as 'Akra' in Rajasthan (India) and grows upto a height of 1-3m long with broad10-13cm wide and 17-19 cm long cutaneous leaves.[1] It is traditionally used as a medicinal plant in India.[2] The latex of Calotropis is used in the treatment of leprosy, eczema, inflammations, malarial and low hectic fevers[3] while the leaves, fruits and roots are used in rheumatism, as anti-inflammatory, antimicrobial, antioxidant and hepatoprotective agents. The flowers are found to be effective in asthma, piles and malaria. [4-10]

With this view the present research work is concentrated on evaluation of antioxidant activity of *Calotropis procera*. Antioxidant protects human body against oxidative stress and damage to all types of biomolecules like proteins, lipids and nucleic acid caused by overproduction or inefficient elimination of Reactive Oxygen Species (ROS). [11-12] Scientific evidences reveals that antioxidants play an important role in reducing the risk for chronic diseases including cancer and heart diseases.[13]

MATERIALS AND METHODS

i. Collection of plant materials and their extraction:

The leaves, fruits and flowers of the plant were collected from local areas of Rajasthan. The shade dried materials were then pulverized separately to 40 mesh size, 100g each of which were then extracted in 500mL methanol using a soxhlet extractor. Finally the extracts were filtered and used for antioxidant activity evaluation.

ii. Chemicals:

All chemicals were of A.R. Grade and were procured from Ases Chemical Works, Jodhpur Rajasthan

iii. Determination of Antioxidant activity using DPPH via free radical scavenging activity:

DPPH free radical scavenging activity was measured according to the procedure described by Blios.[14] Methanolic extracts of the samples of different concentrations (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000 ppm) were added separately to each of the 3.5mL, 100µM methanolic DPPH

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which were then incubated for 30 min. Taking ascorbic acid as the standard, the absorbance of each of the solutions were determined at 517nm using Double Beam UV-Visible spectrophotometer (Rayleigh UV-2601).A blank reading is also noted and finally the DPPH free radical scavenging activity was calculated by the formula:

$$\text{DPPH free radical scavenging activity (\% RSA)} = \frac{A_{blank} - A_{test}}{A_{blank}} \times 100$$

where A_{blank} and A_{test} are absorbance of blank and sample extract solutions. The IC_{50} values were calculated from percentage inhibition v/s concentration curves by linear regression analysis.

RESULTS

The results of the DPPH free radical scavenging activity of ascorbic acid, leaves, fruits and flowers are tabulated in tables 1-4 respectively. The variation of antioxidant activities in ascorbic acid, leaves, fruits and flowers with the increasing concentration of samples have also been depicted through the curves given in the figures 1-4 respectively.

DISCUSSIONS

The study shows that %RSA increases gradually with increase with concentration of samples. The concentration at which the %RSA value i.e. the inhibition value reaches 50% is called the IC_{50} value. The lower IC_{50} value indicated high antioxidant value in analyte.[15] The IC_{50} values in leaves, fruits and flowers of *Calotropis procera* were found to be 16.08, 16.06 and 10.31µg/mL respectively.

CONCLUSION

The results showed a good antioxidant activity in the plant which can be efficiently used in the pharmaceutical purposes in arid regions of Rajasthan and world over.

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DECLARATION Of CONFLICT OF INTEREST

The manuscript has no conflict of interest.

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Table 1: DPPH Radical Scavenging Assay of Ascorbic Acid.

S. No.	Concentration (ppm)	Absorbance (nm)	% RSA	IC_{50} value (μg/ml)
	10	0.529	31.02	
	50	0.429	44.06	
	100	0.399	47.97	6.80
	300	0.280	63.49	
	500	0.268	65.05	
		Control	**1.00**	

Table 2: DPPH Radical Scavenging Assay of *Calotropis procera* leaves.

