



***Malaxis acuminata* (Jeevak): A remedial medicinal plant of pivotal importance**

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Abstract

Ayurveda is a medical science of Ancient India. It deals with matters relating to health, day-to-day life and promotion of longevity means to live long healthy life. World Health Organization (WHO) has confirmed that herbal medicines are serving the health needs of about 80 percent of the world's population. In ayurveda the *aṣṭavarga* plant group has been assigned various medicinal properties such as *Jivaniya* means the drugs strengthening vitality, immunity system, *Bramhniya* means increasing flesh in the body by activating cell regeneration and *Vayasthapana* means metabolic processes especially anabolism become active. *Astavarga* is the important ingredients of various ayurvedic formulations and it is a group of eight medicinal herbs out of which four are orchids namely *Malaxis acuminata*, *Malaxis muscifera*, *Habenaria intermedia*, *Habenaria edgeworthii*. The *Malaxis acuminata* is very useful plant in ayurveda and it is important component of *Astavarga* plant group. *Malaxis acuminata* grows in the shady areas of semi-evergreen to shrubby forest. It belongs to the family *Orchidaceae*, commonly named *Jeevak*. *Jeevak* (*Microstylis wallichii* syn *Malaxis acuminata*) is a highly exploited medicinal terrestrial orchid. *M. acuminata* showed the highest density in the habitats BO, MO and OP. *Malaxis acuminata* grows in colonies in the shady areas of semi-evergreen to thick forest. In this time people are becoming more aware about benefits of medicinal plants and are attracted towards this plant possessing immense therapeutic value. The dried pseudobulbs of *malaxis acuminata* are important ingredients of polyherbal immune-booster nutraceutical 'Chyavanprash', known to restore vigour, vitality and youthfulness. *Malaxis acuminata* are also acclaimed for their tremendous therapeutic potential. Hence this systematic review analysis has conducted to study botanical description, phytoconstituents, pharmacological activity and medicinal uses of *malaxis acuminata*.

Keywords: ayurveda, *Malaxis acuminata*, *astavarga*, pseudobulb, antioxidant activity

Introduction

Ayurveda, originated in India, is a type of traditional medicine based on herbal compounds, minerals. Ayurveda is an ancient medical science. The word, ayurveda is composed of two words of Sanskrit, *ayur* (meaning life) and *veda* (meaning knowledge or Science). Thus Ayurveda is a medical science of Ancient India. It deals with matters relating to health, day-to-day life and promotion of longevity means to live long healthy life. Ayurveda is a traditional system of medicine and medication, based on experience and observation. In modern India also, Ayurveda is being used. India is also considered as one of the potential exporting countries of medicinal plants. Indian Government give equal importance ayurveda as other pathies^[1, 2, 3].

Ayurveda has the distinction of being the "oldest medical system known to man and the oldest and most comprehensive spiritual teachings in the world". Ayurveda is based on the principle of maintaining a balance among the body, mind and spirit just to maintain and prolong the life of a person^[4]. Despite using harsh chemical substances as in allopathy, ayurveda uses natural medicinal substances that are safer for human body. Ayurveda works by 'defense strategy' rather than 'offense strategy' by making the host body strong to deal with various physical and mental stresses to human body. By understanding the origin of the disease, ayurveda targets eating, breathing, digestion, thoughts, memory and sleep, which are easy approaches helpful to gain good health^[5].

