https://doi.org/10.33472/AFJBS.6.8.2024.1960-1968

African Journal of Biological Sciences

Mahameda (*Polygonatum cirrhifolium* (Wall) Royle): An Important Astavarga Plant from Indian system of medicines

Aditi Rawat[1*], Nidhi Singh[2*], Puja Pal[3*], Sakshi Chavan[4*], Samiksha Admane[5*], Unnati Sharma[6*], Vikas Sharma[7], Geeta Bhandari[8], Archna Dhasmana[9], Vikash S Jadon[10]

[1,2,3,4,5,6,7]Department of Molecular Biology and Genetic Engineering, School of Bioengineering & Biosciences, Lovely Professional University, Punjab, India
Himalayan School of Biosciences, Swami Rama Himalayan University, Jollygrant, Dehradun, Uttarakhand, India-248016,
[10*]Professor, Department of Molecular Biology & Genetic Engineering, School of Bioengineering and Biosciences, Lovely
[7*]Professional University, Phagwara-Jalandhar, India Email: biotech_vikas@rediffmail.com
Himalayan School of Biosciences, Swami Rama Himalayan University, Jollygrant, Dehradun, Uttarakhand, India-248016

***Correspondence Author:** Dr. Vikas Sharma, Dr Vikash S Jadon
*Professor, Department of Molecular Biology & Genetic Engineering, School of Bioengineering and Biosciences, Lovely Professional University, Phagwara-Jalandhar, India Email: biotech_vikas@rediffmail.com
*Himalayan School of Biosciences, Swami Rama Himalayan University, Jollygrant, Dehradun, Uttarakhand, India-248016

Article History
Volume 6,Issue 8, 2024
Received:26 Apr 2024
Accepted : 09 May 2024
doi: 10.33472/AFJBS.6.8.2024.1960-1968

ABSTRACT

The Himalayan region is one of the major biological hot spot in the world rich in medicinal and aromatic plants (MAPs). *Polygonatum cirrhifolium* (Wall) Royle is an herbaceous medicinal plant found in the Himalayan region. *P. cirrhifolium* (Wall) Royle; locally known as Mahameda, belongs to a group of eight medicinal plants known as "Astavarga". Whole plants and especially rhizomes and seeds are rich in important bioactives like triterpenoid saponin, steroidal saponins, flavonoids, and phytosterols owing to its immense medicinal properties. These bioactive have been reported in treating various diseases such as bronchitis, TB, leprosy, urogenital edema, cough, worms, menstrual irregularities, etc. *P. cirrhifolium* (Wall.) Royle is classified as an endangered medicinal plant species, due to habitat fragmentation, poor seed germination, high anthropogenic pressure for trade, and unscientific collection from the wild. Both *in-situ* and *ex-situ* conservation measures are needed for maintaining its natural populations. *P. cirrhifolium* (Wall.) Royle might be explored to discover other therapeutic components by means of isolating noble compounds, characterization of those components, and their organic assessment. It can also be suggested that the population of endangered plants with superior medicinal value can be used for conservation prioritization and management planning of these species. Among all "Astavarga" plants, *P. cirrhifolium* (Wall.) Royle is the least explored scientifically. Therefore, this current review article mainly focuses on the geological distribution along with the medicinal properties of *P. cirrhifolium* and their therapeutic uses.

Keywords: *Polygonatum cirrhifolium* (Wall) Royle; Astavarga; Endangered; Medicine; Conservation; Bioactives

Introduction

The Himalayan region is enriched with various endemic medicinal and aromatic plants among which *Polygonatum cirrhifolium* (Wall) Royle is an important one [Rawal et al. 2013]. Plants growing in the Himalayan region, are rich sources of natural antioxidants, anti-inflammatory and antibacterial substances. *Polygonatum cirrhifolium* (Wall.) Royle is one of those plants that have been reported as endangered and vulnerable, found mostly in India, Bhutan, Nepal, China, and Pakistan [Singh et al. 2018; Lohani et al. 2011]. *P. cirrhifolium* (Wall.) Royle is generally considered a sciophyte and grows on the slopes of hills as well as oak-Rhododendron forests [Suyal et al. 2019]. *P. cirrhifolium* is a tall perennial rhizomatous, high-value Himalayan medicinal herb; commonly known as 'Mahameda'. The height of this plant species varies between 30-120 cm. The leaves of *P. cirrhifolium* have coiling at their ends thus it is also called "Coiling Leaf Solomon".

