



REVIEW ARTICLE

CULTIVATION OF "VIDARIKAND" (*PUERARIA TUBEROSA* DC): A DRUG OF POTENTIAL IMPORTANCE

*Dr. Saurav Sharma, Dr. Monika Agrawal, Dr. Makhan Lal

Dravyaguna Department, State Ayurvedic College Lucknow, India

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ABSTRACT

The demand for natural products derived from medicinal plant is increasing in national and international market. The sudden increases in demand of the pharmaceutical industries of Indian system of medicine has led to deforestation because of which some plant species have been endangered such as *Kutki*, *Jatamansi*, *Ativisha*, *Vatshanabh* etc. *Vidarikand* (*Pueraria tuberosa* DC) is one of them. "*Vidarikand*" is a perennial herb is in high demand. Its tubers carry many therapeutic potentials and are part of many important formulations like *Chawanprash*, *Indrokta rasayan*, *Brimhani gutika*, *Sukumari tail*, *Vidaryadi ghrita* etc. in Ayurveda. Its important habitats are Himalaya, Sikkim, Mount Abu, Punjab, Western Uttar Pradesh and Central India. Its increasing demand in the pharmaceutical industry and simultaneous uncontrolled exploitation of natural habitat has decreased the availability of authentic drug. This has eventually led to adulteration and substitution. It is therefore necessary to promote cultivation of *Vidarikand* which is largely required by the herbal drug industry. Under the scheme of National AYUSH Mission during 12th plan its cultivation is eligible for 50% subsidy. The yield of tubers is reported to be about 5 – 7.5 tons per hectare. It is utmost necessary to promote shifting of *Vidarikand* from forests to the cultivated source for its long term stability and prevent adulteration and substitution.

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INTRODUCTION

Vidarikand (*Pueraria tuberosa* DC.) commonly known as Indian Kudzu is a member of family Fabaceae. It is distributed nearly throughout the India except in very humid or very arid regions and ascending up to 1200m (THE AYURVEDIC PHARMACOPOEIA OF INDIA) in Punjab, Western Uttar Pradesh and Central India (Indian Medicinal Plants An Illustrated). In *Ayurveda*, tuberous roots of *Vidarikand* are used to treat many diseases such as *Daha*, *Raktapitta*, *Angamarda*, *Daurbalya*, *Sosha* etc and carries many therapeutic potentials like *Brimhan*, *Vrashya*, *Jivniya*, *Rasayan*, *Shukral*, *Balya* etc¹. It is a part of important formulations such as *Chyavanprasha rasayan*, *Saaraswataarista*, *Naarsingha churna*, *Vidaari ghrita*, *Amritaprasa ghrita* etc (Ayurvedic medicinal plant of India). *Pueraria tuberosa* extract contains different classes of phytoconstituents including Alkaloids, Carbohydrates, Steroids, Glycosides, Tannins, Terpenoids, Flavonoids, Coumarins and anthocyanides^(1,3,4,5). Indian Government promote cultivation of medicinal plants, According to National Ayush Mission (NAM) list of prioritized plants for cultivation under scheme of NMPB *Pueraria tuberosa* DC (*Vidaikand*) eligible for 50% subsidy (http://www.nmpb.nic.in/sites/default/files/cultivation/Species_for_50_subsidy.pdf).

Supervision of National medicinal plant board (NMPB) cultivation status 2016-17 cultivation of *Vidarikand* 5 hectare area in Gujrat (http://www.nmpb.nic.in/cultivationstatus?name=vidari&field_financial_year_value%5Bvalue%5D%5Byear%5D=&field_species_vocabulary_id_tid=All&Search=Search).

Morphology

It is a perennial climber with woody tuberculated stem with large tuberous roots¹.

Stem – woody, up to 12 cm in diameter^(4,5,9).

Leaves - are trifoliate and alternate, leaflets are egg-shaped, with round base and unequal sides. They are 10 - 15 cm long and 7 - 10 cm wide^(4,5,9).

Flowers – Bisexual, purplish-blue in color, fascicled on 15-30 cm long racemes with flowering time February-April^(4,5,9).

Fruit - Pods are linear, about 5 - 7.5 cm long and constricted densely between the seeds. They have silky, bristly reddish-brown hair, with 3 - 6 seeds, fruiting time may-June^(4,5,9).

Root - Tuberous roots, globose or pot-like, up to 60 cm long and 30 cm thick, weight approx 5 to 10 kg, up to 35 kg. The insides are white, starchy and mildly sweet^(4,5,9).

Chemical Composition

Pueraria tuberosa extract contains different classes of phytoconstituents including Alkaloids, Carbohydrates,

*Corresponding author: Dr. Saurav Sharma,
Dravyaguna Department, State Ayurvedic College Lucknow, India.

Steroids, Glycosides, Tannins, Terpenoids, Flavonoids, Coumarins and anthocyanides. Tuber contain 85.1% dry matter, 64.6% Carbohydrates (sucrose, glucose and fructose), 28.4% crude fibers, 10.9% protein. Some of the important phytoconstituents are isoflavonoids – pueraren, genaestin, daidzein, tuberosin, pterocarpanone-hydroxytuberosone, two pterocarpenes- anhydrotuberosin and 3-O methylanhydro-tuberosin, coumestan tuberostan, isoflavone - puerarone and a coumestan-puerarostan^{1,2,3}.