Ayurveda is comprehensive system of natural health care that originated in the ancient Vedic times of India. During Vedic period, India had contributed a lot to the different parts of the world. Ayurveda is a system of medicine with historical roots in the Indian subcontinent. Globalized and modernized practices derived from Ayurvedic traditions are a type of alternative medicine^[6, 7]. Study of medicinal plants as natural products is widespread throughout the world. From pre-historical period, medicinal plants have been used for traditional and conventional medicine formulations. People, in general, prefer these medicinal formulations due to their safe, effective and inexpensive mode. Henceforth, medicinal plants are the indispensable part of human healthcare system^[8, 9]. Recently, herbal medicines are gaining importance due to their high margin of safety. There are number of medicinal plants well known for their medicinal usage for treating diabetes mellitus in traditional system of medicine^[10]. Herbs are eco-designed drugs consisting of several phytochemical ingredients in each possessing divergent pharmacological activities^[11]. Traditional herbal medicines are naturally occurring, plant-derived substances with minimal or no industrial processing that have been used to treat illness within local or regional healing practices. Traditional herbal medicines are getting significant attention in global health debates^[12]. Traditional plant medicine is now becoming an area of ever-increasing importance in the health care systems. Since times immemorial, plants form the basis of various traditional therapeutic systems like, Ayurveda, Unani,

Sidha. Uses of plant based remedies in healthcare preparations have been reported in Vedas and the Bible. Plants produce a diverse group of bioactive molecules, making them a rich source of different types of medicines [13]. These days medicinal and nutraceutical herbs are receiving immense scientific attention for their holistic effects. Thus, natural products with pharmacological or biological activities are playing a very important role in medicine. Medicinal plants are of great importance to the health of individual and communities. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on human body [14, 15, 16]. It has also been confirmed by World Health Organization (WHO) that the herbal medicines provide the health necessity of about 80 percent of the world's population especially for millions of people in the vast rural areas of developing countries. In India, 65% of the population in rural areas use Ayurveda and medicinal plants to help meet their primary health care needs [17, 18].

Principle Energies of Body [19]

Ayurveda identifies that there are three basic types of energy in the body mainly *vata*, *pitta* and *kapha* and states that a balance of the doshas results in health, while imbalance results in disease. *Vata* is the energy of movement. It controls bodily functions associated with motion, including blood circulation, breathing, blinking, muscle and tissue movements, heartbeat and movements of cytoplasm and cell membrane. Balanced state of *Vata* energy will result in creativity and vitality. Imbalanced state, *vata* creates fear and anxiety. *Pitta* is the energy of digestion and metabolism. It controls the body's metabolic systems, including digestion, absorption, assimilation, nutrition, metabolism and temperature. In balanced state, *pitta* leads to contentment (understanding) and intelligence while in imbalanced state, *pitta* cause ulcers and arouse anger, hatred. *Kapha* is the energy of lubrication and structure. This energy controls growth of the body. It supplies water to all body parts, moisturizes the skin, lubricates the joints and bones and maintains the immune system. Balanced condition of *kapha* is required for the expression of love and forgiveness. Imbalance may lead to insecurity and envy.

About Astavarga [20, 21]

Ayurveda is the study of life and has been upgraded by various *Rishis* and saints, for example, *Aswani Kumars*, *Atreya*, *Bhardwaja*, *Dhanwantri*, *Charak* and *Susrut* and many others. During early period of development of Ayurveda, *Ashwani Kumars*, who had the vast reputation as *Ayurvedic* wonder healers, saw the old, delicate, and starved body of *Rishi Chyavan* and choose to revive him through Ayurvedic medication. *Rishi Chyavan* was conceived in the genealogy of Maharishi *Bhrigu*, who was a great astrologist, His astrological findings are valid even today. Accordingly, *Ashwani Kumars* came out with a formulation using eight different plants which miraculously rejuvenated the body of *Rishi Chyavan* and this preparation came to be known as *Chyavanprash*. The group of these eight plants is called *Astavarga*. *Astavarga* is a group of eight medicinal plants in

Ayurveda medicine, namely, *Habenaria intermedia* D. Don, *Habenaria edgeworthii* Hook. f. ex Collet, *Malaxis acuminata* D. Don, *Malaxis muscifera* (Lindley) Kuntze, *Polygonatum cirrhifolium* Royle, *Polygonatum verticillatum* Allioni, *Fritillaria roylei* H.f. and *Lilium polyphyllum* D. Don ex Royle. *Astavarga* plants has been assigned various medicinal properties i.e rejuvenating and health-promoting properties and are known to strengthen the immune system and have immense cell regeneration capacity.