India has a very long, safe, and continuous usage of healthcare systems via Ayurveda (literal meaning "the way or science of life") that has about 700 types of plants listed in its medicinal systems which are recorded in the literatures such as Vedas and Samhitas [Meena et al. 2009]. In recent times global populations are showing faith in herbal ayurvedic and plant-based products because of their natural origin and claim to be safer than other chemical products and modern systems of medicines like allopathy. The plant *Polygonatum cirrhifolium* belongs to a group known as Astavarga. 'Paryayaratnamala' was the first ancient textbook where the word "Astavarga" ('Ashta' means eight and 'Varga' means group) was used [Joshi et al. 1983]. In Ayurveda, the name 'Astavarga' means a group containing eight medicinal plants, Mahameda [*Polygonatum cirrhifolium*], Meda [*Polygonatum verticillatum*], Jeevak [*Crepidium acuminatum*], Ridhi [*Habenaria intermedia*], Vriddhi [*H. edgeworthii*], Rishvak [*Malaxis muscifera*], and Kakoli [*Roscoea procera*], Kshirakakoli [*Lilium polyphyllum*]. These astavarga plants are well recognized for improving vitality, enhancing cell regeneration potential, and strengthening immune responses [Shah et al. 2006; Singh et al. 2006; Dhyani et al. 2010].

The plant *P. cirrhifolium* contains various phytochemicals compounds including phenolics, alkaloids, phytosterols, flavonoids, tannins, triterpenoid saponins, and steroidal saponins [Dhyani et al. 2010; Horng et al. 2014]. Rhizome, seed, and sometimes the whole plant have been reported for medicinal purposes to treat skin diseases, lung infection, tuberculosis, menstrual problems, sexual debility, cough, leprosy, worms, gout, and high fever [Balkrishna et al; 2012]. The rhizome possesses some medically important secondary metabolites with potential pharmacological activities such as antioxidant, hypoglycemic, antifungal, antibacterial, cardiotonic, and demulcent [Suyal et al. 2021]. Due to habitat fragmentation, poor seed germination, high anthropogenic pressure for trade, and unscientific collection of plant materials, this medicinal herb is becoming endangered from its natural habitats [Suyal et al. 2021]. Conservation strategies; *in-situ* and *ex-situ* are needed to be implemented with a particular focus on the tissue culture of elite genotype to increase genetically authentic and superior plantlet production to maintain the existence of this endangered species [Shah et al. 2006].

Habitat and Distribution

The Himalayan plant *Polygonatum cirrhifolium* (Wall.) Royle has been designated as endangered by the International Union for Conservation of Nature and Natural Resources (IUCN). India has the most extensive traditional and local knowledge of medicinal plants in the world. One of the mega-biodiversity hotspots on earth is the Himalayas [Heywood et al. 2000]. The Eastern Himalayan area specifically is referred to as the "Cradle of Flowering Plants" and has more than 400 different varieties of medicinal plants. The region's impressive range of diverse plant species is mostly a

result of geographical characteristics like climate, altitude, ecology, and topography which is an essential part of growth and development of plant species like *Polygonatum cirrhifolium* (Wall.) Royle. It is found in temperate Himalayan region along with Himachal Pradesh, Sikkim as well as in some regions of Manipur. Mahameda plant is also found in southeast part of Nepal where is it regarded as 'Vani meda.'

To understand the status, the study area conducts a population evaluation of the species for the Uttarakhand Himalaya. The state of Uttarakhand is situated between 28° 53' 24" and 31° 27' 50" north latitude and 73° 34' 27" and 81° 02' 22" east longitude. It has a 55,672 km2 area and makes up 9% of IHR. The present study was composed of five sites such as Chaubattia, Jageshwar, Abbott Mount, Kilbury, Milam, Thanidar and Dunagiri in the Kumaun division. And other five sites were present such as Bharsar, Binsor, Bhavisya Badri, Dayara, and Tangnath in the Garhwal division.

