

## ***Rheum Australe*: An Endangered High-Value Medicinal Herb of North Western Himalayas**

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The demand for medicinal plants has increased globally because of wide interest and acceptability in herbal medicines. Most of the demand is being met through collection of large quantity of medicinal plants and plant part from wild populations. However, the methods of collection of medicinal plants are not well refined and not organized. As a result, the rates of exploitation may exceed those of local natural regeneration and the natural habitat is depleting at a faster rate. The Himalayan region of India is a rich reservoir of biological diversity. This region has many high value medicinal herbs, has a rich local tribal tradition of herbal medicine. Most of medicinal plants, even today, are collected from wild. The continued commercial exploitation of these plants has resulted in receding the population of many species in their natural habitat. Vacuum is likely to occur in the supply of raw plant materials that are used extensively by the pharmaceutical industry as well as the traditional practitioners. Paradoxically, 90% of them are collected from wild sources (forest) and only meagre minority is sustainably produced and harvested through cultivation. Furthermore, 70% of such collection involves destructive harvesting, wherein roots, barks, twigs, flowers, leaves, fruits, seeds and whole plants (in case of herbs) are collected for use in herbal drugs. Current estimates by the Threatened Plants Species Committee of the Survival (TPSSC) of IUCN indicated that 1 in 10 species of vascular plants on earth is endangered or threatened due to commercial exploitation and increasing international trade. It has been pointed out that nearly 60,000 plant species may be in danger of extinction leading to gene erosion during the next 30-40 years. The Himalaya covers 18% of the Indian sub continent and accounts for more than 50% of Indian forest and contains 405 of India's endemic species

*Rheum australe* is one of the important high value species, which has huge economic potential, being used in pharmaceutical industries and due to heavy anthropogenic pressure, its natural population is threatened, which in turn has affected the natural regeneration. *Rheum*

*australe* is a high altitude endangered medicinal plant commonly known as Revandchini belongs to family Polygonaceae. The roots of the plant contain number of anthraquinones derivatives consisting of emodin, emodin 3-monoethylether, chrysophanol and rhein. Roots are purgative, astringent, tonic, stomachic and aperient. The petioles are pickled; powdered roots are used for cleaning the teeth and sprinkled over ulcers for quick healing. It is of special use for infant's stomach problems. It has been found as potent anti-inflammatory drug .Due to these properties, the species has excessive demand, which leads to illegal exploitation from natural habitat, resulting in habitat destruction.



*Rheum Australe*

The history of rhubarb dates back to ancient China and the Mediterranean region as a highly popular laxative drug and a general tonic. Indian rhubarb is used as purgative and astringent tonic; its stimulating effect combined with aperient properties renders it especially useful in atonic dyspepsia. Powdered roots are sprinkled over ulcer for healing and also used for cleaning teeth. Leaf stalks are eaten either raw or boiled, sprinkled with salt and pepper. Leaves and flowers are also edible; Rhizomes roots are purgative, astringent, tonic, stomachic and aperient. The petioles are pickled. Powdered roots in action are aperient, astringent, diuretic

emmenagogue, expectorant, purgative stomachic and tonic. It is of special use for infant's stomach problems. Root is regarded as a panacea in local home remedies and is used in stomach problems, cuts, wound and muscular swellings, tonsillitis and mumps. It has been found as a potent anti-inflammatory drug. It is used in preparation of lavangabhaskar -churna, Ghuttis, Gripe water and several anti-diarrheal and anti-dysenteric preparations.

### **Agro-techniques**

The study was conducted to determine the seed germination and growth behavior of *Rheum australe* under different field conditions viz., open, glass house and shade net house and different time of sowings at lower altitude of 1250 m of mid hill conditions of Himachal Pradesh. Seeds were harvested during October month from different natural ecological zones of Himachal Pradesh. Seed germinability was tested in the mixture of soil+sand+vermicompost+cocopeat (2:1:1:1). The experiment was carried out for two years with three replications. The results revealed that maximum seed germination, seedling emergence, seedling shoot and root length, was recorded under shade net house conditions in soil + sand + vermicompost+cocopeat (2:1:1:1) media, when the seeds were sown during November month. The experiment was conducted under different planting densities in Himachal Pradesh. The plants raised in polybags at experimental farm Nauni, Solan Himachal Pradesh were transplanted at Forestry Research Sub-Station, Rahla (Manali) Himachal Pradesh at different spacings. Maximum plant height (33.41 cm) was recorded in (60×60cm), spacing however, maximum above ground biomass (37.28 g plant<sup>-1</sup>) and below ground biomass (40.22g plant<sup>-1</sup>) was recorded in (60×90cm) spacing after 36 months. The spacing of 60×60 cm resulted in significant increase in estimated underground biomass yield (9.90 q ha<sup>-1</sup>) (Bhardwaj et al., 2020).

### **Phytochemical Constituents**

The drug contains a number of anthraquinone derivatives based on emodin, emodin-3-monomethyl ether, chrysophanol, aloe emodin and rhein. These occur free and as quinone, anthrone or dianthrone glycosides. The astringent principle consists chiefly of gallic acid, present as glucogallin, together with small amounts of tannin and possibly catechin. Glucogallin on hydrolysis yields gallic acid and glucose. The drug also contains cinamic and rheinolic acids, volatile oil, starch and calcium oxalate Emodin, rutin, chrysophanol and

chrysophenic acid are the four chief active constituents of rhubarb. Among these chrysophanol is found in a higher concentration.

Indian Rhubarb, which is official in the Indian Pharmacopoeia, consists of the dried rhizomes of *Rheum emodi*. The major phytoconstituents reported to have been isolated from the rhizomes are: free anthraquinones and their glycosides. The anthraquinones, both with and without carboxyl groups are found in *Rheum emodi*. Anthraquinones with carboxyl group include rhein, while those without carboxyl group include chrysophanol, aloë-emodin, emodin, physcion (emodin monomethylether), chrysophanein and emodin.

### **Conclusion**

The habitat specificity and overexploitation for herbal drug preparations have made *R. australe* to figure prominently among endangered plant species. Effective measures must be taken to preserve the dwindling wild populations of this plant species. Cultivation techniques should be formulated for effective and sustainable utilization of the plant at commercial scale.