Malaxis acuminata [22, 23]

Malaxis acuminata is a worldwide soil loving plant belongs to the family Orchidaceae, commonly named as Jeevak. *Malaxis acuminata* is a highly exploited medicinal terrestrial orchid. Jeevak show the highest density in the Banj-oak, mixed oak, and Oak pine forests. This species grow in colonies and one colony may contain 5-25 individuals. *Malaxis acuminata* forms colonies in shady places, moist ground and in the area that are wet & mossy. *Malaxis acuminata* is an important medicinal plant having immense ethnomedicinal potential. The dried pseudobulbs known as 'jeevak' are important ingredients of 'Chyavanprash' which is a polyherbal immunebooster known to restore vigour, vitality and youthfulness. This drug is also used in various ayurvedic formulations like *Astavarga churna*, *chyavanprash Rasayan*, *Ghrita*, *Taila*, *Gutika*, *Agada* etc.

Botanical Specification [24, 25, 26]

Botanical Name: *Malaxis acuminata* D. Don **Syn.** *Crepidium acuminatum* (D. Don) Szlach, **Syn.** *Microstylis wallichii* Lindl.

Family: Orchidaceae

English Name: The gradually tapering *Malaxis*, *Jeevaka*

Sanskrit/ Hindi Name: *Jeevak*

Habit: A terrestrial, pseudo bulbous, 5-25 cm in height, perennial, tender herb. Stem tending to be pseudobulbous at base.

Habitat: Around the world it is found in Cambodia, China and South-East Asia. In India found in temperate and subtropical Himalayas at an altitude of 1200-2100 m from Himachal Pradesh, Uttarakhand to Arunachal Pradesh, Assam, Nagaland, Manipur, Mizoram, Tripura, in Khasi hills and also found in Andaman Islands, Travancore, Anamallay hills and Madhya Pradesh.

Taxonomic Features: Its stem is underground, spreading, fibrous roots downwards, ribbed.

Leaves: Usually 2-4, sessile or petioled, 7.5-12.5 cm long, ovate-lanceolate, often discolored, light green, acute with prominent veins, leaves in whorls on the nodes directly raised upwards, angular, attenuate, stem covered by basal leaves forming a tubular structure.



Fig 1: *Malaxis acuminata* (Jeevak)

Flowers: *Scape*-7.5- 20 cm long, flower small shortly stalked in terminal raceme, about 10 mm in diameter, yellowish- green with purple centre; *bracts*- spreading shorter than the ovary; *sepals*-oblong, dorsal 1-3 nerved, lateral 3-5 nerved, 2 lateral rather shorter than the dorsal, margins recurved; *petals*- linear, slender, longer than sepals, margin recurved, lip-5, shield like, slightly convex, tip rounded, notched or bilobulate, adnate to the base, the column sides of the lip produced upwards into large auricles, auricle of the lip very variable, acute or obtuse, straight and slightly overlapping; *staminal column*-very short with short spreading arms; *anthers*-subterminal, *pollinia*-4.

Fruits: 6 chambered capsule.

Seeds: Minute, powdery, ovoid.

Pseudobulbs: Pseudobulbs 3-9 cm long and 1-3 cm in diameter, conical, fleshy, smooth, shining, in pairs, new one look like garlic cloves, greenish-white, covered with membranous sheath, slightly mucilagenous, remain alive over longer period (figure 1)

Flowering: July-August.

Fruiting: September-October.

Active ingredients: Its pseudobulbs contains alkaloid, glycoside, flavonoids and β -sitosterol. Also contains piperitone, O-Methylbatatasin, 1, 8-cineole, citroenellal, eugenol, glucose, rhamnose, coline, limonene, p-cymene and ceryl alcohol.

Properties & Action: The pseudobulbs are sweet, refrigerant, aphrodisiac, ferbrifuge and tonic.

Therapeutic Uses: It is useful in haematemesis, fever, Seminal weakness, burning sensation, dipsia, emaciation, tuberculosis and general debility also consumed as health tonic.

