



(RESEARCH ARTICLE)



Antioxidant activity of hydroalcoholic extract of leaves of *Calotropis procera*

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GSC Biological and Pharmaceutical Sciences, 2023, 22(01), 072–075

Publication history: Received on 01 December 2022; revised on 05 January 2023; accepted on 08 January 2023

Article DOI: <https://doi.org/10.30574/gscbps.2023.22.1.0011>

Abstract

Plants are reported to have anticancer, antimicrobial, anti-diabetic, anti-inflammatory and antioxidant properties. In the present study, hydroalcoholic extract of *Calotropis gigantea* was investigated for its antioxidant activity. Antioxidant activity was determined in vitro by reducing power, DPPH and nitric oxide method. Hydroalcoholic extract of *Calotropis procera* shown significant antioxidant activity. *Calotropis procera* (Asclepiadaceae) commonly known as akado and wild growing tropical plant, which possesses number of medicinal properties. It is reported to contain cardiac glycosides, β -sitosterol, madrine, saponins, alkaloids, tannins, trisecharoides and flavonols. The plant has been used for various disease conditions, including leprosy, ulcers, tumours and piles. Various pharmacological activities reported like antifertility, anti-inflammatory activity, hepatoprotective activity, antimyocardial infraction activity and antidiarrhoeal activity.

Keywords: *Calotropis procera*; Antioxidant activity; Crude extract; Disc diffusion method

1. Introduction

Calotropis procera (Sodom apple) is a member of the plant family Asclepiadaceae, a shrub about 6m high and is widely distributed in West Africa and other parts of the tropics [1]. The plant is erect, tall, large, much branched and perennial with milky latex throughout. In India, the secretions from the root bark are traditionally used for the treatment of skin diseases, enlargements of abdominal viscera and intestinal worms [2]. In Senegal, the milky latex is locally applied in the treatment of cutaneous diseases such as ringworm, syphilitic sores and leprosy. In Nigeria traditional medicine, *C. procera* is either used alone or with other herbs to treat common diseases such as fevers, rheumatism, indigestion, cold, eczema and diarrhoea [3,4].

Traditional doctors in West Africa have claimed to have successfully used the plant to cure many diseases. However, *In-vitro* anti-oxidant activity, antimicrobial activity and anti-diabetic activity of *C. procera* have not been properly documented. In this report, we provide new information on the anti-oxidant activity, antimicrobial activity and anti-diabetic activity activities of *C. procera* [5].

Calotropis procera of family Asclepiadaceae is a tropical plant growing wild in warm climate up to an altitude of about 1050 meters. It is a native plant of North Africa. This plant is well distributed throughout India, particularly it is abundantly found in Rajasthan. It also found in Pakistan, Africa, Mexico, Australia, Egypt, Central and South America and Caribbean islands [6,7].

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Latex of *Calotropis procera* is well known for cardiac glycosides and hydrocarbons [8]. The reported cardiac glycosides were Calotropogenin [9], Calotropin [10], Calotoxin, Uscharin and Calactin[11] with identification of some hydrocarbon derivatives like Linoleic acid, Oleic acid and Palmitic acid. The maximum portion of dry latex of *C. procera* extracted by acetone was 54%. During initial screening the other solvents tried were n-hexane, petroleum ether, chloroform and dimethyl sulphoxide but none of them could extract as much large part as acetone. Majority of the latex is composed of hydrocarbons therefore n-hexane part of acetone extract was concentrated for separation and identification.

2. Material and methods

2.1. Plant Collection

Leaves of *Calotropis procera* were collected from local area of Bhopal in the month of December. The plant parts were washed properly and dried in shade. Dried plant material was subjected to reduction to coarse powder using hand grinder.

2.2. Preparation of Extract

Approximately 200 g of powdered crude drugs were extracted with hydro-alcoholic solvent (70:30) by double maceration process. The macerates were filtered with muslin cloth and concentrated using rotary evaporator to avoid thermal degradation.

2.3. DPPH method

DPPH scavenging activity was measured by the spectrophotometer. Stock solution (6 mg in 100 ml methanol) was prepared such that 1.5 ml of it in 1.5 ml of methanol gave an initial absorbance. Decrease in the absorbance in presence of sample extract at different concentration (10- 100 µg/ml) was noted after 15 minutes. 1.5 ml of DPPH solution was taken and volume made till 3 ml with methanol, absorbance was taken immediately at 517 nm for control reading. 1.5 ml of DPPH and 1.5 ml of the test sample of different concentration were put in a series of volumetric flasks.