Due to concerns about their ecology and conservation, more and more attention has been given to the diversity of medicinal plants in recent years [Dhar et al. 2000]. The Himalayas' temperate to altitude areas are the source of at least 90 percent of the overall species of plants used in the medicinal business today. *Dactylorhiza hatagirea, Berberis Sp., Aconitum heterophyllum, Nardostachys Grandiflora, Paris polyphylla*, and *Polygonatum cirrhifolium* are several dominant plants that can be connected to their natural habitats.

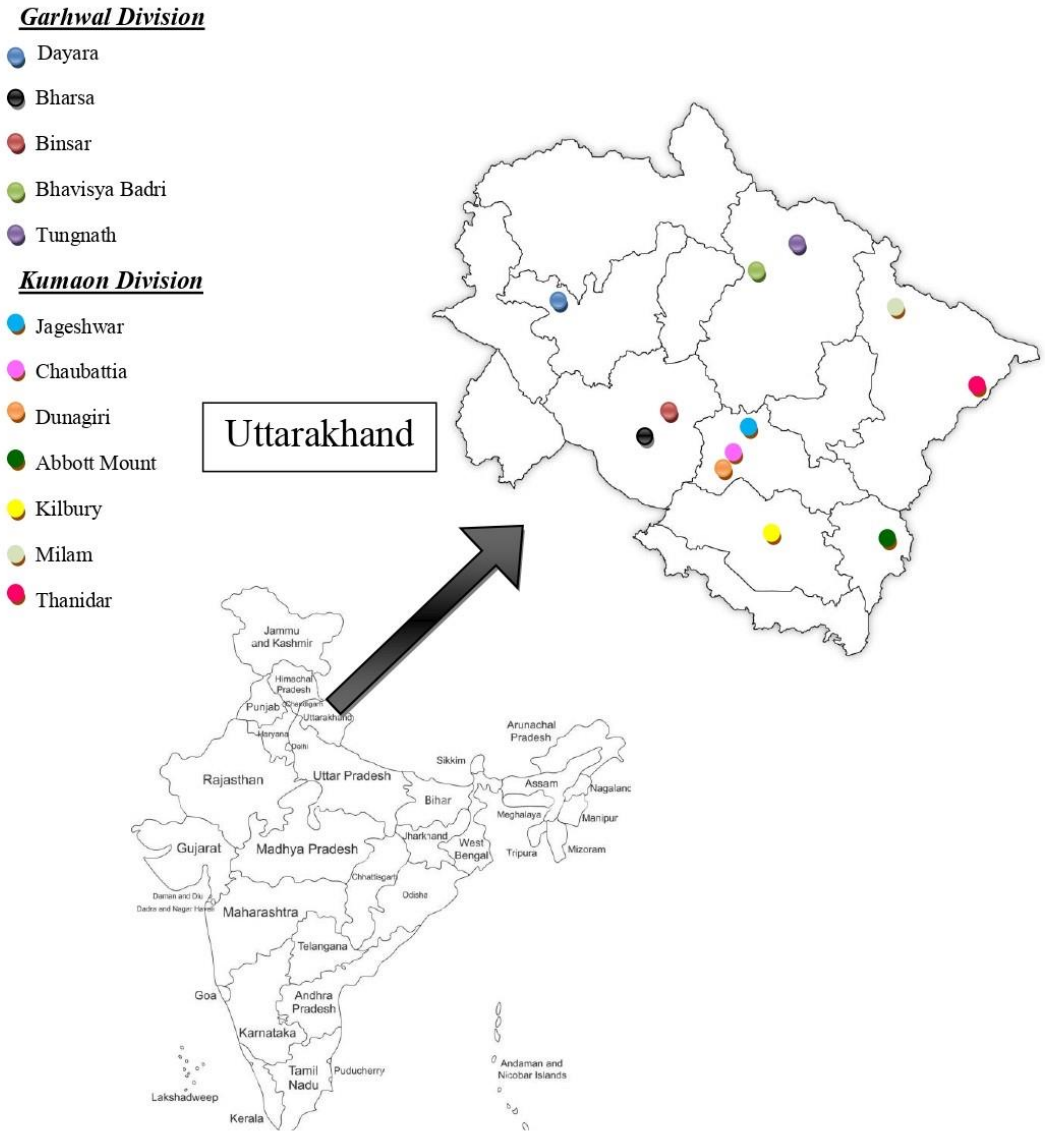

Fig. 1: Distribution of *Polygonatum cirrhifolium* (Wall) Royle (Mahameda)

Morphology

Polygonatum cirrhifolium, also known as *Polygonatum cirrhifolium* (Wall.) Royle is a member of the Asparagaceae family and goes by the local name Mahameda. This plant has a tall, perennial habit that ranges in height from 30 to 120 cm. found worldwide in Pakistan, China, Nepal, Bhutan, and Northern Asia. This plant bloomed from July to August. This plant's fruiting season lasted from September to October [Suyal et al. 2021].

