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Review Article

Medicinal Uses and Conservation Status of *Aconitum violaceum*

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ABSTRACT

Aconitum violaceum Jacq. ex Stapf belonging to family Ranunculaceae is an important medicinal plant of Himalaya regions. Its medicinal potential is due to the presence of pharmacologically active compounds such as At, aconitine, benzoic acid, aconine and flavanoids. This plant has notable antioxidant, anti-inflammatory, and analgesic properties. Traditionally, this plant is used for the treatment of asthma, cough, neural disorders, cardiac diseases as well as for curing sciatica and joint pain. Due to remarkable medicinal values and commercialization, this plant is threatened, and it is at high risk of extinction. Conservation practices and management techniques should be carried out to protect this important plant from extinction. Recent biotechnological approaches will be quite helpful for its conservation.

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INTRODUCTION

A From the antiquated circumstances, the general population are depending on therapeutic plants for curing their infirmities. History of restorative plants is as far old as mankind's history. From hundreds of years, the historical backdrop of drug store and pharmacognosy is interlinked. Home grown medications are used worldwide for the treatment of extensive variety of sicknesses, so restorative plants assume urgent part in world wellbeing. In spite of extraordinary headway in present day meds, individuals are as yet reliant on plants for medicinal services. It is approximated that right around 25 % of whole current prescriptions are straightforwardly or by implication got from plants. Restorative plants indicate appropriation worldwide, yet they are richer in tropics. As per World Health Organization, 60%– 80% population of developing countries rely upon plants for their essential human services. From the most recent decades, the utilization of

therapeutic plants turns out to be popular to the point that numerous vital plants are in danger of extinction due to overuse. Variety *Aconitum* of family Ranunculaceae has various pharmacologically imperative gatherings of blossoming plants. These species are rich in the high region of Central Himalaya depicted to the rate of very nearly 90 species. The *Aconitum* plants are circulated extensively everywhere throughout the calm snowcapped districts of world. *Aconitum violaceum* Jacq. ex Stapf (*A. violaceum*) is an ethnomedicinally essential plant of Himalaya district. It has gigantic therapeutic potential in light of the nearness of a few alkaloids and flavonoids. Because of overexploitation, this plant is confronting' termination issue. It is pronounced as undermined plant species (Abott, 2005; Hou and Jin, 2005; Miana *et al.*, 1971; Khan *et al.*, 2013).

Habitat

A. violaceum is called as violet monkshood in English.

Mithatelia, Telikachnag and Tilla in Hindi. This plant demonstrates wide distribution on elevated fields of Central Himalaya. This species develops in rhododendron woods edges, icy riverine woodland fringe and rough sodden territories, open verdant elevated slants, shady damp snowcapped inclines, high dry scour, wet rocks, Quercus-Abies timberland outskirts and combined with Carex nubigena-Kobresia duthiei groups. It develops on inclines in an elevation scope of 3600– 4800 m. It has an age length of one year (Yadav and Verma, 2010).

Taxonomic Description

Aconitum violaceum belongs to family Ranunculaceae. Plant species is a little herb and its paired tubers with

1– 1.5 m in stature which bears thick spike of numerous dull or light blue blossoms. Stem (tallness of 10– 30 cm), is glabrous (bushy). Leaves with long petioles are available in type of a thick bunch close to the base and barely at any point similarly spread over the entire length, intense or sub-heartless tip, glabrous. Size of upper leaves is highly lessened. Inflorescence is thick and raceme is straightforward. Sepals are pubescent, violet, once in a while blue or yellowish green with blue veins. Petals (nectaries) are bushy with truncate recurved lips and hood is gibbous dorsally. Filaments are bristly in the upper however winged in the lower part and these wings end in small teeth (Narayana *et al.*, 2001).



Figure 1. *Aconitum violaceum* Jacq. ex Stapf.

Active Constituents

A. violaceum contains tisane and indaconitine. Both can be essentially separated from each other. It additionally contains diterpenes, flavonoids, unsaturated fats, aconitine, indaconitine and polysaccharide, for example, starch. The restorative properties of this plant are ascribed because of the nearness of aconine, benzoicacid, sparteine, tannins, and tars. The roots contain 4.3 % indaconitine, aconitic corrosive and starch (Miana *et al.*, 1971; Braca *et al.*, 2003).

Biotechnological Approach

Present day biotechnological methods have been utilized

to assess the impacts of various development controllers on aberrant shoot organogenesis and extraordinary auxiliary metabolite creation in *A. violaceum*. Callus culture and section chromatography are used for this reason. Plant development controllers, for example, 2, 4-dichlorophenoxyacetic corrosive (2,4-D) and kinetin improve the recurrence of callus generation for circuitous recovery. 6-Benzyl aminopurine uncovered noteworthy impacts advancing shoot recovery and a critical auxiliary metabolite generation. Cytokines are development factor and they additionally indicate fixation subordinate impacts of optional metabolite generation. Besides, auxin-cytokine communications additionally improve

roundabout shoot recovery and the manufacture of optional metabolites (Rawat *et al.*, 2013).

