AYUSHDHARA
ISSN: 2393-9583 (P)/ 2393-9591 (O)
An International Journal of Research in AYUSH and Allied Systems

Review Article

MEDA- AN IMPORTANT MEMBER OF *ASTAVARGA* IS SUFFERING FROM IDENTIFICATION AND STANDARDIZATION

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KEYWORDS: *Meda*, *Astavarga*, *Polygonatum verticillatum* (L.) All., Ayurveda.

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ABSTRACT

Meda is one of the most important plants included in *Astavarga*. This plant is used in variety of Ayurvedic formulations such as *Cyavanprasa*. Dried underground parts (rhizomes) of this plant are used for medicinal purpose. This plant is claimed to possess rejuvenating, health promoting, immune system strengthening, anti-oxidant and cell regenerating properties. Also claimed to promote body fat, healing fractures, control fever, abdominal thirst, diabetic condition, seminal weakness, and as a cure for *Vata*, *Pitta* and *Rakta dosa*. The demand of this herb is increasing day by day but due to scarcity of this plant in wild, unaware about authentic botanical source, non-existing cultivation practices there is widespread problem of adulteration or substitution with other plants. The poor quality of raw material affect the quality of end product formed. So by taking into account the above situation this systematic review/ metadata analysis has conducted to find out adulteration in *Meda*.

INTRODUCTION

Meda commonly known as whorled solomon's seal is a perennial rhizomatus herb[1]. According to Miller (1754) the generic name of Polygonatum is derived from its characteristic feature of rhizome which resembles to a great extent as *Yovi*, a knee, because it has many little knees[2]. It is a highly valuable medicinal plant specially rhizome which in the form of syrup is used for the treatment of pain, pyrexia, burning sensation and for phthisis and in combination with other herbs as it promotes urine discharge[2]. The plant is also used as emollient, aphrodisiac, appetizer, galactagogue and tonic for weakness[3]. Rhizome of this plant is an important ingredient of *Astavarga*, a drug used in as a tonic and for aphrodisiac[4,5]. The plant also exhibits antifungal activities and used in the preparation of cosmetics as a skin tonic. Its rhizome is collected from wild and traded for medicinal purposes. This is one of the reasons that *Meda* is rapidly disappearing. So there is an urgent need for conservation of this plant[6].

Now a days, Ayurvedic products are suffering from a serious problem of adulteration with addition of low grade, spoiled, inferior, spurious drugs, and useless parts of same or different plant, harmful substances or totally different drug either free from or inferior in therapeutic and chemical properties from original drug which do not confirm with the authenticated official standards and used to enhance profits. Owing to this, devotion in herbal drugs has turned down[7,8,9].

Adulteration is a practice of substituting the original crude drug partially or fully with other substances which is either free from or inferior in therapeutic and chemical properties or addition of low grade or spoiled drugs or entirely different drug similar to that of original drug substituted with an intention of enhancement of profits[10,11]. Due to which the faith has declined[12]. Adverse event reports are not due to the intended herb, but rather due to the presence of an unintended herb.

Unlike in the olden days, when physicians themselves used to collect the herbs, prepare and administer the medicine, but now a days the newer generation of Ayurvedic physicians are using

prepared drugs available in the market[13]. As a result, professional plant collectors have taken over the floor and the industry is forced to accept the herbs they bring on their terms without questioning. Herb collectors, who are unable to meet increasing demand on their part, adulterate the drugs with other plants and spurious substances.

Botanical source of *Meda*

The Ayurveda and Sanskrit literature has described an herb with many synonyms, which do not exactly indicate the botanical source but many a times attribute to therapeutic utility of the plant. For a single herb various synonyms are mentioned in Ayurvedic lexicons on the basis of morphology, habitat, origin, medicinal property etc.

