



Study of Antioxidant Activity of Aerial Parts of Five Varieties of *Solenostemon scutellarioides* (L.) R. Br. from Dibrugarh, Assam

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ABSTRACT

The aim of the present study is to determine the antioxidant activity of water, methanol, ethanol, acetone and petroleum ether extract of five varieties of *Solenostemon scutellarioides* (L.) R. Br. It is an ornamental plant from Lamiaceae family having different foliage colour. Antioxidant activity of different aerial parts of the plants were examined spectrophotometrically by DPPH and ABTS radical scavenging activity using ascorbic acid as standard. All the extracts have little or more antioxidant activity.

Keywords: Antioxidant activity, DPPH, ABTS.

INTRODUCTION

Solenostemon scutellarioides (L.) R. Br. syn. *Plectranthus scutellarioides* (L.) R. Br. (syn. *Coleus blumei* Benth.), a member of the Lamiaceae family, is planted as ornamental flower in Indian gardens. The colourful foliage depends on sunlight, anthocyanins, water-soluble flavonoid, biosynthetic pigments, chlorophyll.¹⁻⁵ More than 300 species and several hundred varieties of *Solenostemon* are present.⁶

Free radicals are continuously produced in our body which are essential for energy supply, detoxification, chemical signaling and immune function but it increases the oxidative stress in our body.⁷ Antioxidants reduce the oxidative stress and reduce risks of chronic disease, by neutralizing the reactive species by donating hydrogen.⁸⁻¹⁸

Intake of natural antioxidant is important for human to reduce the oxidative stress.¹⁹

In this study we aimed to study the antioxidant activity of crude extracts of different aerial parts of the five varieties of *S. scutellarioides* (L.) R. Br. Using DPPH and ABTS.

MATERIALS AND METHODS

Sample collection

Fresh leaves (young and mature), inflorescence and stem of the five varieties of *S. scutellarioides* (L.) R. Br. were collected from household premises of Dibrugarh, Assam, India. The materials were shade dried and grounded to fine powder using electric grinder.

The selected five varieties of *S. scutellarioides* (L.) R. Br are-



Fig. 1: var. 1

Fig. 2: var. 2

Fig. 3: var. 3



Fig. 4: var. 4

Fig. 5: var.5



Sample extraction

Samples were macerated separately with water, methanol, ethanol, acetone and petroleum ether for 48 hours and filtered through Whatman No. 1 filter paper. The filtrate was then evaporated at a constant temperature (60°C) until a semi dried powder/sticky mass of crude extract was obtained.

Experimental

Antioxidant activity of the solvent extracts were studied by using DPPH and ABTS radical scavenging method as described by Anti-Stanojevic,²⁰ and Re,²¹ respectively. The results were compared with standard ascorbic acid. For all the cases 500µl of sample was treated with DPPH and ABTS.

RESULTS AND DISCUSSION

Antioxidant activity of the crude extracts of five varieties of *s. scutellarioides* (L.)r. br.

Antioxidant activity of the crude extracts of five varieties are presented in table 1 to 5. In case of variety 1, water extract of mature leaves (95.85±0.13), methanol extract of inflorescence (82.23±0.00) and ethanol extract of mature leaves and inflorescence (80.93±0.00 and 80.15±0.00 respectively) have higher antioxidant activity against DPPH. Water extract of young and mature leaves and inflorescence (85.45±1.79, 86.20±0.66 and 88.28±0.00 respectively); methanol, ethanol, acetone and petroleum ether extract of young leaves and inflorescence (88.34±0.61 and 87.41±0.00; 86.74±0.61 and 88.08±0.00; 81.23±0.21 and 88.41±0.00; 88.17±0.21 and 88.41±0.00 respectively) have higher inhibition against ABTS. In case of variety 2,

