



In-vitro antioxidant activity of *Solanum jasminoides* Paxt extracts

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Abstract

Three successive whole plant extracts (petroleum ether, methanol and water) of *Solanum jasminoides* Paxt were screened for their *in vitro* antioxidant activity using 2,2-diphenyl-2-picryl hydrazyl (DPPH), 2,2-azino-bis (3ethylbenzo-thiazoline-6-sulphonic acid) diammonium salt (ABTS), hydrogen peroxide, nitric oxide, hydroxyl radical, inhibition of lipid peroxidation, deoxyribose and p-NDA methods. The successive methanol extract exhibited significance antioxidant activity and hence merits further investigation.

Keywords: *Solanum jasminoides* (P.), Antioxidant activity

1. Introduction

Several studies have shown that the therapeutic effects of some medicinal plants, fruits and vegetables, which are commonly used in folklore remedies against many diseases, can be attributed to their antioxidant properties of their phytoconstituents [1, 2]. Free radicals and reactive oxygen species (ROS) are well known inducers of cellular and tissue pathogenesis leading to several human diseases such as cancer, inflammatory disorders, as well as in the aging processes [3, 4]. *Solanum jasminoides* Paxt (Family: Solanaceae) is found on the road sides Ootacamund, The Nilgiris District, Tamilnadu, India, at an altitude of 1500-2500 m. In the present investigation three successive extracts of the plant were screened for their *in vitro* antioxidant activity using standard procedures.

2. Material and Methods

2.1. Plant Material

The whole plant were collected from road side of Ootacamund, The Nilgiris forests and authenticated by the Survey of Medicinal Plants and Collection Unit, Ootacamund, India. A voucher specimen (TIFAC 03) has been deposited at J.S.S College of Pharmacy herbarium, Ootacamund, India.

2.2. Chemicals

2,2-Diphenyl-2-picryl hydrazyl (DPPH) and 2,2-azinobis (3-ethylbenzo-thiazoline-6-sulphonic acid) diammonium salt (ABTS) were obtained from Sigma Aldrich Co., St. Louis, USA. Rutin and p-Nitroso dimethyl

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aniline (*p*-NDA) were obtained from Acros Organics, NJ, USA. Naphthyl ethylene diamine dihydrochloride (NEDD) was from Roch-Light Ltd., Suffolk, UK. Ascorbic acid, nitro blue tetrazolium (NBT) butylated hydroxyl anisole (BHA) and α -Tocopherol were from SD Fine Chemicals Ltd., Mumbai, India and 2-Deoxy-dribose was from Hi-Media Laboratories Pvt. Ltd., Mumbai, India. All other chemicals used were of analytical grade.

2.3. Animals

Healthy male albino rats of wistar strain (180–220g) were obtained from the animal house, J.S.S. College of Pharmacy, Ootacamund, India. The experiments were conducted as per the guidelines of CPCSEA, Chennai, India (approval no. JSSCP /IAEC/ Ph.D / PH.Chemistry/01/2005–2006).

2.4. Extraction procedure

The whole plant was chopped to small pieces and dried in shade. The dried plant was powdered, passed through sieve no. 20 and extracted (600g) successively with 4.6 L each of petroleum ether (60–80°C), methanol and water in a Soxhlet extractor for 18–20 h.

2.5. *In vitro* antioxidant activity

The extracts were tested for their *in vitro* antioxidant activity using the standard methods, namely Scavenging of ABTS radical cation [5], DPPH radical scavenging method [6], Scavenging of hydrogen peroxide [7], Lipid peroxidation inhibitory activity [8], Nitric oxide radical inhibition assay [9, 10], Scavenging of hydroxyl radical by deoxyribose method [11], Scavenging of hydroxyl radical by *p*-NDA method [12], Scavenging of super oxide radical by alkaline DMSO method [12]. Absorbance was measured against a blank solution containing the extract or standard but without the reagents. A control test was performed

without the extracts or standards. Percentage scavenging and IC_{50} values \pm S.E.M. (the concentration of the sample required to inhibit 50% of radical) were calculated.

2.6. Statistical analysis

Results are expressed as mean \pm S.E.M. Comparisons among the groups were tested by one-way ANOVA using Graph Pad Prism. A *p*-value of <0.05 was considered significant.

3. Results and Discussion

The preliminary phytochemical investigations of the extracts reveal the presence of steroids, terpenoids, alkaloids, carbohydrates and phenolic compounds such as tannins and flavonoids, etc. The antioxidant activities obtained are given in Table 1. The data reveal that among the three successive extracts tested, the successive methanolic extract (SJM) exhibits potent antioxidant activity in DPPH, ABTS, hydrogen peroxide, inhibition of lipid peroxidation and nitric oxide radical inhibition assays with IC_{50} value of 14.24 ± 0.66 , 34.15 ± 0.41 , 130.90 ± 1.73 , 174.00 ± 1.96 and 274 ± 2.50 g/mL, respectively. The values are comparable to those obtained for the standard. However, SJM has moderate to low activity in scavenging hydroxyl radical by *p*-NDA, deoxy ribose and superoxide radical by alkaline DMSO methods. The petroleum ether extract shows poor antioxidant activity in ABTS method with an IC_{50} value of 872 ± 3.15 g/mL. It was inactive in all the other methods tested. The water extract shows good scavenging activity in ABTS method with an IC_{50} value of 61.50 ± 0.62 g/mL. In DPPH, nitric oxide, hydrogen peroxide and inhibition of lipid peroxidation assays, SJM shows moderate antioxidant activity with IC_{50} value of 280.00 ± 4.80 , 280.83 ± 2.36 , 465.72 ± 3.78 and 545.12 ± 3.81 g/mL, respectively. Water extract was, however, found to be inactive in scavenging hydroxyl radical by *p*-NDA, deoxy ribose and superoxide radical by alkaline DMSO

Table 1. *In vitro* antioxidant activity of *Solanum jasminoides* whole plant extracts

Sample	IC ₅₀ values ± SEM* (mg/mL)									
	ABTS	DPPH	Hydrogen Peroxide	Lipid peroxidation	Nitric Oxide	Deoxyribose	p-NDA	Superoxide		
SJP	872.56±3.15	779.00±2.92	>1000	>1000	>1000	>1000	>1000	>1000		
SJM	34.15±0.41	14.24±0.66	130±1.73	175.00±1.96	274.00±2.50	595.12±3.7	>1000	>1000		
SJW	61.50 ± 0.62	280.00±4.80	280.83±2.36	465.72±3.78	545.12±3.81	>1000	>1000	>1000		
Ascorbic acid	11.25±0.49	4.97±0.67	187.33±3.51	-	-	-	>1000	-		
Rutin	0.51±0.26	8.9±0.15	36.16±0.25	-	88.47±2.54	-	203.63±3.25	-		
BHA	-	-	24.75±1.53	-	-	74.66±1.49	-	-		
Á-Tocopherol	-	-	-	91.66±1.67	-	-	-	-		

* Values are mean ± SEM, n=3.

methods. In conclusion, the successive methanol extract of *Solanum jasminoides* was found to possess significant antioxidant

activity. Further work is under progress to identify and isolate the antioxidative constituents and to establish the activity in animal models.

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