Final volume was adjusted to 3 ml with methanol. Three test samples were taken and each processed similarly (Olufunmiso and Anthony, 2011). Finally the mean was taken. Absorbance at zero time was taken for each concentration. Final decrease in absorbance was noted of DPPH with the sample at different concentration after 15 minutes at 517 nm.

$$\text{Calculation of \% Reduction} = \frac{\text{Control Absorbance} - \text{Test absorbance}}{\text{Control Absorbance}} \times 100$$

3. Result and Discussion

3.1. Results of antioxidant activity of hydroalcoholic extract of *Calotropis procera*

Table 1 % Inhibition of ascorbic acid and Hydroalcoholic extract of *Calotropis procera* using DPPH method

S. No.	Concentration (µg/ml)	% Inhibition	
		Ascorbic acid	Hydroalcoholic extract
1	10	44.65	18.35
2	20	48.62	26.47
3	40	65.34	37.66
4	60	69.65	46.74
5	80	77.41	59.24
6	100	84.13	65.55
IC50 (µg/ml)		17.68	66.28

There is increasing evidence that indigenous antioxidants may be useful in preventing the deleterious consequences of oxidative stress and there is increasing interest in the protective biochemical functions of natural antioxidants contained in herbs and medicinal plants. Antioxidant activity of hydroalcoholic extract of *Calotropis procera* was measured by free radical scavenging activity. The tested plant extract showed strong antioxidant activity in Table 1

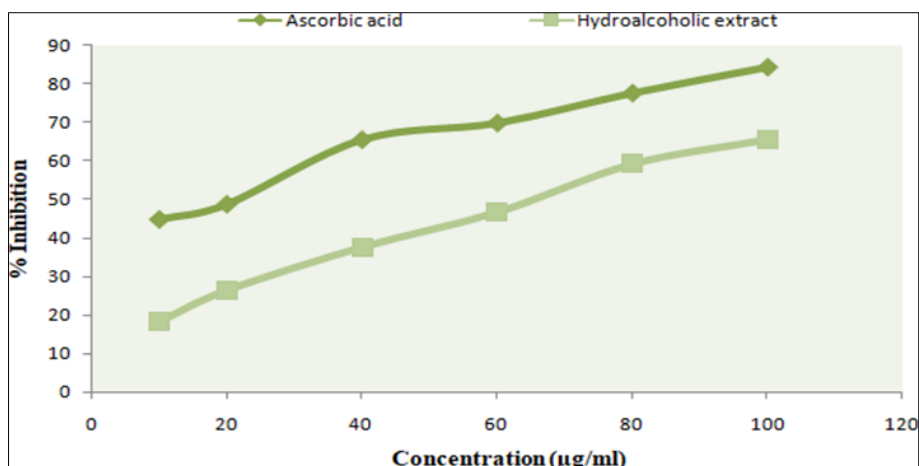


Figure 1 % Inhibition of ascorbic acid and hydroalcoholic extract of *Calotropis procera* using DPPH method

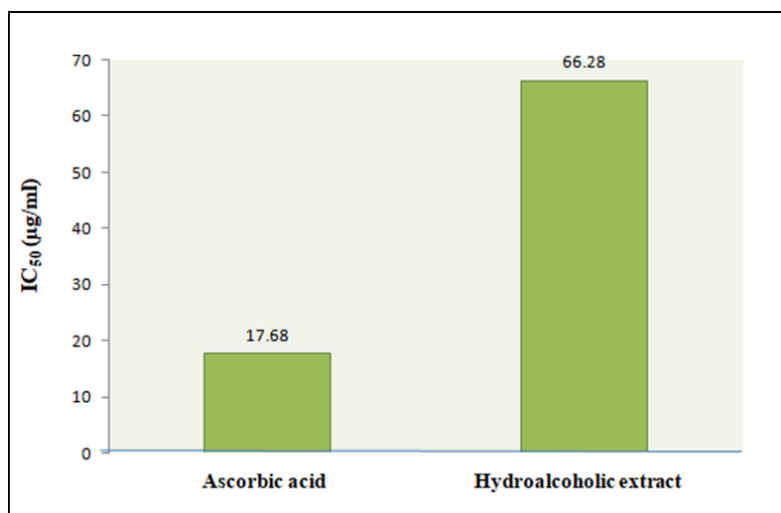


Figure 2 Comparative graph of IC₅₀ value of ascorbic acid and Hydroalcoholic extract

4. Conclusion

Medicinal plants are the richest bio-resource of drugs of traditional systems of medicine, modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs. Plants have great potential uses, especially as traditional medicine and pharmacological drugs. A large proportion of the world population depends on traditional medicine.

Table shows the results of antioxidant screening test for hydroalcoholic extract of *Calotropis procera* using DPPH method. The comparative radical scavenging effect of standard and extract is shown in Figure 2. The ascorbic acid and extract have shown dose dependent scavenging of DPPH radicals. The radical scavenging effect of standard and extracts was in the order ascorbic acid > leaves extract. IC₅₀ (µg/ml) was found to be 17.68 and 66.28 respectively.

Compliance with ethical standards

Acknowledgments

The authors are thankful to the Chairman Spectrum Group of Institutions for providing all the laboratory facilities. The authors greatly acknowledge the indispensable help received from the scholars whose articles have been cited in this manuscript.

Disclosure of conflict of interest

The manuscript has no conflict of interest.

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