Many scholars made an effort to survey and carry research on medicinal plants but they were confused in many instances. The first and foremost modern description of *Astavarga* plants were found in the book named '*Dravyaguṇa-Vijnana'* authored by Acharya Priyavrat Sharma[14], however, the detailed description of *Meda* was missing.

During this review it has been found that many scholars have different viewpoints about the botanical source of *Meda*[15-45]. However, on the basis of this meticulous review, majority of acceptance by various authors, on the basis of API & AFI, the botanical source of *Meda* is considered as *Polygonatum verticillatum* (L.) All. The view point of all the scholars about the identity is presented in (Table 1).

Taxonomical classification [46]

Kingdom: Plantae;

Phyllum: Tracheophyta;

Class: Liliopsida;

Order: Asparagales;

Family; Asparagaceae;

Genus: *Polygonatum;*

Species: *Verticillatum*;

Synonyms[47]**:** *Troxilanthes angustifolia* Raf.; *Sigillum verticillatum* (L.) Montandon; *Polygonatum verticillatum* subsp. *stellifolium* (Pete rm.) K.Richt.; *Polygonatum roseum Hook*.; *Polygonatum minutiflorum* H.Lev.; *Polygonatum macrophyllum* Sweet; *Polygonatum leptophyllum* (D.Don) Royle; *Polygonatum kansuense* Maxim. ex Batalin; *Polygonatum jacquemontianum* Kunth; *Polygonatum erythrocarpum Hua*; *Polygonatum angustifolium* Bubani; *Evallaria verticillata* (L.) Neck.; *Convallaria verticillata* L.; *Convallaria stellifolia* Peterm.; *Convallaria leptophylla* D.Don; *Campydorum verticillatum* (L.) Salisb, *Polygonatum verticillatum* var. gracile Baker ex Aitch.;

Specific habitat of *Meda* as per Ayurveda: According to *Bhawaprakasa*[48] and *Saligrama Nighaṇtu*[49], *Meda* is grown in south east part of Himalaya.

Morphological characters of *Meda* as per Ayurveda: According to *Bhawaprakasa Nighaṇtu*[48] *Meda* is a rhizomatous plant. Its rhizomes are whitish in colour.

Morphological description of *Meda* (family, genus, species):

Description of plant family: Asparagaceae[50]

It is a small family consisting of genus of perennials with thick underground organs, reduced leaves and small, star-like, fragrant flowers. Asparagaceae is a family of flowering plants, placed in the order Asparagales of the monocots.

In earlier classification systems, the species involved were often treated as belonging to the family Liliaceae. Erect or scandent, mostly glabrous herbaceous or sub shrubby with persistent, evergreen or annually withering branches growing from a compact or creeping, sympodial rhizome or rarely a tuber. Stems erect, their branches often patent; leaves on long shoots and short shoots (if the latter present) scale like, scariose, spurred at the base and subtending solitary or clustered phylloclades, the latter leaf like to angled or terete, rarely (*A. densiflorus*) bearing minute, reduced scale leaves; spines present or absent, formed from modified leaf spurs. Flowers in fascicles or borne singly, bisexual, or unisexual and monoecious or dioecious, pendulous or erect, on articulated pedicels, the pericladium separated from pedicel by a swelling; tepals 6, free and spreading or basally fused and then forming a cup or tube; stamens 6.

Description of Genus[51,52,53]**:** Polygonatum also known as King Solomon's-seal or Solomon's seal, is a genus of flowering plants. It is a herbaceous perennial plant. Stem leafy above. There is a sympodial fleshy rhizomes, upon which the annual shoots leave curious seal-like marks when they die away. Leaves alternate opposite or whorled and are upto 10cm long and hairy below. Flowers in auxillary 1 or more flowered curved peduncles drooping or hang from the axils of the leaves, green or white in colour. Fruits are globular. Propagation is by division of roots.

The genus Polygonatum (*Asparagaceae sensu* APG III) contains a total of about 57 plant

species (commonly called Solomon's-seal) of which many European and Asian species have been used for centuries to treat a host of ailments including indigestion, coughs, arthritis, high blood pressure, skin conditions, inflammation of the intestines, and also damaged tendons, cartilage, ligaments, muscles, and bones.