Part use: Pseudobulb

Formulations: *Astavarga churna*, *Chyavanprash rasayan*, *Chitrakadi taila*, *Vachadi taila*, *Mahakalyan ghrita*, *Mahamayura ghrita*, *Mahapadma taila*, *Jivaniya ghrita*, *Vajikaran ghrita*, *Brahini gutika* and *Himvana agada*.

Substitutes: *Vidari kand* (*Pueraria tuberosa* (Willd.) DC), *Safed behmen* (*Centaurea behen* Linn.) and *Guruchi* (*Tinospora cordifolia* (Willd.) Miers. Various species of

Malaxis are found in North- West Himalaya (Uttarakhand) viz., *Malaxis cylindrostachya* (Lindl.) Kuntze and *Malaxis mackinnoni* (Duthie) Ames are used in place of *Jeevak*.

Phytochemical profile of *Malaxis acuminata*

Bhatnagar, *et al.* (1970) reported the presence of β -Sitosterol, cetyl alcohol, choline and two sugars namely glucose and rhamnose from *Malaxis acuminata*.²⁷

Gupta, *et al.* (1978), The thin layer chromatographic studies revealed that the constituents like limonene, eugenol, citronellal, 1, 8-cineole, piperitone and p-cymene, o-Methylbatatasin are reported to occur in *Malaxis acuminata*.^[28]

Sharma, *et al.* (2009), Qualitative analysis of plant metabolites (primary and secondary both) of *Malaxis acuminata* shows the presence of Phytochemicals such as Alkaloid, glycosides Carbohydrate, Flavonoid, Resin, Saponin, Starch, Steroids, Tannin.^{29, 30}

Lohani, *et al.* (2013), Chemical analysis / Metal analysis by Atomic absorption spectroscopy indicated the presence of metals/nutrients as Cu, Zn, Mn, Fe, K, Ca, Mg, Al, Ba, B, Mo, Cl and fatty acid analysis using GC-MS revealed the identification of common fatty acids including - Linoleic acid, α -Linolenic acid, Oleic acid, Palmitic acid, Stearic acid, γ -Linolenic acid, Eicosanoic acid, Eicosenoic acid and Eicosadienoic acid. Other chemical constituents such as vitamins α -Tocopherol and γ -Tocopherol, terpenoid are also isolated.³¹

Bose *et al.* (2017), In one recent studies dietary fatty acids, alpha - hydroxy acids, phenolic acids, sterols, amino acids, sugars and glycoside are reported in this plant by GC-MS.³²

Arora *et al.* (2017), reported the presence of phytoconstituents from DCM pseudobulbs extract of *Crepidium acuminatum* D. Don Szlach by GC-MS analysis. The extract mainly contains essential oils namely caryophyllene, Eugenol, Humulene, phenol, 2, 4 bis (1,1 dimethylethyl), Caryophyllene oxide; 2, 5 Octadecadiynoic acid, methyl ester.^[33]

Arora *et al.* (2018), reported the fingerprint profile of various phytochemicals of crude drug by HPTLC technique indicated the presence of saponins, bitter principles, essential oils, athraquinones, sterols, coumarins, flavonoids, steroids, tannins and glycosides in methanol extract of pseudobulbs of this plant.^[34]

Adam *et al.* (2018), showed the presence of acidic polysaccharides, anthocyanins, lignin, phenolic substances, cutin, suberin, lipids and starch.^[35]

Arora *et al.* (2019), quantify some phytochemicals present in the pseudobulbs of *Crepidium acuminatum* such as alkaloids, resins, tannins, crude fibre, phenolic compound, flavonoids, carbohydrate and saponins were determined by different methods.^[36]

Pharmacological Activities: [37, 38, 39, 40]