S. No.	Concentration (ppm)	Absorbance (nm)	% RSA	IC_{50} value (μg/ml)
	100	0.644	16.03	
	200	0.621	19.04	
	300	0.598	22.03	
	400	0.575	25.02	
	500	0.559	27.11	
	600	0.536	30.12	16.08
	700	0.521	32.07	
	800	0.513	33.12	
	900	0.498	35.07	
	1000	0.483	37.02	
		Control	**1.00**	

Table 3: DPPH Radical Scavenging Assay of *Calotropis procera* fruits

S. No.	Concentration (ppm)	Absorbance (nm)	% RSA	IC_{50} value (μg/ml)
	100	0.642	16.29	
	200	0.636	17.07	
	300	0.633	17.47	
	400	0.630	17.86	
	500	0.627	18.25	
	600	0.624	18.64	16.06
	700	0.619	19.29	
	800	0.616	19.68	
	900	0.613	20.07	
	1000	0.607	20.86	
		Control	**1.00**	

Table 4: DPPH Radical Scavenging Assay of *Calotropis procera* flowers.

S. No.	Concentration (ppm)	Absorbance (nm)	% RSA	IC_{50} value (μg/ml)
	100	0.690	10.13	
	200	0.982	11.08	
	300	0.676	11.86	
	400	0.673	12.25	
	500	0.668	12.90	10.31
	600	0.665	13.029	
	700	0.662	13.68	
	800	0.659	14.08	
	900	0.656	14.47	
	1000	0.653	14.86	
		Control	**1.00**	