water, methanol, ethanol and acetone extracts (72.99±0.09, 70.09±0.00, 71.34±0.00 and 73.65±2.89) of mature leaves have little higher inhibition against ABTS. In case of variety 3, water extract of mature leaves and inflorescence (84.50±0.58 and 82.95±1.20) and methanol extract of inflorescence (84.69±0.00) recorded significant inhibition against DPPH. Water and methanol extract of young and mature leaves and inflorescence (81.44±0.30, 85.78±0.63 and 86.12±3.35; 80.00±0.67, 81.87±0.33 and 89.73±0.00) and ethanol, acetone and petroleum ether extract of inflorescence (88.41±0.00, 89.73±0.00 and 89.07±0.00) have significant inhibition against ABTS. In case of variety 4, water and methanol extract of mature leaves and inflorescence (80.08±1.09 and 80.72±0.08; 81.09±0.00 and 85.88±0.00); ethanol and acetone extract of inflorescence (84.59±0.00 and 84.54±0.00) showed inhibition against DPPH. Water, methanol, ethanol and acetone extract of inflorescence (86.55±0.00, 87.42±0.00, 83.77±0.00 and 88.41±0.00) recorded significant amount of inhibition against ABTS. In case of variety 5, methanol and ethanol extracts of young leaves (78.78±0.00 and 75.89±0.12 respectively) have higher inhibition against than other extracts against DPPH. Water and methanol extract of young and mature leaves (79.64±3.81 and 84.28±0.63; 78.88±0.00 and 71.00±0.00 respectively) and ethanol extract of young leaves (76.89±0.03) recorded higher inhibition than other extracts against ABTS. Antioxidant activity of ethanol and water extract of leaves against DPPH was recorded by Wardojo,²². They recorded IC 50 value of ethanol, water and ascorbic acid were 227.84µg/ml, 244.42 µg/ml and 7.27 µg/ml.

Table 1: Anti-oxidant activity of crude extracts of different parts of *S. scutellarioides* (L.)R. Br. (var. 1.)

Sample ↓	DPPH radical scavenging activity (% inhibition in mg/ml)					ABTS radical scavenging activity (% inhibition in mg/ml)				
	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract
Young Leaf	11.37 ±0.43	35.27 ±1.22	43.20 ±2.30	44.89 ±0.00	49.95 ±0.18	85.45 ±1.79	88.34 ±0.22	86.74 ±0.61	81.23 ±0.03	88.17 ±0.21
Mature Leaf	95.85 ±0.13	79.88 ±1.05	80.93 ±0.00	77.34 ±0.23	67.90 ±0.23	86.20 ±0.66	62.74 ±0.29	62.89 ±0.20	60.56 ±0.00	56.45 ±0.00
Inflorescence	45.52 ±0.00	82.23 ±0.00	80.15 ±0.00	49.15 ±0.00	46.61 ±0.00	88.28 ±0.00	87.41 ±0.00	88.08 ±0.00	88.41 ±0.00	88.41 ±0.00
Stem	34.34 ±0.00	36.45 ±0.45	33.45 ±0.00	33.23 ±0.00	30.01 ±0.00	56.67 ±0.02	56.98 ±0.00	54.34 ±0.00	49.46 ±0.05	32.67 ±0.00
Ascorbic acid	90.28 ±0.02					89.00 ±0.00				



Table 2: Anti-oxidant activity of crude extracts of different parts of *S. scutellarioides* (L.)R. Br. (var. 2).

Sample ↓	DPPH radical scavenging activity (% inhibition in mg/ml)					ABTS radical scavenging activity (% inhibition in mg/ml)				
	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract
Young Leaf	49.99 ±0.09	39.55 ±0.00	41.56 ±0.00	34.45 ±0.56	29.09 ±0.46	55.55 ±0.09	55.87 ±2.45	54.45 ±0.00	41.98 ±0.67	45.67 ±0.00
Mature Leaf	60.00 ±0.00	61.34 ±0.00	60.75 ±0.48	43.78 ±1.84	38.98 ±0.99	72.99 ±0.09	70.09 ±0.00	71.34 ±0.00	73.65 ±2.89	63.67 ±0.09
Inflorescence	45.36 ±1.00	34.43 ±0.09	29.09 ±0.00	29.89 ±0.00	27.78 ±0.00	44.90 ±0.09	40.00 ±0.98	43.87 ±0.45	43.56 ±0.89	29.09 ±0.90
Stem	30.98 ±0.09	22.22 ±0.09	29.98 ±1.11	12.56 ±1.09	14.45 ±0.09	29.99 ±0.09	31.13 ±0.00	21.34 ±0.09	19.09 ±1.09	21.90 ±0.09
Ascorbic acid	90.28 ±0.02					89.00 ±0.00				

Table 3: Anti-oxidant activity of crude extracts of different parts of *S. scutellarioides* (L.)R. Br. (var. 3).