- Garg P *et al.* reported the antioxidant activity in butanol extract of *M. acuminata*.
- Bag *et al.* reported the antioxidant activity of the pseudobulb extract against the long lived 2, 2-diphenylpicrylhydrazyl (DPPH) radical at room temperature.
- Arora M *et al.* reported the potent antimicrobial activity in *malaxis acuminata* and its pseudobulbs is used to treat various infectious disease caused by microbes.
- Pseudobulb of *Malaxis acuminata* is aphrodisiac, haemostatic, antidiarrhoeal, styptic, antidysentric, cooling and tonic.
- It is useful in sterility, vitiated conditions of Pitta and Vata, semen related weakness, internal and external hemorrhages, dysentery, fever, emaciation, burning sensation and general debility.
- Malaxis acuminata* is used in bleeding disorders, blood disorders, tuberculosis, insect bites, rheumatism.
- It is reported to be refrigerant therefore used to reduce fever (Febrifuge).
- This medicinal plant is vitality promoter, maintain the balance between Vata, Pitta and Kapha.
- It enhances the energy, body strength and helps as body mass promoter.
- This medicinal plant helps to increase the longevity and slow down the process of aging.

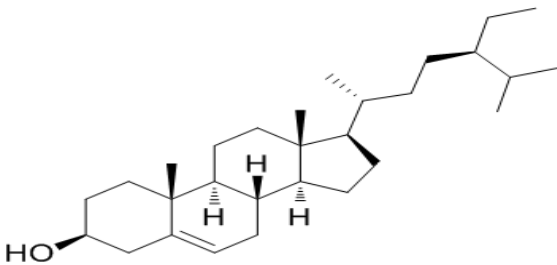
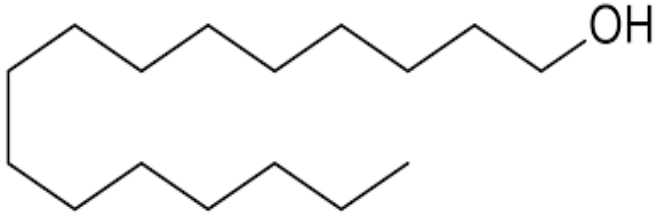
- Pseudo bulb extract of *Malaxis acuminata* shows antioxidant, antifungal and antibacterial activity.
- In experimental animals the ethanolic extract of its pseudo bulb exhibit analgesic and anti-inflammatory activity.

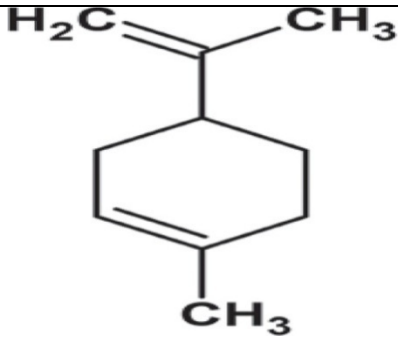
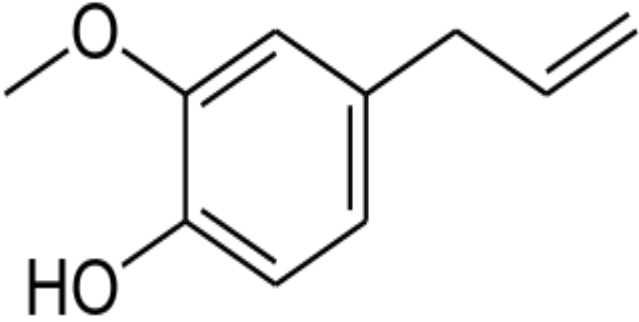
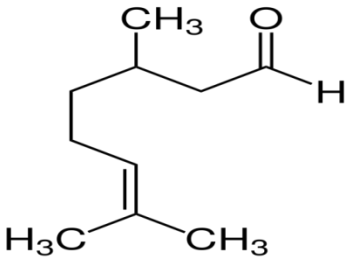
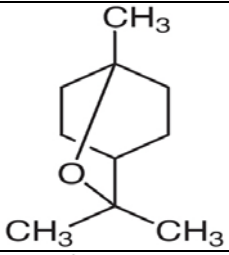
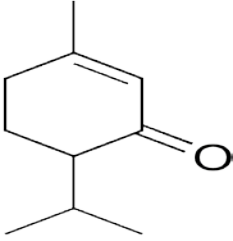
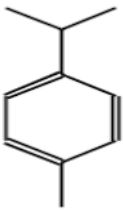
Medicinal Uses