The stem of Mahameda is very flimsy, weak, flexuous, unbranched, and glabrous via numerous tendrils, and it typically grows in combination with bushes, according to its taxonomical characteristics. The leaves have irregular ciliolate edges and veins are sessile, whorled, oval, elongated, sharp, obliquely carinate, or dark green underneath. They range in length from 10 to 20 cm. In stem inflorescence, white, reddish-white, or light green blooms are common, with floral blossoms on occasion. The plant can be found in the temperate Himalayas between 1800 and 3900 meters. Round when blooms in the form of ripe, then flowers represent round, blue-black berries that are white, greenish, or pinkish on trade stocks. Flowers and fruits arise from the base of the leaves. Flowers are white often greenish or slightly purple in colour. Fruits are green,

round, and small in size which become reddish when ripe. This plant species flowers between the month of July to August and fruiting period occurs between the month of August to September [Singh et al. 2018; Suyal et al. 2021].

Medicinal property

The major benefit of *Polygonatum cirrhifolium* is that it treats vata, pitta, general weakness, aphrodisiac, and so on. It has been cited in Ayurveda as general tonics that helps increase the vital energy in the body, promote cell regeneration ability, and stimulate the immune system [Bhatt et al. 2014]. It can be used alone or in combination for making several revitalizing tonics in traditional Ayurvedic treatments [Suyal et al. 2019]. Roots and rhizomes of the plants are considered to be aphrodisiacs, general tonics, energy enhancers, immune system strengtheners, cardiotonic, sialagogues, and stimulants. In the Tibetan medicine system, the roots are reported to have a pleasant flavor and a neutral power. They are antitussive, carminative, and tonic, increasing heat and drying out serous secretions. They are used to treat cough, weariness, renal and hip discomfort, abdominal edema and fullness, fluid build-up in bone joints, and skin eruptions [Wang et al. 2022]. They have long been used to stop and lessen human diseases. In modern days also stressed lifestyle and unhealthy fooding habits have increased the likelihood of mental illness, skin disorders, anorexia, sexual dysfunction, urogenital edema, menstrual irregularities etc are some important examples which can be treated with the use of the plants leaves, rhizomes, and stem [Singh et al. 2019].

The species has been found to be a significant source of bioactive substances including triterpenoid saponin, steroidal saponins, flavonoids, and phytosterols. It also has a strong antioxidant potential and DNA damage prevention activity against oxidative stress, which helps to maintain vitality and body strength [Wang et al. 2022].

Major phytoconstituents in Mahameda

The most used component in *Polygonatum cirrhifolium* is its rhizomes, which give its responses with respect to various activities [Virk et al. 2022].

Pharmacological activities

Polygonatum cirrhifolium possesses pharmacological activities such as antioxidant, hypoglycemic, hypertensive, antibacterial, and antifungal activities. Juice of Mahameda is heavy to digest [Suyal et al. 2019] but on the other side, it has remarkable medicinal activities (karmas). Balances aggravated in pitta and vata doshas which aggregates Kapha dosha.

a. Vrishya – Aphrodisiac used to increase sexual desires in both males and females. Its records are also found in Kamasutra texts written by Vatsyayana. It is consumed with milk and also used as a folk share medicine in different places.
b. Sthanyakrit – Increases breast milk in breastfeeding women.
c. Brihmana – Nourishes the body tissues and helps the cells to regenerate, anti-aging effect on the skin.
d. Shukra vivardana – Increases semen and, sperm count in males.
e. Ruchya – Appetizer, serves as an additive or extract before the meal and helps an individual gain weight.

