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RESEARCH ARTICLE

MEDICINAL PLANT: ASHWAGANDHA

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ABSTRACT

In India, Ashwagandha (*Withania somnifera* Dunal) is a popular medicinal plant since time immemorial. Ashwagandha contains various alkaloids, steroidal lactones and saponins, and has been used for its supposed antistress, antitumor, anti-inflammatory and antiarthritic properties. This review reveals the important phyto-chemicals, various health benefits of Ashwagandha and its cultivation practices.

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INTRODUCTION

India is rich in its biological resources and considered as one of 17 mega biodiversity countries of the world. The Eastern Himalayas, Western Ghats and Indo-Burma Region are the bio resource hot spots of India. India has rich vegetation of more than 45,000 plant species of which 15,000-20,000 plants have medicinal values (Shiva, 1996). Out of these around 7000-7500 plants are used for medicinal purpose by traditional communities (Sen and Chakraborty, 2020). The report of World Health Organization shows that 80% of world population still depends on traditional medicines as they are efficient, safe, cost effective, affordable and easily accessible by the poor. The medicinal plant products, which are derived from plant parts such as stem, bark, leaves, fruits and seeds have been part of phyto-medicine that produce a definite physiological action on human body(Singh and Gilca,2010). The most important of these natural bioactive constituents of plants are alkaloids, tannins, flavonoides, and phenolic compounds. Medicinal plants made a lot of contribution towards the discovery of large number of new generation synthetic drugs. Among various valuable plants, in the traditional Indian systems of medicine, *Withania somnifera* Dunal is a popular Indian medicinal plant belonging to family Solanaceae, commonly known as Ashwagandha, Indian ginseng and Winter cherry.

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Ashwagandha in Sanskrit means horse's smell, probably originated from the odor of its root, which resembles that of sweaty horse. Ashwagandha is a short, tender perennial shrub growing 1.4 to 1.5 meters tall. Its erect branches extend radially from a central stem. Leaves are ovate to elliptic, dull green, usually upto10-12 cm long. Roots are fleshy, tapering, whitish brown. The flowers are small, green and bell-shaped. The ripe fruit is orange red in colour.

HEALTH BENEFITS

Ashwagandha has been linked to a plethora of health benefits. Root and berries are used for making medicine. Various studies have shown that Withania somnifera increases longevity by promoting physical and mental health, and rejuvenates the body in debilitated conditions. Extracts of all parts of the plant having therapeutic properties by tuning the endocrine, cardiopulmonary, central nervous system, and against sexual problems. The roots are the constituent of over 200 formulations in Ayurveda, Siddha and Unani medicines. The roots are reported to contain alkaloids, tannins, saponins, amino acids, minerals K, Mn, Fe, Zn, Cu, Al, Ca, Cd, and Ni, steroids, volatile oil, starch, reducing sugars, glycosides. There are several reports to establish its immunomodelatory, anti inflammatory in the treatment of joint diseases, antistress (adaptogenic properties), memory enhancing, antiparkinsonian, hypolipidemic, antibacterial, cardiovascular, antioxidant, antitumor, and adaptogenic properties (Singh et al.,1982; Alam et al.,2012; Mishra et al.,2000). It helps to counteract chronic fatigue, weakness, dehydration, bone weakness, impotency,

premature aging emaciation, debility, convalescence and muscle tension, and an appropriate remedy for asthma and bronchitis. It can be taken in the form power in dosages ranging from 450mg to2 g (Abbas *et al*.2004)

PHYTO-CHEMICALS: These pharmacological activities are mainly contributed by the alkaloids and steroidal lactones (Kuboyam et al.2006). Alkalod consists of with anine and other sub stituents such as somniferine, somnine, somniferinine, withananine, pseudo-withanine, tropine, pseudo-tropine, 3-a-gloyloxytropane, choline, cuscohygrine, isopelletierine and anaferine. The steroidal lactones includes ergostane type steroidallactones, withferin A, withanolides A-Y, withasomniferin-A, with asomnidienone, withasomniferols A-C, withanone etc(Gulati et al.2017). Some 40 withanolides, 12 alkaloides and numerous sitoindosides have been isolated from the plant (Budhiraja and Sudhir, 1987).

CULTIVATION: Ashwagandha is native to India and North Africa. It grows well in dry and sub-tropical regions. It is also found in Nepal, China and Yemen. Rajasthan, Punjab, Haryana, Uttar Pradesh, Gujarat, Maharashtra, Madhya Pradesh and Kerala are the major Ashwagandha producing states of India. It prefers sandy loam, light red soil, and black soil having pH 7.5 to 8.0 with good drainage. The crop prefers dry condition of 20^0C to 38^0C temperature. To propagate it can be grown from seed in the early spring or from greenwood cuttings in the later spring. Seeds can be sown by broadcast method in the main field or by transplanting method. Five kg of seeds are required for planting in 1 hectare of the main field. Ten to 12 kg per ha is sufficient for broadcasting method. Seeds are sown in the month of June-July. About 35 days old seedlings are transplanted in the main field. Line to line distance of 20 to 25 cm and plant to plant distance of 8 to 10 cm should be maintained in the main field.

Promising varieties are Jawahar, JA-20, JA-134, Raj Vijay Ashwagandha-100 and genotypes are HWS-08-14, HWS-08-18, HWS-1228, HWS-1229, and Selection-2B. Flowering and bearing of fruits start from December onwards. The crop is harvested when leaves are dried out and berries turned yellow-red colour. Plants are harvested for roots by digging in January to March i.e.150-180 days after sowing. There should be moisture in soil at the time of digging and even the tap root should be carefully pulled out so that it is not damaging the lateral roots. The roots are separated from the aerial portion by cutting the stem 1 to 2 cm above the ground. After digging, the roots are washed, cut into 7 to 10 cm small pieces and dried in shed up to 10-12% moisture content. Berries are handpicked and are dried and crushed to take out the seeds. The potential yield from 1 hectare of commercial cultivation is 6.5 to 7.0 q/ha. Commercially 6-15 mm diameter and 7 to 10 cm length root are of superior grade that fetches premium price. Alkaloid percentage in roots ranges from 0.13 to 0.31 %.The sale price of dried roots and seeds has been considered at Rs. 90/kg and Rs. 75/kg respectively. Ashwagandha is prone to several pests and diseases. Seedling rot and Leaf spot disease, *Alternaria alternata* is the most prevalent disease. A decline in concentration of its secondary metabolites occurs by this disease. Disease can be minimized by use of disease free seeds and by giving seed treatment before sowing. The carmine red spider mite, *Tetranychus urticae* is the most prevalent pest of the plant in India. Treehopper feeds on the apical portions of the stem, making them rough and woody in appearance and brown in color. The apical leaves are shed and the plant gradually dies. The plant is a host for mealybug, *Phenacoccus solenopsis*. A combination of 0.5% malathion and 0.1% - 0.3% kelthane as foliar spray at 10-15 days interval is useful for mites, aphids etc. Biopesticides can be applied to prevent the diseases and pests attack. Adopting crop rotation and proper drainage will reduce the impact of pests and diseases.

Conclusion

The plant shows variation in phytochemical composition with geographic distribution. The domestic demand for Ashwagandha roots is about 7000 tonnes annually by the processors and pharmaceutical companies. In India the production is less (around 1500 tonnes / yr) thus necessitating the increase in its cultivation and higher production of phyto-chemicals. Commercial cultivation of Ashwagandha fetches good profit provided there are good farm management practices and proper marketing channel. Recognition of the medicinal plant and the economic benefits of these plants are on increase in India.

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