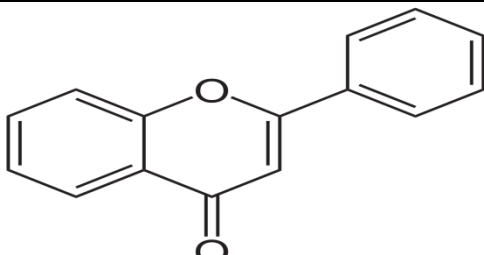
- Powder prepared from Jeevak and other herbs mixed with an appropriate quantity of honey and crystal sugar is useful in cough and cardiac diseases.
- Jivaniya ghrita processed with jeevak is useful for the whole body vitiated with gout and other chronic vata associated disorders.
- Mahapadma taila processed with jeevak and other herbs is useful in gout and fever.
- Asthapana vasti processed with jivaka and other medicinal herbs is useful in treating anaemia, malaria.
- Ghrita processed with Devadaru, Kakoli, Jeevak and other medicinal herbs given in proper dose is useful in child emaciation.
- Himavana Agada prepared with the powder of pancavalkala, jeevak and other herbs mixed with honey to make a paste and external application of this paste on snake bite reduces the toxicity.

Chemical structure and biological activities of some of the compounds from *Malaxis acuminata* plants. [41, 42]

Table 1

Name	Chemical Structure	Biological activities
β -Sitosterol		It shows Anti-inflammatory, Chemoprotective, hypocholesterolemic, angiogenic, analgesic, anthelmintic and antimutagenic, immunomodulatory, anticancer, antidiabetic activity.
Cetyl alcohol		It shows Antimicrobial, emollient activity.
Limonene		It is effective as Anticancer, dissolve gall stones, heartburn and gastroesophageal re-flux disorder (gerd)

		
Eugenol		It shows Antioxidant activity, anti-inflammatory, antibacterial and antiviral activity
Citronellal		It shows Relaxant effect in smooth muscle of trachea
1, 8-Cineole		It shows Mucolytic and spasmolytic action on the respiratory tract benefits in inflammatory airway diseases, such as asthma and chronic obstructive pulmonary disease (COPD), antiseptic anthelmintic, anti-inflammatory, Antimicrobial activity
Piperitone		Antimicrobial activity
p-Cymene		It shows Antioxidant, antinociceptive & anti-inflammatory, anti cancer activity

Flavonoid		It acts as antibacterial, hepatoprotective, anti-inflammatory, anticancer and antiviral agents
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Conclusion

Malaxis acuminata is an important plant of Astavarga. It has a lot of therapeutic potential. Study revealed the presence of saponins, bitter principles, steroids, Sterols, essential oils, anthraquinones, coumarin and flavonoids in methanol extract. Its GC-MS analysis revealed presence of many bioactive metabolites such as, dietary fatty acids, α -hydroxy acids, phenolic acids, sterols, amino acids and glycosides which substantially explain the use of *M. acuminata* as one of the potential health rejuvenator and anti-aging ingredient in many Ayurvedic formulations. Evidence for the presence of antioxidants activity has been obtained in the pseudobulb extract of *Malaxis acuminata* (*Jeevak*). *Malaxis acuminata* reported to contain various embryonic constituent such as flavonoids, Piperitone, β - Sitosterol, Limonene, Eugenol, 1,8 cineole, p-cymene which are having an immunomodulatory, anticancer, antidiabetic, anti-inflammatory, antimicrobial and antioxidant activities. As the pseudobulb extract of *Malaxis acuminata* (*Jeevak*) has tremendous medicinal significance, further studies are required to isolate and characterize the bioactive principles for developing anticancer drug in near future.

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