**Qualitative Phytochemical Analysis of Extracts of Rhododendron Arboreum Flower Fortified with Aleovera and Ginseng.**

**1Bhasker Jyoti, 2Dr. Prity Pant, 2Dr. R.C Mishra.**

1,2Department of Agriculture

Swami Vivekananda University, NH-26 Narsinghpur Road, Sirojna,

Sagar, Madhya Pradesh. Pin: 470228

1Email:bhaskerjyotitiwari@gmail.com

**Abstract**

To evaluate the preliminary phytochemical screening of the flower extracts of
*Rhododendron arboreum* (R. arboreum) fortified with aleovera and ginseng, the
preliminary phytochemical screening was performed by the standard methods as described by Harborne. The phytochemical analysis carried out on the flowers of R. arboreum showed the presence of bioactive compounds phenols, saponins, steroids, tannin, xanthoprotein and coumarin. The present study suggested that the flower extracts of R. arboreum along with the presence of aleovera and ginseng possess significant phytochemical constituents that are rich in bioactive secondary metabolities and their incorporation in the food products can lead to have nutritionally rich functional food products.

**Keywords:** Aleovera, Antimicrobial properties, Ginseng, R. arboreum extract, Qualitative analysis.

**Introduction:**

Plants used in traditional medicine contain a wide range of bioactive compounds that can be used to treat infectious diseases [1-5]. The most important of these bioactive compounds of plants are alkaloids, flavonoids, tannins and phenolic[6-10]. Rhododendron arboreum (R. arboreum) a tree species endemic to the Kumaun region of Uttrakhand India, has ecological significance and economic importance in addition to its graceful flowers [11, 12]. The beautiful, magnificent flowers and evergreen foliage of Rhododendrons have attracted the attention of botanists and horticultural enthusiasts throughout the world. The flowers of the species of Rhododendron are considered sacred and offered in temples and monasteries [13]. Apart from aesthetic and sacred values, Rhododendrons also have medicinal and economic values. The dried flowers of R. arboreum are supposedly highly efficacious in checking diarrhea and blood dysentery [14]. The fresh and dried corolla that is acid-sweet in nature is given when fish bones get struck in the gullet [15]. The flowers of R. arboreum are used for
brewing local wine to prevent high-altitude sickness in the Darjeeling hills of eastern Himalayas. The young leaves are said to be poisonous as well as medicinal and applied on the forehead to alleviate headache [16]. Squash is also prepared from the flowers of R. arboreum. The grained wood of R. arboreum is used for making ‘khukri’ handles, packsaddles, gift-boxes, gunstocks and posts [12].Chemical analysis of the leaves of R. arboreum revealed the presence of hyperoside (3-D -galactoside of quercetin), ursolic acid and epifriedelinol, a triterpenoid compound[17]; Quercetin-3-rhamnoside a crystalline chemical compound have been reported from the flowers of this species[18]. Recently Swaroop et al[19] reported three biologically active phenolic compounds i.e. quercetin, rutin and coumaric acid in flowers of R. arboreum using high-performance thin-layer chromatography (HPTLC). Aloevera with the presence of bioactive compound, offers an explanation to show lessen blood glucose level with various useful impacts have been accounted, including immune modulatory, wound and consume mending, hypo glycaemic factor, anticancer, gastro-defensive, antifungal, and calming properties. Aloevera is a colorless gel which does not interfere with the color values of the juice; it also helps to improve nutritive, physiochemical and sensory quality the finished product by protecting off-flavor of R. arboreum juice. Ginseng is another supplement which is specifically incorporated due to its adaptogen: decreases stress by suppressing release of cortisol, Immune modulator, helps in managing menstrual discomfort, improves erectile dysfunction problems, Pre-diabetics and diabetics by glucose regulation, also increases our cognitive ability. Thus, there is no reference in the published literature to phytochemical work pertaining secondary metabolites on the flowers of R. arboreum with Aleovera and ginseng. The result of the phytochemical examination of the flowers of this plant is described in the respective communication.

**Collection of the plant material**

Flower of *Rhododendron*, grown in the Kumaon region of Uttarakhand were procured. The flower petals were cleaned and graded according to size and color and after removing the sexual organs, calyx and stalk; the petals were washed under running tap water to obtain the edible portion. This edible portion (petals) was used for further analysis.

**Preparation of flower extracts and phyto chemical screening:**

5 g of fresh flowers along with the addition of Aleovera gel and gensing as per the standardized juice extract followed in the present study. Extract was kept in closed conical flask with 20 mL of solvents (acetone, benzene, chloroform, ethanol, petroleum ether and distilled water) separately 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 40C. The flower extracts were concentrated using vacuum evaporator and dried. All the extracts were subjected to preliminary phytochemical screening as per the methods given by Harborne.

**Results**
The presence of various bioactive phytochemical constituents indifferent extracts is reported in Table 1. A total of 6 different types of extracts were prepared to test the availability of 12 biochemical compounds evident in all extracts.

**Table: 1 Results of preliminary phytochemical screening.**

***Phytochemical constituents Acetone Benzene Chloroform Ethanol Petroleumether H2O***

Alkaloids - - - - - -
Phenol +++ ++ + +++ + ++
Flavonoids - - - - - -
Saponins - +++ +++ - +++ -
Protein - - ­- - - -
Quinone - - - - - -
Steroids - + - +++ - -
Tannin +++ - - +++ - +++
Xanthoprotein +++ - - - - -
Carboxylic acid - - - - - -
Coumarins +++ - + - + -
Carbohydrates + +++ + + - -
***Number of chemical compound in each extracts*** 4 4 5 5 4 2

**Conclusion**
Since ancient times, plants has been used to cure various ailments caused by microorganisms [21-26]. Moreover, the potential of high altitude plants as a source for new varietal energy drink is still largely unexplored. There is an abundant medicinal plant throughout the world but only small amounts are investigated for its biological activity and its incorporation in the food products of our day to day life [27-29]. Nevertheless, today there is a wide range of medicinal plant parts which include the flowers, leaves, stem, fruits and root extracts are used as powerful raw ingredients for its value addition in our food products, possessing a variety of antimicrobial and healing properties. The phytochemical screening of the flowers of R. arboreum showed the presence of

secondary metabolites including phenols, saponins, tannins and coumarins which has great medicinal properties and has a tremendous scope of its value addition in the food products. In addition, there are several reports to show Rhododendron species for having potent antimicrobial chemicals [30-32]. Moreover, several species of Rhododendron has been widely used as main ingredient in traditional medicine. Hence, the presently studied R. arboreum flower extract could be of considerable interest for the development of new medicinal drink having therapeutic properties. However, further research is required to isolate the bioactive principle of this plant as well as further studies on its bioavailability of these compounds in human body.

**Conflict of interest statement**

We declare that we have no conflict of interest.

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