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Study of in-vitro antioxidant activity of various extracts of aerial parts of *Olax scandens*

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ABSTRACT

*Olax scandens*Roxb. (family *Olacaceae)* Available in throughout tropical India. The current study, aerial parts of different concentrates of *Olax scandens*was evaluated for its *in-vitro* antioxidant potential by Diphenylpicrylhydrazyl activity, superoxide scavenging activity, iron chelating activity taking ascorbate, quercetin & Ethylenediamine tetraacetate as the standard correspondingly. An IC_{50} value was originated that methanolic concentrates of *Olax scandens*is more efficient in Diphenylpicrylhydrazyl radical, superoxide radical activity, Iron chelating capacity compared EA & PE concentrates. The methanolic concentrates of *Olax scandens* & ascorbate exhibited antioxidant potential possessing IC_{50} 226μg/ml & 66μg/ml (DPPH). 185μg/ml & 60μg/ml (Superoxide) , 287μg/ml & 65μg/ml (iron-chelating Activity) respectively. Invitro antioxidant studies obviously show methanolic concentrates of *Olax scandens* have better antioxidant activity. These results indicate that aerial parts of methanolic concentrates *Olax scandens* could serve as a natural antioxidant, which may be useful in preventing free radical-induced diseases.

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INTRODUCTION

A free radical is any species capable of freelance existence that contains a lot of odd unpaired electrons. Electron unpaired being single that is only in an orbital (Halliwell, 1991). The electron unpaired gives convinced characteristic property to the free radical, like as paramagnetism. The chemical reactivity of free radicals is usually more. They may be + charged, - charged, or neutral charge electrically (Slater, 1984). These RO having a major task in the pathogenesis of many oxidative stress associated disorders like carcinogenesis, cardiovascular diseases, arthritis, diabetics, & neurological disorders (Halliwell and Gutteridge, 1990). The generally used synthetic antioxidants at present are BHA, BHT, PG, & TBHQ. However, these drugs are assumed accountable for liver harm and performing as carcinogens in lab animals (Anagnostopoulou *et al.*, 2006). The investigate for new products with antioxidative potential & a smaller number of adverse effects is an active domain of research. Thus, the extension and utilization of huge efficient antioxidants of the natural source was popular (Sakagami *et al.*, 1991).

Olax scandens Roxb. (family *Olacaceae*) is commonly known as “Parrot Olax, Sprawling olax ” in English & locally known as ‘Kurpodur’ in Telugu. This plants fruits and leaves has been used for therapeutic & food purpose. *O. Scandens leaves were* used as constipation. *Olax scandens*(Roxb.), is gen-

erally known as Badrul in Odiya, used for cooking & different therapeutic purposes (Sinha and Lakra, 2005). *Olax scandens* bark decoction is used treatment fever & cough. (Duraipandiyan *et al.*, 2006). *O. scandens* leaves were used for mouth ulcers. (Kumar *et al.*, 2015). *O.scandens* boiled leaves were applied in the head for the treatment of headache. (Kumar *et al.*, 2010). Still, no literature are available on the antioxidant potency of *Olax scandens*. Thus, the present study to assess the antioxidant activities of *Olax scandens.*

MATERIALS AND METHODS

Gathering & Identification of Plant

The aerial parts of *O.scandens*(family *Olacaceae*) were gathered from Medak, Telangana state, India. Plant identification was made from the Botanical investigation of India, Telangana regional center, Hyderabad, (BSI/DRC/2019-20/Tech/174). The *O.scandens,* were desiccated under shadowy, segregate, crushed through the grinder (Satheeshkumar *et al.*, 2011).

Preparation of Concentrates

The pulverized materials were progressively concentrated with PE (40-60^{0}C) through hot constant percolation method in Soxhlet equipment (J B Harbrone, 1984) for twenty-four hours. At that moment, the marc was subjected to EA (76-78^{0}C) for 24 hrs & then mark was subjected to methanol for 24 hrs. The concentrates were concentrated through the rotational evaporator and subjected to solidify drying in a lyophilizer till dry powder was acquired. (Vasagam *et al.*, 2010).

