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Preliminary phytochemical studies of the leaf extracts of *Rhododendron arboreum* Sm. ssp. *nilagiricum* (Zenker) Tagg

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ABSTRACT

Objective: To examine the secondary metabolites present in the leaf extracts of *Rhododendron arboreum* Sm. ssp. *nilagiricum* (Zenker) Tagg. **Methods:** Phytochemical screening of the leaf extract was done to determine the phytochemical constituents in the various solvents studied. **Results:** The phytochemical study carried out on the leaf extracts of *R. arboreum* Sm. ssp. *nilagiricum* (Zenker) Tagg. confirm the existence of secondary metabolites such as phenols, saponins and tannins. **Conclusions:** The study suggests that the leaf extracts of *R. arboreum* Sm. ssp. *nilagiricum* (Zenker) Tagg. can be best utilized in developing bioactive compounds against pathogenic infection.

1. Introduction

Nature has been a source of medicinal agents for thousand of years and an impressive number of modern drugs have been isolated from natural sources and many based on their use as traditional medicine [1–5]. Worldwide, more than 35,000 plant species have been used for medicinal purposes [6]. India and China are the leading countries enjoying major global market share in medicinal plants. India is a home to thousands of important medicinal plant species; it is ranked sixth among 12 mega diversity countries of the world having two hotspots of biodiversity [7–11]. The genus *Rhododendron*, having about 72 species, 20 sub species and 19 varieties in India, is mainly distributed in the Eastern Himalayas, while *Rhododendron arboreum* Sm. ssp. *nilagiricum* (Zenker) Tagg. is the only endemic species found in western Ghats. Apart from the aesthetic and ethnic values of *R. arboreum*

(commonly found in Eastern Himalayas), leaves were reported to contain flavonoids [12] and phenolic compounds [13] were found to have potent antioxidant [14] anti-inflammatory [15] and hepatoprotective activity [16]. Recently Kiruba et al. (17) screened the phytochemical constituents of the flowers of *Rhododendron arboreum* ssp. *nilagiricum* are found the presence of secondary metabolites including phenols, saponins, tannins and coumarins which has great medicinal importance. However, there is no report is available on the phytochemical screening of *Rhododendron arboreum* ssp. *nilagiricum* except the findings of Rangaswami and Sambamurthy [18], who reported the chemical compound quercetin from the leaves of this species. Keeping the fact in view the present study was conducted to find out the phytochemical constituents of *Rhododendron arboreum* Sm. ssp. *nilagiricum* (Zenker) Tagg. – an endemic representative of western Ghats.

2. Collection and identification of plant material

Leaves of *Rhododendron arboreum* Sm. ssp. *nilagiricum*

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Table 1Results of preliminary phytochemical screening of the leaf extracts of *R. arboreum* var. *nilagiricum*.

Phytochemical constituents	Name of the extracts					
	Acetone	Benzene	Chloroform	Ethanol	Petroleum Ether	H ₂ O
Alkaloids	–	–	–	–	–	–
Phenol	+++	++	+	+++	++	+++
Flavonoids	–	–	–	–	–	–
Saponins	–	+++	+++	–	+++	–
Protein	–	–	+	–	–	–
Quinone	–	–	–	–	–	–
Steroids	–	–	–	–	+++	–
Tannin	+++	–	–	+++	–	+++
Xanthoprotein	+	–	–	–	–	–
Carboxylic acid	–	++	+	–	–	–
Coumarins	–	–	–	–	–	–
Carbohydrates	+++	–	+++	+++	–	+++

(–) absent; (+) low; (++) average; (+++) high.

(Zenker) Tagg. were collected from Palni Hills of Western Ghats and authenticated by the botanist of the Department of Botany at Nesamony Memorial Christian College, Marthandam where the voucher specimen was deposited.

3. Preparation of leaf extracts and phytochemical screening

Prior to the phytochemical screening, the leaves of respective species were washed with sterile water to remove any associated debris, shade dried in order to prevent photolysis and thermal degradation, chopped into small pieces and ground coarsely to powder form in a mortar and pestle. For extraction of crude phytochemical, 5g of powdered leaf material was kept in closed conical flask with 20 ml of various solvents like acetone, benzene, chloroform, ethanol, petroleum ether and distilled water in a shaker at room temperature for 24 h. After incubation, the extracts were filtered through Whatman No. 41 filter paper and the extracts were collected and stored in the refrigerator at 4 °C. All the extracts were subjected to preliminary phytochemical screening as per the methods given by Harborne [19].

4. Results

The results of the findings are reported in Table 1. The phytochemical screening of the leaves of *Rhododendron arboreum* ssp. *nilagiricum* showed the absence of flavonoids, which has been reported in the leaves of *Rhododendron arboreum* ssp. *nilagiricum* yet to be studied.

5. Conclusion

The detailed survey of literature revealed that the species of *Rhododendron* exhibited anti-inflammatory, hepatoprotective, anti-diarrhoeal, antidiabetic, antioxidant properties due to presence of flavonoids, saponins, tannins and other phytochemicals. Young leaves are poisonous cause intoxication in large quantities [20, 21]. Thus the present studies, along with the previous studies, prove that *Rhododendron arboreum*, including the presently studied subspecies *nilagiricum* are having great medicinal importance. Thus, the leaves of the experimental plant could be of considerable attention to the development of novel drugs in the field of biomedicine.

Conflict of interest statement

We declare that we have no conflict of interest.

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