

BIOCHEMICAL CHARACTERIZATION OF *RHODODENDRON ARBOREUM* LEAVES FROM HIMACHAL PRADESH REGION

Pramod Rawat, Jigisha Anand, Navin Kumar and Nishant Rai^{1*}

Department of Biotechnology, Graphic Era Deemed to be University, Dehradun, India.

*e-mail : nishanrai1@gmail.com

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ABSTRACT : The increased antibiotic resistance necessitates the need to explore alternative antimicrobials and also to safeguard human health. Since centuries, medicinal plants have been known for their pharmacological effect and are being used traditionally for the treatment of numerous ailments. *Rhododendron arboreum* is economically and medicinally a very important plant variety exhibiting therapeutic properties and found wide application in treatment of various disorders. In the present study, *R. arboreum* leaves collected from Himachal Pradesh, India were subjected to extraction in 80% methanol. The percent yield of the methanolic extract of the leaves was 18.4%. The extract was subjected to solvent-solvent extraction using hexane (RAH) and ethyl acetate (RAEa) solvents. The HPLC analysis indicated the presence of quercetin in RAH and RAEa and the concentration of quercetin in both the solvent extracts were estimated in the range of $0.3 \pm 1\text{mg}$ and $0.143 \pm 1.15\text{mg}$ quercetin g^{-1} respectively. The presence of quercetin makes the leaves of *R. arboreum* an efficient antimicrobial herbal candidate with various nutraceutical and antimicrobial applications.

Key words : Immuno-modulatory, methanolic extract, phytoconstituents, Quercetin, *Rhododendron arboreum*.

INTRODUCTION

Rhododendron is a genus consisting of over 1000 species of evergreen or deciduous woody plants belonging to Ericaceae family. Most species have showy flowers. The genus *Rhododendron* is characterized by shrubs and big trees. Its common name in Hindi is Buransh and is a state tree of Himachal Pradesh. The juice of its flowers is consumed as an adaptogenic seasonal drink in Himachal Pradesh. High altitude *Rhododendron* species growing in Indo-Himalayan region is emerging as a potent immuno-modulator (Sonar *et al.*, 2013). The preliminary phytochemical analysis showed that methanolic extract consists of phytoconstituents like alkaloid, carbohydrate, glycosides, proteins and amino acid, phenolic compounds (Painuli *et al.*, 2016; Rawat *et al.*, 2017, 2018). The acetone and methanol i.e. extracts of *Sida cordata* leaves and *R. arboreum* have maximum *in vitro* anti-inflammatory and antioxidant activity (Kumar *et al.*, 2014; Painuli *et al.*, 2018). The phytochemical screening of *R. arboreum* from different parts *viz.* flowers, leaves, bark, stem and roots, showed the presence of different classes of secondary metabolites such as steroids, alkaloids, terpenoids, flavonoids, saponins, glycosides, phlobatanins, anthraquinones, reducing sugars and tannins. The

presence of these secondary metabolites indicates the therapeutic potential of *R. arboreum*.

MATERIALS AND METHODS

Collection of the leaves

The *Rhododendron arboreum* leaves were collected from Ani-Jalori bypass from Himachal Pradesh ($31^{\circ}28' 28.9524''$ N, $77^{\circ}25' 21.3852''$ E) (Fig. 1, Table 1). The collected leaves were identified by Dr. S. K. Srivastava, Scientist 'D' Botanical Survey of India (BSI), Dehradun (Accession No: 115589). The leaves were washed thoroughly under clean water and were left for drying under shade for 2 weeks. The dried leaves were then powdered in a blender and kept in zip lock bags in refrigerator at 4°C until further use.

Preparation of extract

The powdered (10gm) *R. arboreum* leaves was extracted in 80% methanol through hot percolation method using soxhlet apparatus continuously for 18 hours. The extracts were filtered through whattmann filter paper no.1, collected and concentrated using vacuum evaporator (Variac) and the percentage yield of the leaves extract was evaluated. Further, the extract was stored in the refrigerator at 4°C separately (Sindiriri *et al.*, 2013; Anand *et al.*, 2018).