Etymology of Polygonatum[54]**:** Gr polys, many and gonia, knee-joint; referring to the many joints in the rhizome.

Botanical description of *Polygonatum verticillatum* (L.) All[55-58,76]

Annual or perennial, tall and an erect glabrous herb up to 120cm in height with grooved and angled stem, root fibers are thick and fleshy. Leaves are sessile, in whorls of 4-8 and are linear or narrow lanceolate, 8-15 and 0.5-3cm and acute or acuminate. Upper part of stem leaves, zigzag and grooved. Flower are white, pinkish white of pale green in whorled racemes, in terminal whorls of leafy-racemes. Perianth is oblong, 0.4-0.6 cm long 6-parted with spreading segments. The berries are globose and red when ripe. Rhizome usually shortly branched, usually tuberous terete, very rarely moniliform, 0.7--1.5 cm thick. (Figure 1, 2 &3)

Distribution[55]**:** It is occasionally found in moist shaded places, oak forest and along the way sides between 1500-3000m.

Flowering and Fruiting[55]**:** June- September **Parts used:**[55] Rhizomatous roots are used medicinally.

Vernacular Names:

Name in Indian Languages[31]**: Hindi-** *Meda*; **Gujarati-** *Meda*; **Malayalam-** *Meda*; **Punjabi-** *Shakakul*; **Tamil-** *Meda*; **Telugu-** *Meda*; **Nepali-** *Khirangalo, Khirlong, Setak chini, Khinraula*.

Sanskrit- *Meda; Medodbhava; Madhura; Jīvna; Syamameda; Surmeda; Samudbhava; Salyaparṇī; Maṇicchidra; Medkodabhava; Medasamudbhava; Salya; Praṇadhara; Maṇicchidra; Devamaṇi; Surmeda; Medasamudabhava; Dhara; Salaparṇī; Mahameda; Vasucchidra; Vṛsya; Tridanta; Vasa; Jīvanī; Salyaparṇika; Nakhchedhya; Hima; Rañga; Medasara; Snehavatī; Medina; Snigdha; Vara; Medodrava; Sadhavī; Purusadantika; Sresta; Syama; Mahapurusadantika; Adhvara; Dhīra; Rasa* (Table1)[59][62-75]

Name in Foreign Languages[31]**:**

English- Whorled leaf Solomon Seal

China- Lun ye huang jing, yang jiao shen; **Dutch-** Quirlblattriges Salomonossiegel, Krans salomons siegel

French- Sceau de salomon verticille; German- Quirlblattrige weibwurz

Swedish- Krans rams.

Ayurvedic Properties

It has *Madhura Rasa; Madhura Vipaka; Guru Guṇa; Vatapittasamaka, Stanyakaraka, Sukrakaraka, Kaphavardhaka, Snigdha, Medavardhaka, Jīvanīya, Sukrajanana, Snehopaga. Rajayaksma, Jvara, Ksaya, Raktapitta, Daha* and *Kasasamaka.*[31,59].

Substitutes of *Meda*

Timely non availability of *Meda*, the local herbalists and Ayurvedic industry have experimented with substituting other medicinal plants like *Satavarī* (*Asparagus racemosus* Willd.), *Salama-misrī* (*Eulophia campestris* Wall.) *Polygonatum verticillatum* (L.) *Asparagus racemosus* Willd., *Eulophia campestris* Wall.[60,61]

Table 1: Botanical Source of *Meda* - According to Modern Scholars [15-45]