MATERIALS AND METHODS

It is a conceptual study. Various Ayurvedic books, books on Agriculture and books on Medicinal plants etc. have been consulted. Internet has also been explored for recent researches.

Agro techniques for vidarikand cultivation climate: From the cultivation point of view *Vidakand* prefers sub-tropical climate, shade and warm humid conditions⁸.

Soil: For the cultivation of *Pueraria tuberosa* textured loam soil is best. High moisture content and partial shady area with rich organic content are suitable for its cultivation⁸.

Propagation of the vidarikand: It is generally propagated by seeds but seed germination is low. Tubers and layering is also used for raising plants. Ground layering of stem for the better result and germination percentage for propagation⁸.

Nursery Raising: Plantation of the *Vidakand* is more effective by nursery raising. It is a cost effective and more successful method. The seeds are soaked in water over night and sown in nursery in month of May⁸. Keep in mind that width of the nursery should be less length can be more because at the time of weeding the person can uproot the weed without entering in the bed. A person can easily do the weeding by sitting on the border of the bed. The bed must be at the height of 22-30cm. from the ground level. To prepare the nursery first of all clean the farm. Mix the organic manure in the soil. After the maturing do a light irrigation of the bed.

Field preparation: At the time of nursery raising the field preparation should also be started. First of all the weeds must be removed by 2-3 deep ploughing. After the ploughing mix the 15-20 tone organic farmyard manure. The manure should be mixed properly. After the mixing of the manure level the field with the help of leveler. Before leveling please do a light ploughing by the cultivator⁸.

Seedling: Seedlings are planted in field at the end of July. The plants can be raised vegetatively in June-July and shifted to main field in August-September. Ground layering may be done with the help of rooting hormones. Stem cuttings also require treatment of rooting hormone⁸.

Transplanting of the seedlings: The healthy plants raised in the nursery can be transplanted in the well prepared field. The seedlings or cuttings are planted at spacing of 75cm X 75cm in 30cm deep pits filled with 1:1:1 mixture of soil, sand and manure. About 18,000 plants are required for planting in one hectare land. Intercropping System is widely spaced crop and allows inter-cropping of narrow spaced, erect plants like *Desmodium* (Shalparni) and *Plumbago* (Chitrak) during the first season. It can also be grown as inter-crop under large tree

plantation or orchards. In fact, up to 50% shade provides ideal conditions for its growth and development⁸.

Weed control in the crop: Mechanical and cultural methods are used to control weeds. *Pueraria tuberosa* is a perennial crop and requires three hands weeding in the first year at 30, 60 and 180 days after transplanting, corresponding with end of August, September and early February months⁸.

Disease And Pest Control: The leaves are damaged by sucking and chewing type of insects during and after rainy season. This can be controlled by applying Neem cake in the soil and repeated spray of its solution in July-August to control this menace⁸.

Water Management and Irrigation: One time irrigation is required at the time of transplanting and two during establishment stage at 15 and 45 days after transplanting. The plant becomes dormant during winter. Generally, 3 to 4 irrigations are required during April-June in the following year⁸.

Maturity and harvesting of the crop: The large tuberous roots take 4-5 years to develop. Occasionally the tubers may develop up to 20 kg in weight. Medium sized tubers are considered better⁸.

Harvesting: The best time for collection should be determined according to the quality and quantity of biologically active constituents rather than the total vegetative yield of the targeted medicinal plant parts. The large tuberous roots take 4-5 years to develop. Occasionally the tubers may develop up to 20 kg in weight. Medium sized tubers are considered better⁸. Season of tuber collection is April-May⁹.

Storage: The tubers are cut into thin slices, dried in shade and then stored in air tight container at cool and dry place⁸.

Production: The yield of tubers is reported to be about 5 – 7.5 tons per hectare.³

Subsidy: According to National Ayush Mission (NAM) list of prioritized plants for cultivation under scheme of NMPB, cultivation of tubers of *Pueraria tuberosa* DC (*Vidaikand*) are eligible for 50% subsidy⁶.

Cost of cultivation: The cultivation cost of *Vidakand* for 2016-17 has been estimated to be rupees 29282 per acre⁶.

DISCUSSION

Vidakand (*Pueraria tuberosa* DC.) is an important and potential medicinal plant in Ayurveda. Its lesser availability has exposed it to suffer adulteration malpractices. Hence its cultivation becomes essential which also does not cause harmful effect on soil health and environment. Indian climate is preferably better for cultivation of *Vidakand*. Indian government promotes cultivation of medicinal plants. According to National Ayush Mission (NAM) medicinal plant cultivation scheme, cultivation of tubers of *Pueraria tuberosa* DC (*Vidaikand*) is eligible for 50% subsidy⁶. It is a perennial climber so cultivation work is less tedious, cost effective and more productive. Economically this plant will provide more income to the cultivator as well as reduce pressure on the collection from wild habitat in forests.

Conclusion

Vidarikand (*Pueraria Tuberosa* DC.) is an important and potential medicinal plant. Successful cultivation of these crops is economically attractive provided marketing is not a problem because its increases demand of the pharmaceutical industries. Cultivation of medicinal plants generates employment and income. However, additional studies are required of the improving yield and quality of *Vidarikand* and other medicinal plants is less. Present time needs attention and promotion of medicinal plant cultivation for quality raw material. Present article focuses on cultivation techniques of *Vidarikand* for its long term stability and prevention of adulteration and substitution. Further research activities in the respective field are required.

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