Assessment of Antioxidant potential through invitro methods

The variety of concentrates of *O.scandens* were used assessment of antioxidant activity by Mensor *et al.* (2001) method was adopted for Diphenyl picrylhydrazyl radical assay & Winterbourn *et al.* (1975) method described for Superoxide radical (O_2^-) assay and Benzie and Strain (1996)ss method was adopted to determine the Iron chelating activity.

RESULTS AND DISCUSSION

DPPH scavenging activity

The DPPH activity of PE concentrates of *Olax scandens* appeared Table 1. The PE concentrates of *Olax Scandens exhibit*, a more DPPH activity of 45.08% at 800 μg/ml & ascorbate was recorded 72.82% at 800 μg/ml. The IC_{50} of the PE concentrates of *Olax scandens* & ascorbic acid were recorded 90μg/ml & 66μg/ml correspondingly.

DPPH activity of EA concentrates of *Olax scandens* summarized in Table 2. The EA concentrates of *Olax Scandens exhibit* more DPPH scavenging potential of 59.12% at 800 μg/ml & ascorbate was recorded 72.82% at 800 μg/ml. The IC_{50} of the EA concentrates of *Olax scandens* & ascorbic acid were recorded 504μg/ml & 66μg/m correspondingly.

DPPH potential of methanolic concentrates of *O.scandens* appeared in Table 3. The methanolic concentrates of *O.scandens* having more DPPH scavenging potential of 66.24% at 800 μg/ml & ascorbate was recorded 72.82% at 800 μg/ml. The IC_{50} of the methanolic concentrates of *O.scandens* & ascorbic acid were recorded 226μg/ml & 66μg/m correspondingly.

The methanolic concentrates of *Olax scandens* was recorded to more activity than PE & EA concentrates. The IC_{50} of the methanolic concentrates of *O.scandens*& ascorbic acid were found to be 226μg/ml & 66μg/ml correspondingly.

Superoxide activity

Superoxide radical potential of PE concentrates of *O.scandens* appeared Table 4. The more Superoxide radical potential of PE concentrates & standard at 1000 μg/ml was recorded at 48.65% & 98.01 %. IC_{50} of PE concentrates & standard was recorded as 1070μg/millilitre & 60μg/millilitre correspondingly.

Superoxide radical potential of EA concentrates of *O.scandens* appeared in Table 5. The more SO scavenging potential of EA concentrates & standard 1000 μg/ml was recorded 64.12% & 99.12% correspondingly. EA concentrates & Quercetin IC_{50} was recorded as 495μg/ml & 60μg/ml correspondingly.

Superoxide radical scavenging potential of methanolic concentrates of *O.scandens* appeared in Table 6. Superoxide radical scavenging potential was more in methanolic concentrates & Quercetin (standard) at 1000 μg/ml was recorded 70.28% & 99.12% . Methanolic concentrates & standard IC_{50} was recorded as 185μg/ml & 60μg/ml correspondingly.

IC_{50} values & Superoxide radical potential revealed that methanol concentrates of *Olax scandens* is better activity in scavenging superoxide radical when compared EA & PE extracts.

Iron chelating potential

The iron complex potential of PE concentrates *O.scandens* & Ethylenediamine tetraacetate were appeared in Table 7. The more iron-binding potential of PE concentrates & Ethylenediamine tetraac-

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Table 1: DPPH radical activity of *Olax scandens* PE extract

S.no	Extract (μg/ml)	% of activity(±SEM)*	
		PE concentrates	Ascorbate
1	100	10.29±0.023	54.19 ±0.024
2	200	19.74±0.045	59.24 ±0.032
3	400	34.56±0.063	65.32 ±0.054
4	800	45.08±0.043	72.82 ±0.062
		IC50 = 990 μg/ml	IC50 = 66 μg/ml

*Every value was articulated as mean ± SEM for 3 experimentation

Table 2: DPPH radical activity of *Olax scandens* EA extract

S.no	Extract (μg/ml)	% of activity(±SEM)*	
		(EA concentrates)	(Ascorbate)
1	100	28.33 ± 0.024	54.19 ±0.024
2	200	39.75 ± 0.034	59.24 ±0.032
3	400	47.12 ± 0.023	65.32 ±0.054
4	800	59.12 ± 0.015	72.82 ±0.062
		IC50 = 504μg/ml	IC50 = 66 μg/ml