Therapeutic uses

Polygonatum cirrhifolium possesses DNA damage inhibition [Suyal et al. 2021] against oxidative stress and maintains vitality and body strength [Virk et al. 2022]. It has also shown remarkable effects as a wound healer, cooling agent, mild laxative, and galactagogue (increases breast milk) [Suyal et al. 2019]. Different plant parts are used in the treatment of vata-pitta doshas, seminal weakness, and as a cure for rakta [Suyal et al. 2021].

Polygonatum cirrhifolium shows its activity in the treatment of;

a. Relieving burning sensation
b. Bleeding disorders management
c. General debility (Kshaya)
d. Recovery from fever due to Vata dosha
e. Cough
f. Curing anorexia
g. Emaciation
h. Gout
i. Seminal disorders
j. Bronchitis
k. Tuberculosis

Important Bioactives

Chemically active reagents present in *Polygonatum cirrhifolium* are dauvosterol, 6- stearic acid, α L- rhamnopyranosyl, β- sitosterol, β- D glucopyranoside, and an inorganic compound. It has tannins, phenolics, flavonoids, flavanol, and anti-mutagenic properties [Suyal et al. 2021] Traditionally two most important bioactive compounds are found in Mahameda which give properties to its rhizomes namely,

Ferulic acid

It is an antioxidant that boosts the effect of other antioxidants. The high effect of this acid is remarked in its antiaging activity. Vitamins such as Vit C and Vit D are enhanced by the activity of ferulic acid. The presence of ferulic acid in Mahameda is a differentiating character from the other important species Meda (*Polygonatum verticillatum*) which is another astavarga plant.

Maleamic acid

It is a very strong antioxidant and possesses anti-aging properties.

Apart from above mentioned bioactives other major phytoconstituents include saponin, triterpenoid, flavonoids, phytosterols, and steroidal saponins [Singh et al. 2019]. Anthraquinones, polyphenols, coumarins, carbohydrates, proteins, amino acids, and glycosides are extracted from rhizomes, stems, leaves, and lactones in stems [Suyal et al 2021].

Need for Conservation:

The herb *Polygonatum cirrhifolium (Wall) Royle* also known as Mahameda is a member of the Asparagaceae family which is used for therapeutic, cultural, and ethnobotanical purposes [Lohani et al. 2011]. Different herbs and plants have been used as a source of medicine preparation formulation in India since very ancient times and are essentially an integral part of the healthcare system [Singh et al. 2018]. The leaves of *P. cirrhifolium* are consumed as vegetables; roots cooked with milk are often used as an aphrodisiac and blood cleanser, and root pulps are used to treat cuts and wounds. It is used to treat a variety of ailments and is used as a tonic [Lohani et al. 2011].

It is widely exploited by pharmaceutical firms, so the population in its native environment is rapidly declining [Bhatt et al. 2014]. *P. cirrhifolium* includes important dietary ingredients such as protein, carbohydrates, and fat, and it is utilized as a functional food in addition to its medical benefit [Liao et al. 2021]. However, because of its high commercial potential, it is gathered and produced in an unregulated manner; over-exploitation has resulted in the herb's extinction in its native environment [Lohani et al. 2011]. It is limited to a few specific sites and is prone to destructive harvesting and root/rhizome removal in the wild [Suyal et al. 2021]. It is frequently taken in an unregulated and opportunistic manner, which has resulted in the herb's extinction in its native environment.

Because of overexploitation and a lack of conservation, *P. cirrhifolium* has now become scarce [Lohani et al. 2011]. Unscientific cultivation, overexploitation of rhizome as well as other portions for medical use, and resulting deterioration of their natural habitats, in addition to the recovery of traditional herbal medicinal systems in India as well as abroad which has placed additional strain onto the forests, particularly medicinal plants. [Bhatt et al. 2014]. The growing interest in herbal medicines especially in medicinal herbs found in Himalaya, in particular, has resulted in a severe decline in *P. cirrhifolium* population [Liao et al. 2021]. The usage of medicinal plants/herbal medications has expanded among the general public, and their popularity is at an all-time high. However, as a result of contemporary living and urbanization, many of these plants are on the verge of extinction owing to the loss of natural habitat and a lack of consideration towards ex-situ conservation [Singh et al. 2018]. As a result, it is critical to begin and encourage their protection by using conservation strategies.