Medicinal uses

Distinctive ethnic gatherings, for example, Darmese, Martolia and Bhotiasand Johares of Himalayan locale use *Aconitum* species for the treatment of asthma, neural disorders, hack and incendiary and cardiovascular ailments. Numerous types of *Aconitum* which are local to Europe subcontinent have been conceivably used to cure neuralgia, antiulcer, gout, stiffness, and cardiovascular disappointments. *A. violaceum* has wealthy auxiliary metabolites presented with captivating natural exercises because of the nearness of C19 and C20 diterpenoid, alkaloid, flavanol, kaempferol, acylated flavanol glycosides and glycosides of quercetin (Khan *et al.*, 2013). Rough concentrates of underground parts of the plant procure pain relieving and antipyretic properties and are customarily answered to cure renal pain allergy, high fever, stiffness, wounds, bubbles, and edema. Because of clean properties, this plant is very helpful in the treatment of scorpion and snake nibbles. The plant remove can possibly cure stomach related disarranges including aggravation of the digestive organs, infectious diseases, and scatters of irritate bladder also. Tubers of the plant contain aconitine, which is a neurotoxin, so this plant is useful in enhancing cerebrum work and can cure numerous neurological issues. Plant tubers are in addition utilized for the treatment of tonsillitis and sore throat, debility, and gastritis on the grounds that these are calming and hostile to oxidative. Hostile to proliferative movement of this plant has additionally been accounted for considering its alkaloids against human tumor cell lines, colon and ovarian adenocarcinoma. Half teaspoon root extricates two times every day goes about as tonic, used to treat fever and furthermore for the treatment of heart ailments. Root powder is utilized as a part of easing sciatic torment since it has pain relieving properties (Bhattarai *et al.*, 2010).

Toxic effects

Wild utilization of this plant prompts dangerous impacts because of misidentification, corruption, miss-handling, and defilement. Harmful side effects show up quickly inside 20 to 30 min. The fingers and toes happen bothersome or consuming sensation took after by chills and sweats. Vast amount utilization causes paresthesia (feeling of dryness and harshness in the mouth), absence of the sensation and feeling of extreme icy, colicky

looseness of the bowels, heart musicality unsettling influences, rough heaving, skeletal muscle loss of motion and serious torment. Ventricular arrhythmias and cardiovascular breakdown are the significant reasons for death in aconite harming. In Rasa Vagbhata, eight phases called "Asta-vegas" of aconite harming are accounted for. Changes in skin shading took after by tremor, consuming sensation on whole body, rises from mouth, vikratavastha, hanging of shoulders, senseless lastly passing. By the by, *Aconitum* lethality can be reduced by utilizing assorted strategies previously utilizing it for pharmacological viewpoints. Novel methods and methodologies ought to be utilized for toxicological and concoction examination to enhance its security and in addition quality (Nyirimigabo *et al.*, 2015).

Conservation and management

A. violaceum is abundantly collected due to its tubers. Lamentably, it has been induced and observed that the slant of unsustainable gathering practice is proceeding. Induction is drawn by watching the decrease in zone of inhabitation and environment quality in light of studies and fortuitous confirmation. This plant species has a significant market request inferable from its business use as a plant medicate that is the reason the level of its abuse is very high. It was all in all concurred by specialists that over 40% of the wild populace in the Indian area had declined over the past 10 years. This species was surveyed as powerless in protection evaluation and administration prioritization workshop at Shimla in 2003. This plant is endemic to Himalayan area of Northern Pakistan to Jammu and Kashmir, Himachal Pradesh in India and stretching out up to Nepal. The prevalence of the wild populace is in Indian Himalaya. The present circumstance of species in India is judged as illustrative of the overall populace of the species. This specific plant species is undermined because of territory misfortune and over misuse. It needs quick thought as far as dealing with its environment and additionally feasible gathering rehearses. Dynamic in situ protection ought to be in these territories, where a portion of the subpopulations are available. Observing and reviewing need directly through the known memorable scope of the taxon to decide the states of every single recorded subpopulation. Serious examinations on populace slant, spread procedures and conceptive science must be done to maintain preservation activity programs. In prior circumstances, this plant was utilized to get ready natural

definitions by nearby individuals in minute amounts. Presently, commercialization of plant-based medications lately has supported the request and significant misuse of this plant. The over-the-top gathering and absence of sorted out development prompt the enormous consumption of characteristic germplasm of this restoratively critical plant species. Thus, current biotechnological systems must be received to shield this regular germplasm from annihilation to satisfy the rising interest of the plant material. In vitro spread methods have contributed outstandingly to the advance of pharmaceutical industry over the previous decades in a various of ways including varietal development. The use of in vitro systems for quick mass proliferation assumes a key part in recuperation of jeopardized species, in result beating the danger of extinction (Nadeem *et al.*, 2001). Another procedure of protection is cryo-stockpiling or ordinary stockpiling of imperative plant species under in vitro condition to save germplasm. Another normal system of in vitro capacity is the usage of alginate epitome of explants to create engineered seeds (Mishra *et al.*, 2011; Rihan *et al.*, 2011).

CONCLUSIONS

Aconitum violaceum demonstrates wide dissemination on high fields of Central Himalaya. In customary prescription framework, this plant is utilized for curing numerous sicknesses, for example, hack, cardiovascular infections, neural disorders, neuralgia, articular torment, gout, stiffness, and heart disappointment also. For the most part root and tubers of the plant are restoratively used in natural details. Dynamic constituents of this plant incorporate atisine, indaconitin, aconitine, indaconitine, flavonoids, starch, sparteine, tannins, tars, benzoic corrosive and aconitic corrosive. Wild utilization of this plant prompts lethal impacts because of misidentification, corruption, miss-handling, and tainting. Dangerous side effects show up quickly inside 20 to 30 min. Due to over misuse, this plant is confronting danger of eradication. Present day biotechnology systems, for example, cryo-capacity and solidifying of whole plant and manufactured seeds can assume imperative part in security, administration, and protection of this plant. As it is endemic to a topographically restricted piece of the Himalayas so living space administration hones is likewise received for the preservation of this valuable plant.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

AUTHORS CONTRIBUTIONS

All the authors contributed equally to this work.

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