Sample ↓	DPPH radical scavenging activity (% inhibition in mg/ml)					ABTS radical scavenging activity (% inhibition in mg/ml)				
	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract
Young Leaf	73.91 ±0.43	79.00 ±0.00	78.88 ±0.11	73.89 ±0.03	73.09 ±0.01	81.44 ±0.30	80.00 ±0.67	78.88 ±0.09	70.45 ±0.45	70.00 ±0.00
Mature Leaf	84.50 ±0.58	78.09 ±0.67	75.78 ±0.45	66.79 ±0.00	66.56 ±0.67	85.78 ±0.63	81.87 ±0.33	73.33 ±0.77	71.20 ±4.55	65.78 ±0.00
Inflorescence	82.95 ±1.20	84.69 ±0.00	51.21 ±0.00	57.98 ±0.00	55.35 ±0.00	86.12 ±3.35	89.73 ±0.00	88.41 ±0.00	89.73 ±0.00	89.07 ±0.00
Stem	60.00 ±0.22	60.00 ±0.00	55.77 ±0.78	55.00 ±0.00	50.00 ±0.99	61.60 ±0.55	61.01 ±0.78	61.00 ±0.44	58.89 ±0.89	56.00 ±0.78
Ascorbic acid	90.28 ±0.02					89.00 ±0.00				

Table 4: Anti-oxidant activity of crude extracts of different parts of *S. scutellarioides*(L.)R. Br. (var. 4).

Sample ↓	DPPH radical scavenging activity (% inhibition in mg/ml)					ABTS radical scavenging activity (% inhibition in mg/ml)				
	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract
Young Leaf	76.98 ±0.00	74.56 ±1.00	75.10 ±0.03	70.00 ±0.99	61.78 ±0.00	77.77 ±0.98	68.00 ±2.09	72.21 ±0.00	69.56 ±0.56	50.67 ±1.00
Mature Leaf	80.08 ±1.09	81.09 ±0.00	73.98 ±0.00	65.98 ±0.09	65.90 ±0.09	79.00 ±0.04	69.99 ±1.09	75.98 ±0.44	65.55 ±0.09	49.98 ±0.00
Inflorescence	80.72 ±0.08	85.88 ±0.00	84.59 ±0.00	84.54 ±0.00	79.82 ±0.00	86.55 ±0.00	87.42 ±0.00	83.77 ±0.00	88.41 ±0.00	79.47 ±0.00
Stem	48.67 ±2.00	54.01 ±0.34	50.09 ±0.09	43.56 ±0.09	43.32 ±0.00	54.00 ±0.00	50.00 ±0.11	50.86 ±0.34	51.56 ±0.00	46.76 ±0.00
Ascorbic acid	90.28 ±0.02					89.00 ±0.00				

Table 5: Anti-oxidant activity of crude extracts of different parts of *S. scutellarioides* (L.)R. Br. (var. 5)

Sample ↓	DPPH radical scavenging activity (% inhibition in mg/ml)					ABTS radical scavenging activity (% inhibition in mg/ml)				
	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract	Water Extract	Methanol extract	Ethanol extract	Acetone extract	Petroleum ether extract
Young Leaf	39.35 ±0.86	78.78 ±0.00	75.89 ±0.12	60.00 ±0.01	59.55 ±0.00	79.64 ±3.81	78.88 ±0.00	76.89 ±0.03	67.67 ±0.00	69.09 ±0.00
Mature Leaf	21.51 ±3.76	68.78 ±0.05	67.00 ±0.00	45.45 ±0.87	43.09 ±0.04	84.28 ±0.63	71.00 ±0.00	65.56 ±0.23	67.67 ±0.00	45.99 ±0.55
Inflorescence	46.30 ±0.00	55.03 ±0.00	52.65 ±0.00	40.75 ±0.00	46.44 ±0.00	69.80 ±0.00	66.42 ±1.00	69.74 ±0.00	67.41 ±0.00	61.05 ±0.90
Stem	33.45 ±0.09	30.09 ±0.09	34.45 ±0.00	23.56 ±0.00	20.00 ±0.00	48.00 ±0.09	48.00 ±0.00	45.98 ±0.12	49.45 ±0.08	32.09 ±0.09
Ascorbic acid	90.28 ±0.02					89.00 ±0.00				

CONCLUSION

The present study revealed that the selected varieties of *S. scutellarioides* (L.) R. Br. are good source of natural antioxidant which can prevent the oxidative stress in our body. Further study is needed for their antimicrobial, nutritional, antinutritional properties of these plant, which can signifies their use in our daily life.

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