* Every value was articulated as mean ± SEM for 3 experimentation

Table 3: DPPH radical activity of *Olax scandens* metrhanolic extract

S.no	Extract (μg/ml)	% of activity(±SEM)*	
		(Methanolic concentrates)	Ascorbate
1	100	40.23±0.022	54.19 ±0.024
2	200	49.34±0.043	59.24 ±0.032
3	400	57.55±0.048	65.32 ±0.054
4	800	66.24±0.023	72.82 ±0.062
		IC50 = 226μg/ml	IC50 = 66μg/ml

* Every value was articulated as mean ± SEM for 3 experimentation

Table 4: Activity of PE concentrates of *Olax scandens* on Superoxide radical method

S.no	Extract (μg/ml)	% inhibition (±SEM)*	
		(PE concentrates)	(Quercetin)
1	125	19.15 ±0.012	72.76 ±0.012
2	250	27.09 ±0.014	90.29 ±0.014
3	500	35.33 ±0.022	96.89 ±0.010
4	1000	48.65 ±0.026	99.12 ±0.018
		IC50 = 1070 μg/ml	IC50 = 60 μg/ml

* Every value was articulated as mean ± SEM for 3 experimentation

Table 5: Activity of EA concentrates of *Olax scandens* on Superoxide radical method

S.no	Extract (μg/ml	% of inhibition ($\pm$SEM)*	
		(Ethyl acetate concentrates)	(Quercetin)
1	125	20.12 $\pm$0.014	72.76 $\pm$0.012
2	250	44.49 $\pm$0.025	90.29 $\pm$0.014
3	500	50.23 $\pm$0.033	96.89 $\pm$0.010
4	1000	64.12 $\pm$0.024	99.12 $\pm$0.018
		IC50 = 495 μg/ml	IC50 = 60 μg/ml

* Every value was articulated as mean $\pm$ SEM for 3 experimentation

Table 6: Activity of Methanolic concentrates *Olax scandens* on Superoxide radical method

S.no	Extract (μg/ml)	% inhibition ($\pm$SEM)*	
		Methanolic extract	Quercetin
1	125	35.18 $\pm$0.071	72.76 $\pm$0.012
2	250	54.23 $\pm$0.024	90.29 $\pm$0.014
3	500	62.34 $\pm$0.044	96.89 $\pm$0.010
4	1000	70.28 $\pm$0.017	99.12 $\pm$0.018
		IC50 = 185 μg/ml	IC50 = 60 μg/ml

* Every value was articulated as mean $\pm$ SEM for 3 experimentation

Table 7: Iron-binding potential of *O.scandens* PE concentrates

S.no	Extract (μg/ml)	% inhibition ($\pm$SEM)*	
		PE concentrates	Ethylenediamine tetraacetate
1	125	26.90 $\pm$0.012	57.52 $\pm$0.014
2	250	34.56 $\pm$0.032	64.76 $\pm$0.022
3	500	42.65 $\pm$0.010	82.12 $\pm$0.045
4	1000	51.76 $\pm$0.016	96.34 $\pm$0.034
		IC50 = 980 μg/ml	IC50 = 65 μg/ml

* Every value was articulated as mean $\pm$ SEM for 3 experimentation

Table 8: Iron-binding potential of *O.scandens* of EA concentrates

S.no	Extract (μg/ml)	% inhibition ($\pm$SEM)*	
		EA concentrates	Ethylenediamine tetraacetate
1	125	32.30 $\pm$0.024	57.52 $\pm$0.014
2	250	43.38 $\pm$0.013	64.76 $\pm$0.022
3	500	50.28 $\pm$0.023	82.12 $\pm$0.045
4	1000	64.70 $\pm$0.026	96.34 $\pm$0.034
		IC_{50} = 495μg/ml	IC_{50} = 65μg/ml