Conservation Strategies

Habitat of Mahameda is restricted mainly to the northern region of India mainly the north-eastern Himalayas region and in other countries such as Nepal, Bhutan, China, and Pakistan. It mandates cold regions and takes a long time to develop and grow. It's in-situ as well as ex-situ conservation both are being promoted. Generally, in situ, the plant is grown with the help of Plant tissue culture techniques using BAP or no Plant growth regulator in the media. But the success rates for PTC growth of the plant are less because of its narrow range of growth factors. Mahameda grows specifically in its habitat under natural conditions. The type of soil in which rhizomes of *P. cirrhifolium* grows are discussed as: [Suyal et al. 2021]

a. Parthiv: a soil that contains stones, textured with hard, black, tall trees, and grass.
b. Aapya: This type of soil has variant colours, full of small stones, brownish white, and grassy.
c. Tejas: This is dry, ash-coloured soil; in which trees are scattered dry, and hollow.
d. Vavyaveeya: It is soft but uneven, marshy, tasteless, trees of useless varieties, large mountains, and blackish colour. [Suyal et al. 2021]

Conclusion

Astavarga is an enormous constituent for making different kinds of herbal drug formulations in Ayurvedic pharmacies. *Polygonatum cirrhifolium*, Royle developing within the Himalayan area is assigned as prone through the worldwide Union for Conservation of Nature and natural assets (IUCN). When we take a look at the vicinity to explain the status of flowers inside the Uttarakhand Himalaya populace evaluation of the species is executed.

The examiner location is split into five (Kilburry, Jageshwar, Dunagiri, Chaubattia, and Aboot mount) in the Kumaun department and five (Bhavisya Badri, Tangnath, Dayara, Bharsar, and Binsor) in Garhwal department. *Polygonatum cirrhifolium* typically known as Sobnyam in Kinnaur is a rich

supply of starch, pectin, protein, and fiber content. These compound methods and their elements on my own have diverse medicinal consequences. Variability in climatic conditions, altitude, ecological habitats, overexploitation, deforestation, and others are the elements that caused the extinction of this valuable and unusual medicinal plant from its vegetation. Due to habitat fragmentation, terrible seed germination, excessive anthropogenic strain for change, and unscientific series of plant substances, this medicinal herb is turning endangered from its herbal habitats.

Populations of *P. cirrhifolium* are restricted to small, specialized areas and are threatened in the wild due to poor harvesting. Given the unique nature of the habitat, low plant density, and increasing exploitation trends, this species requires immediate conservation intervention. Therefore, genetic sequence evaluation is essential to identify conservation interventions for the survival of genetic resources, especially threatened plants with low population density. Astavarga plant life remains to improve our biodiversity and is available in proper quantity to gain the one-of-a-kind type of diseases. Methods used in plant breeding, farming technique, and lifestyle organization techniques can prove highly beneficial in maintaining vegetation and reproducing them on a regular basis.

It can be concluded that the plant has good pharmacological properties (antioxidants and adaptog ens) and can also be studied for the development of new drugs through the isolation, characterization, and organic evaluation of the characteristic components.

References

1. Balkrishna A., Srivastava A., Mishra R.K., Patel S.P., Vashistha R.K., Singh A., Jadon V., Saxena P., Astavarga plants-threatened medicinal herbs of the North-West Himalaya, Int J Med Arom Plants, 2:661-676 (2012)
2. Bhatt D., Kumar R., Tewari L.M., and Joshi G.C., Polygonatum cirrhifolium Royle Status assessment and medicinal uses in Uttarakhand, India Academic Journals, 8(5), (2014)
3. Chauhan N.S., Medicinal and aromatic plants of Himachal Pradesh, Indus Publishing Company, NEW DELHI, INDIA. (1999)
4. Chauhan R.S, Nautiyal M.C., Prasad P. and Purohit H., Ecological features of an endangered medicinal orchid, Malaxis muscifera (Lindley) Kuntze, in the western Himalaya, MIOS J, 9 (6): 8-12 (2008)
5. Dhar U., Rawat R.S., Uprety J., Setting Priorities for Conservation of Medicinal Plants- A case Study in the Indian Himalaya, Biol. Cons., 95:57-65, (2000)
6. Dhyani A., Nautiyal B.P. and Nautiyal M.C., Importance of Astavarga plants in traditional systems of medicine in Garhwal, Indian Himalaya, Int. J. Biodivers. Sci. Ecosyst. Serv. Manage, 6: 1-2, 13-19 (2010)
7. Heywood V.H., Global biodiversity assessment, Cambridge University Press, Cambridge, (2000)
8. Horng C.T., Huang J.K., Wang H.Y., Huang C.C., Chen F.A., Antioxidant and Antifatigue Activities of Polygonatum Alte-lobatum Hayata Rhizomes in Rats, Nutrients, 6: 5327-5337 (2014)
9. Joshi V.K., Evolution of the concept of Astavarga, Indian J. Hist. Sci., 18(1): 9-14 (1983)
10. Liao P.H., Li D.L. and Tong H.Y., The complete chloroplast genome of Polygonatum cirrhifolium (Wall.) Royle, a medicine herb, MITOCHONDRIAL DNA PART B, 6(1): 180-181 (2021)