S.No	Author's name	Book name	Year	Botanical name
1.	Priya vrat Sharma	*Dhanwantri nighaṇtu*[15]	1982	*Polygonatum verticillatum* (L.) All.
2.	Thakur Balwant Singh and K. C. Chunekar	Glossary of Vegetable Drugs in Bṛhattrayī[16]	1999	*Polygonatum verticillatum* (L.) All.
3.	Quattrocchi Umberto, F.L.S.	CRC World Dictionary of Plant Names[17]	2000	*Polygonatum verticillatum* (L.) All.
4.	P.K. Warrier, V.P.K. Nambiar, C. Ramankutty	Indian Medicinal Plants, Vol-4[18]	2002	*Polygonatum verticillatum* L.)All.
5.	Dr. Anil k. Dhiman	Medicinal Plants of Uttranchal State[19]	2004	*Polygonatum verticillatum* (L.) Allioni
6.	P.C.Pande, Lalit tiwari, H.C. Pande	Folk- Medicine and Aromatic plants of Uttranchal [20]	2006	*Polygonatum verticillatum* (L.) All.
7.	Singh, A.P.	Ashtavarga- rare medicinal plants[21]	2006	*Polygonatum verticillatum* (L.) All.; *Convallaria*

				verticillata; *Evallaria verticillata*
8.	Mehrotra et al., 2006	Ayurvedic *rasayana* therapy and rejuvenation (*Kaya kalpa*)[22]	2006	*Litsea glutinosa*
9.	Department of Ayush	API Part II, Volume I [23]	2007	*Polygonatum cirrhifolium* (Wall.) Royle; *Asparagus racemosus* (Official Substitute)
10.	Dr. M.K. Adhikari, Mr. D.M. Shakya, Mrs. M. Kayastha, Dr. S.R. Baral	Medicinal Plants of Nepal[24]	2007	*Polygonatum cirrhifolium* (Wall.) Royle
11.	Department of Ayush	API Part II, Volume III[25]	2008	*Polygonatum verticillatum* (L.) All.
12.	Department of Ayush	API Part I Volume VI[26]	2008	*Polygonatum cirrhifolium* (Wall.) Royle
13.	Singh et al., 2009	Medicinal orchids: an overview [27]	2009	*Polygonum verticilliatum* (L.) All.
14.	Dhyani et al.,	Importance of *Astavarga* plants in traditional systems of medicine in Garhwal, Indian Himalaya[28]	2010	*Polygonatum cirrhifolium* (Wall.) Royle
15.	G. Vijaya Raghavan	Comprehensive Medicinal plants vol-5	2011	*Polygonatum verticillatum* (L.)All.
16.	-	*Ashtavarga*- Rare Medicinal plants [29]	2011	*Polygonatum verticillatum* (L.) All.
17.	Bisht et al., 20118	*Polygonatum verticillatum* (L.) All. and *Polygonatum cirrhifolium* (Wall.) Royle: two threatened vital healers from *Asthaverga* nurtured by Garhwal Himalaya [30]	2011	*Polygonatum cirrhifolium* (Wall.) Royle; *Convallaria cirrhifolium* (Wall.) Royle
18.	Acharya Balkrishan	Secrets of Astavarga Plants[31]	2012	*Polygonatum verticillatum* (L.) Allioni
19.	Kazmi et al., 201244	Aphrodisiac properties of *Polygonatum verticillatum* leaf extract. [32]	2012	*Polygonatum verticillatum* (L.) All.
20.	Balkrishna et al.,	*Astavarga* plants-threatened medicinal herbs of the North West Himalaya [33]	2012	*Polygonatum verticillatum* (L.) All.; *Convallaria verticillata*
21.	Wagh et al.,	Medicinal plants used in preparation of polyherbal Ayurvedic formulation *Chyawanprash* [34]	2013	*Polygonatum cirrhifolium* (Wall.) Royle
22.	Ghosh et al., 201354	Comparative estimation and chemical standardization of new and old sample of	2013	*Polygonatum cirrhifolium* (Wall.) Royle

