

Review

Dactylorhiza hatagirea: A high value medicinal orchid

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The family Orchidaceae, best represented by the species *Dactylorhiza hatagirea* (D. Don) Soo, is known worldwide for its manifold uses. It is widely used to cure various diseases like dysentery, diarrhoea, chronic fever, cough, stomachache, wounds, cuts, burns, fractures, general weakness, etc., and widely used in modern medicine. Therefore, an attempt has been made to assess the medicinal potential of the species both in traditional as well as in modern medicine system. These properties are supposed to be cured by different active compounds present in the plant. This paper provides the relevant information about medicinal properties of the high value medicinal orchid.

Key words: *Dactylorhiza hatagirea*, orchid, medicinal potential.

INTRODUCTION

Dactylorhiza hatagirea (D. Don) Soo belongs to the family Orchidaceae. The plant is native and near endemic to Indian Himalayan region (Badola and Aitken, 2003; Samant et al., 1998; Ved et al., 2003). Its distribution extends to Pakistan, Afghanistan, Nepal, Tibet and Bhutan. In India, it is reported from Jammu and Kashmir, Sikkim, Arunachal Pradesh, Uttarakhand, Himachal Pradesh (Samant et al., 2001; Dhar and Kachroo, 1983; Aswal and Mehrotra, 1994; Hajra and Balodi, 1995). Generally, it is widely and narrowly distributed at an altitudinal ranges between 2500 to 5000 m amsl in open grassy slopes and alpine meadows (Bhatt et al., 2005). It is commonly known as panja, salam-panja, hath-panja or hatajari in Uttarakhand; salem panja in Kashmir and wanglak or angulagpa in various parts of Ladakh. Generally, the plant is a perennial herb, up to 60 to 70 cm in height, having palmately lobed, divided root tubers with broadly lanceolate leaves arranged more or less along the stem and purple flowers, but some time white (Figure 1).

MEDICINAL USES

Chemistry

The plant tubers of *D. hatagirea* contain a glucoside, a

bitter substance, starch, mucilage, albumen, a trace of volatile oil and ash (Dutta and Karn, 2007). Chemically, dactylorhins A to E, dactyloses A and B and lipids, etc., are found as major constituents.

Pharmacological activity

According to Ranpal (2009), rhizomatous part of *D. hatagirea* has shown resistance against all Gram positive and Gram negative bacteria, but its aerial part has shown limited resistance against some bacteria. Zonation of inhibitions (ZOIs) between the two parts of *D. hatagirea*, the rhizome part is more effective than the aerial part against all tested organisms, except *Escherichia coli*. Further, it is interesting to note that *E. coli*, one of the very resistant bacteria to synthetic drugs, was found to be very susceptible to the extract of this plant. This finding is distinctive from the folkloric uses *D. hatagirea*. Hence, this plant can be a potential source for evolving newer antimicrobial compounds for treating dysentery caused by *E. coli*.

As per Thakur and Dixit (2007), the herb shows the effectiveness in improving and preventing the functionality of sexual organ and may be helpful in improving the sexual behavior and performance also. The results also corroborate the hype that the plant is capable of being nominated as herbal cure for sexual dysfunction. There is also, sufficient evidence that the plant increase testosterone level in adult male rats. Clinical data on

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Figure 1. The plant of *D. hatagirea*.

testosterone also suggest that a slightly increased level of testosterone in adult males results in an increased sexual desire and arousability (Bancroft, 2005).

INDIGENOUS USES

Since the time immemorial, this species is used in various Indian medicine system, that is, Ayurveda, Siddha and Unani, and also, in some Traditional medicinal systems, that is, Amchi medicinal system. It is widely used to cure dysentery, diarrhoea, chronic fever, cough, stomachache, wounds, cuts, burns, fractures and general weakness, particularly in debilitated women after delivery and to increase regenerative fluids. Tubers of *D. hatagirea* are rich in starch, mucilage, sugar, phosphate, chloride and glucoside-loroglossin (CSIR, 1996). In Uttarakhand *D. hatagirea* is also used in bone fracture (Kala et al., 2004). The tubers of *D. hatagirea* are known to yield a high quality 'Salep' which is extensively used in local medicine as nervine tonic for its astringent and aphrodisiac properties (Vij et al., 1992; Lal et al., 2004; Baral and Kurmi, 2006). This is also well supported by our survey conducted in Ladakh, where high quality of 'Salep' is used as farinaceous food, expectorant, aphrodisiac and as nervine tonic. Local inhabitants collect

the roots, dried and then grind it and take with milk to increase vigourness. Besides its medicinal importance, salep obtained from the tubers of *D. hatagirea*, is used as a sizing material in silk industry.

CONSERVATION STATUS

D. hatagirea has been categorized as critically endangered species (CAMP status), critically rare (IUCN status) and is listed under Appendix II of CITES (Kala, 2000; Samant et al., 2001). Besides these, being an orchid, *Dactylorhiza* can be considered inherently slow growing and poorly regenerating species, because of pollinator specificity and requirement for mycorrhizal association (Bhatt et al., 2005). Due to its high medicinal and edible value, the species has great demand in national and international market (Badola and Pal, 2002; Olsen and Helles, 1997). Furthermore, extraction of the raw material from its wild population is the only source for meeting the market demand. According to a report, the annual demand of this species is approximately 5000 tons (Kala, 2004). This leads to over-exploitation of the species from wild. Local inhabitants collect this high value medicinal plant for illegal trading. The local inhabitants could collect Rs. 100 to 200 per kg of dried roots of

D. hatagirea. For 1 kg of dried roots, 90 to 100 mature plants are exploited. As a result, so many areas are there where *D. hatagirea* is present in abundance, but now, a few individuals of this species are seen. This indicates that if the casual factors continue to operate, this species may become extinct within a few years.

During the survey, it was also observed that local inhabitants carry their livestock in the higher regions of the valley for grazing. This is another level of disturbance, because due to the grazing and trampling, the underground part of the *D. hatagirea* get exposed or removed. These levels of disturbances, like grazing pressure, over exploitation and unawareness of proper procedure of collection and propagation, etc., are the other major factors for declining this species from its natural habitats.

CONCLUSION

D. hatagirea is generally used as nervine tonic for its astringent and aphrodisiac properties, and it is widely used to cure dysentery, diarrhoea, chronic fever, cough, stomachache, wounds, cuts, burns, fractures and general weakness, particularly in debilitated women after delivery and to increase regenerative fluids. Recent research shows a promising result against *E. coli* and clinical trial shows that the herb is also used to increase testosterone level and also help to increase sexual desire. The main aim of this article is to focus on the medicinal potential of such dawdling medicinal orchid and suggest that future research should be conducted in a manner to keep in mind the properties of such wonder herb, while analyzing/isolating/characterizing the active principle(s) compounds present in it. In the same time, we should also try to identify the active compound responsible for each and every property, and identify if they act singly or in combination with other compounds present in the wonder herb. Furthermore, keeping in view the demand and status of this species, it is necessary that further research is needed to overcome these problems and also to promote cultivation, propagation, awareness and conservation of this species through people participation and of course through various conservation methods like, *in-situ* and *ex-situ*.

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