11. Lohani N., Kumar R., Tewari L.M., Joshi G.C., Effect of different organic treatments on ex situ conservation of Polygonatum cirrhifolium Royle, Int J Biodiversity Sci Ecosyst Services Manage, 7(2): 134-140 (2011)
12. Meena A.K., Bansal P. and Kumar S., Plants-herbal wealth as a potential source of Ayurvedic drugs. Asian Journal of Traditional Medicine, 4:152-70 (2009)
13. Pushpangadan P., Ethnobiology in India: A status Report, Gov. of India, NEW DELHI, INDIA, (1995)
14. Rawal R.S., Bhatt I.D., Chandra S. K., Nandi S.K., The Himalayan biodiversity: richness, representativeness, uniqueness and life-support values. G.B. Pant Institute of Himalayan Environment and Development (GBPIHED), Almora (2013)
15. Shah R., Nature's Medicinal Plants of Uttaranchal: Herbs, Grasses and Ferns, Nainital, India: Gyanodaya Prakashan, 2: 1-531 (2006)
16. Singh A.P., Astavarga - Rare Medicinal Plants, Ethnobotanical Leaflets, 10:104- 108 (2006)
17. Singh N., Singh A.K., Absar N., Singh V.R., Singh V.P., Importance of endangered rare, Astavarga medicinal plants in traditional system of medicine in Ayurveda, International J. of Agric. Sci., 14 (1): 258-265 (2018)
18. Singh S.K., Patra A., Evaluation of adaptogenic potential of Polygonatum cirrhifolium (Wall.) Royle: In vitro, in vivo and in silico studies, South African Journal of botany, 121: 159-177 (2019)
19. Suyal R., Bahukhandi A., Bhatt I.D., Rawal R.S., Comparative Analysis of Biochemical Attributes of Genus Polygonatum in Western Himalaya, Natl. Acad. Sci. Lett., 44: 457-460 (2021)
20. Suyal R., Bhatt D., Rawal R.S., Tewari L.M., Status of Two Threatened Astavarga Herbs, *Polygonatum cirrhifolium* and Malaxis muscifera, in West Himalaya: Conservation Implications, Proc. Natl. Acad. Sci., India, Sect. B Biol. Sci., 90(2): 695-704 (2019)
21. Suyal R., Jugran A.K., Bhatt I.D. and Rawal R.S., Assessment of genetic diversity, population structure and phytochemical variations in Polygonatum cirrhifolium (Wall.) Royle: an endangered medicinal herb, Genetic Resources and Crop Evolution, 1-15 (2021)
22. Virk J.K., Bansal P., Gupta V., Singh R. and Kumar S., Ferulic Acid and Maleamic Acid - The Probable Scientific Basis of Pairing of Meda-Mahameda (Polygonatum cirrhifolium and P. verticillatum) Couplets, 16: 4 (2022).
23. Wang J., Qian J., Jiang Y., Chen X., Zheng B., Chen S., Yang F., Xu Z. and Duan B., Comparative analysis of chloroplast genome and new insights into phylogenetic relationships of Polygonatum and tribe polygonateae, Frontier in plant science, 13: 882189 (2022)
24. https://www.easyayurveda.com/2022/01/11/mahameda/