* Every value was articulated as mean $\pm$ SEM for 3 experimentation

Table 9: Iron-binding potential of *O.scandens* Methanolic concentrates

S.no	Extract (μg/ml)	% inhibition($\pm$SEM)*	
		Methanol concentrates	EthyleneDiamine tetra acetate
1	125	36.22 $\pm$0.010	57.52 $\pm$0.014
2	250	47.42 $\pm$0.014	64.76 $\pm$0.022
3	500	60.56 $\pm$0.016	82.12 $\pm$0.045
4	1000	68.89 $\pm$0.021	96.34 $\pm$0.034
		IC_{50} = 287μg/ml	IC_{50} = 65μg/ml

* Every value was articulated as mean $\pm$ SEM for 3 experimentation

etate 1000 μg/ml were recorded, 51.76% & 96.34 %. The IC_{50} of PE concentrates of *O.scandens*& Ethylenediamine tetraacetate were found as 980μg/ml & 65μg/ml correspondingly.

The iron complex potential of EA concentrates of *Olax scandens* & Ethylenediamine tetraacetate were presented in Table 8. The more iron-binding capacity of EA concentrates & Ethylenediamine tetraacetate 1000 μg/ml was recorded at 64.70% & 96.34 %. The IC_{50} value of ethyl acetate concentrates of *Olax scandens* & Ethylenediamine tetraacetate were found 495μg/ml & 65μg/ml correspondingly.

The iron complex potential of methanolic concentrates of *Olax scandens* & Ethylenediamine tetraacetate were presented in Table 9. The more iron-binding potential of methanolic concentrates & Ethylenediamine tetraacetate 1000 μg/ml were recorded, 68.89% & 96.34 %. The IC_{50} value of methanol concentrates of *Olax scandens* & Ethylenediamine tetraacetate was recorded as 287μg/ml & 65μg/ml correspondingly.

IC_{50} values & iron binding potential revealed that methanol concentrates of *Olax scandens* is huge activity in iron chelating potential when compared ethyl acetate & petroleum ether concentrates. But when compared to the all the three concentrates, the methanol concentrates of the *Olax scandens* showed the better result.

Assessment of antioxidant activity, so many *in vitro* methods have been used a variety of concentrates of *Olax scandens*. Diphenylpicrylhydrazyl is a stable N_2-centered free radical generally utilized for testing the antioxidant potential of herbal concentrates. When the stable Diphenylpicrylhydrazyl radical accepts an electron from the antioxidant compound, the violet colour of the Diphenylpicrylhydrazyl as reduced to yellow colored diphenylpicrylhydrazine radical which was measured colorimetrically. Substances which are able to perform this reaction can be considered as antioxidants & therefore radical scavengers (Dehpour *et al.*, 2009). The results of antioxidant activity by Diphenylpicrylhydrazyl radical activity, superoxide radical activity & iron-chelating potential were expressed in terms of % inhibition of generated free radicals respectively with respect to various concentrations. Among the three different plant concentrates tested, interestingly, in the DPPH radical activity of the methanolic of *Olax Scandens exhibited* more Diphenylpicrylhydrazyl radical potential comparable with that of ascorbic acid.

Superoxides could be produced in huge amounts by various biological processes. It is known to be more injurious to cellular components as an originator of the most ROS, contributing to tissue damage & many disorders (G B J M Halliwell, 1999). The methanolic concentrates of *Olax scandens* exhibited higher ability in scavenging superoxide anion radical when compared to the strand quercetin.

The iron-chelating potential of all the concentrates was measured by Fe-ferrozine complex formation. Ferrozine-Fe complex is producing red-colored, which absorbs at 562nm (Yamaguchi *et al.*, 2000). It was revealed that Ethylenediamine tetraacetate, which forms σ bond with iron, are efficient as secondary antioxidants, for the basis that they decrease the redox potential, thereby stabilizing the oxidized form of the iron ion (Duh *et al.*, 1999). Iron chelating potential of methanolic concentrates of *Olax Scandens exhibited* higher ability in scavenging compared to standard Ethylenediamine tetraacetate.

CONCLUSION

The current trends, antioxidative activity of the herbs having more interest due to their possible use as natural additives to substitute synthetic ones. Among the three various concentratess methanolic concentrates of *Olax scandens* exhibited higher potency of antioxidant activity. These results indicate that aerial parts of methanolic concentrates *Olax Scandens could* serve as a natural antioxidant, which may be useful in preventing free radical-induced diseases.

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