		Chyawanprash. [35]		
23.	Bhatt et al., 2013	*Polygonatum cirrhifolium* royle and *Polygonatum verticillatum* (L.) Allioni: status assessment and medicinal uses in Uttarakhand [36]	2013	*Polygonatum cirrhifolium* (Wall.) Royle
24.	Sharma et al., 2013	Quality of life changes in knee osteoarthritis (*Janusandhigata* vata) with *Matrabasti* [37]	2013	*Polygonatum cirrhifolium* (Wall.) Royle
25.	Dr. Mukesh Kumar Dr. Anjali Khare, Dr. C.P. Shukla	Medicinal Plants [38]	2014	*Polygonatum verticillatum* (L.) All.
26.	Sagar et al., 2014	Adulteration and substitution in endangered, ASU herbal medicinal plants in India, their legal status, scientific screening of phytochemical constituents[39]	2014	*Polygonatum verticillatum* (L.) All.
27.	Raj et al., 2014	Assessment of nutritional and antioxidant potential of selected vitality strengthening Himalayan medicinal plants [40]	2014	*Polygonatum verticillatum* (L.) All.
28.	Rawat et al., 2014	Assessment of nutritional and antioxidant potential of selected vitality strengthening Himalayan medicinal plants [41]	2014	*Polygonatum verticillatum* (L.) All.
29.	Rakesh Shah, 2015	Edible Plants of North West Himalayas [42]	2015	*Polygonatum cirrhifolium* (Wall.) Royle
30.	Saboon et. All,2016	Pharmacology and biochemistry of *Polygonatum verticillatum*: A review[43]	2016	*Polygonatum verticillatum* (L.) All.
31.	Khan et. All, 2016	Phytochemical analysis, antibacterial, and antifungal assessment of aerial parts of *Polygonatum verticillatum*. [44]	2016	*Polygonatum verticillatum* (L.) All.
31.	Pankaj Kumar et al.,2018	Morpho-anatomical standardization of six important RET medicinal plants of *Astavarga* group from Western Himalaya, India [45]	2018	*Polygonatum verticillatum* (L.) All.

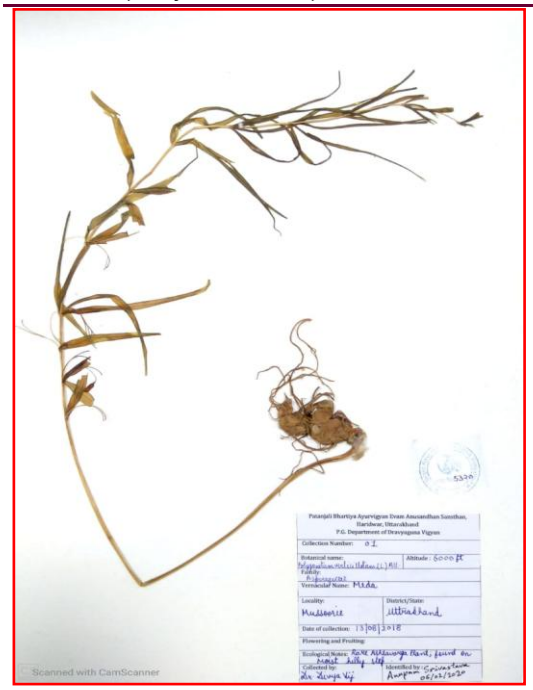

Figure 1 Herbarium

Figure 2 Rhizome

Figure 3: Whole plant

CONCLUSION

From the above mentioned information we have concluded that various controversies were existing regarding the botanical source of *Meda* since past. Unfortunately due to the lack of plant identification knowledge many species are now named and used as *Meda* in various parts of our country but among them *Polygonatum verticillatum* (L.) All. is widely accepted as *Meda*.

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Cite this article as:
Vij Divya, Mishra Rajesh Kumar. Meda- An Important Member of Astavarga is Suffering From Identification and Standardization. AYUSHDHARA, 2020;7(4):2838-2846.
Source of support: Nil, Conflict of interest: None Declared