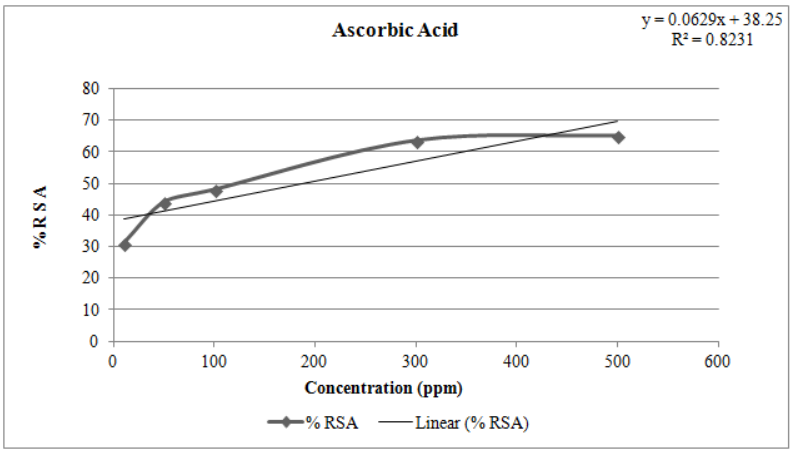

Figure 1: DPPH Radical Scavenging Assay of Ascorbic Acid

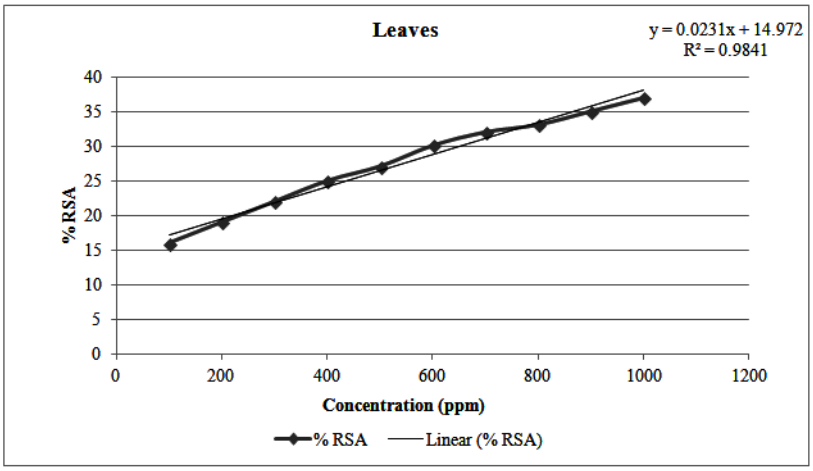

Figure 2: DPPH Radical Scavenging Assay of *Calotropis procera* leaves

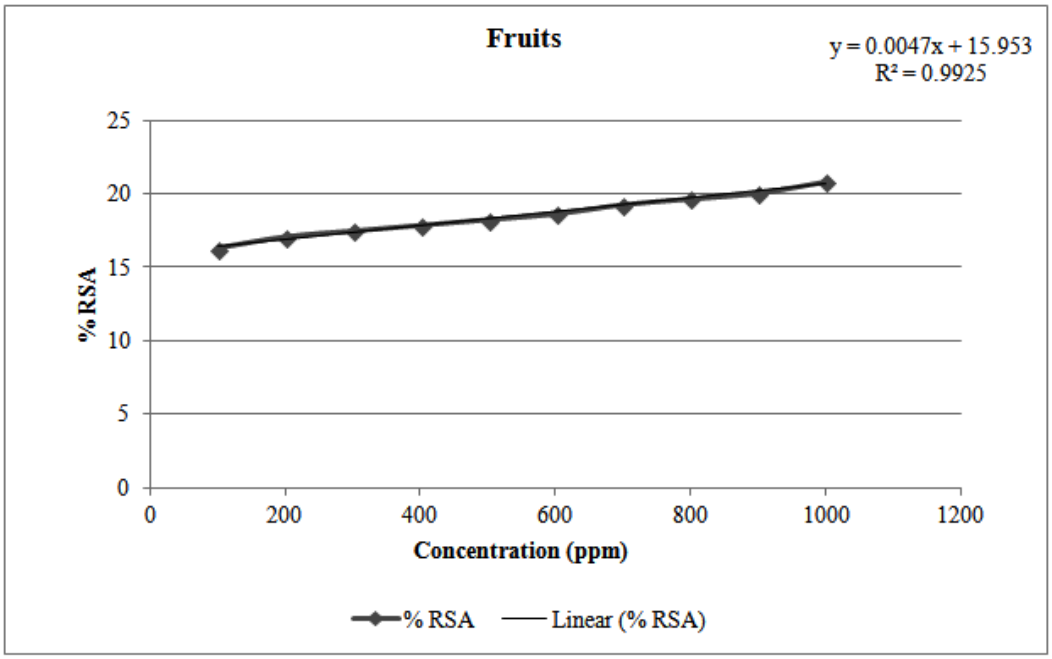

Figure 3: DPPH Radical Scavenging Assay of *Calotropis procera* fruits

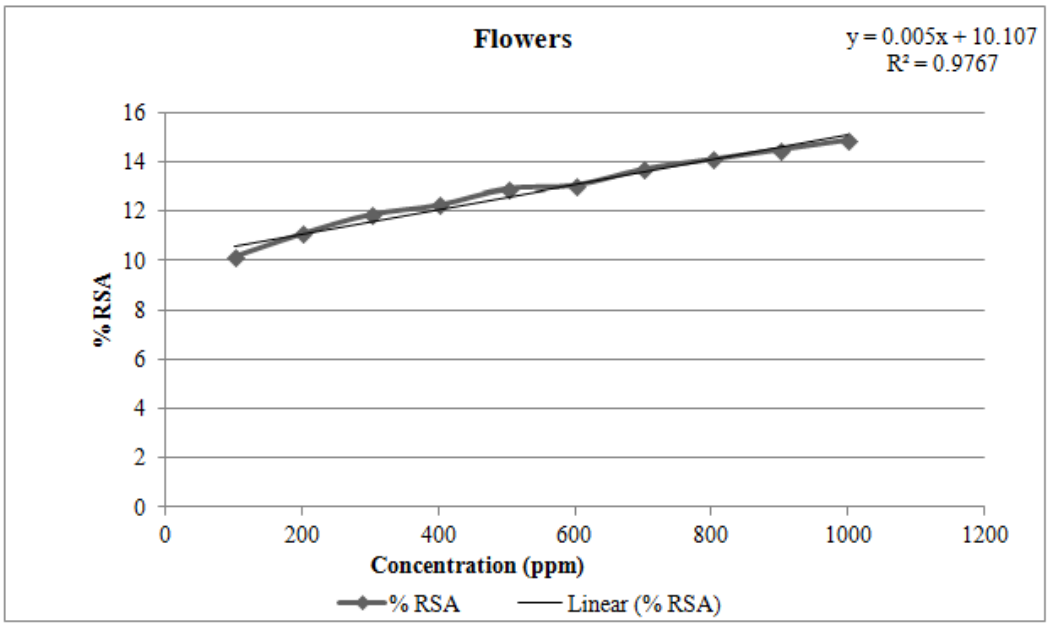

Figure 4: DPPH Radical Scavenging Assay of *Calotropis procera* flowers