

SOME MEDICINAL AND AROMATIC PLANTS CULTIVATION IN GARHWAL HIMALAYA REGION: A REVIEW

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ABSTRACT

Uttarakhand situated in Northern part of India and in the heart of Himalayas. Medicinal plants have played an important role of primary health care system among the local people of Himalayan region. Uttarakhand is a hill state in the Indian Himalayan region. Due to its unique geographical location and different climatic conditions, it has rich biodiversity and variety of plant species. In Uttarakhand, enough possibilities exist for their processing of medicinal and aromatic plants. This may built a network of rural enterprise, thereby increasing the employment and income for the rural peoples of the state.

KEYWORDS: Medicinal Plants, Economic, Important, Uttarakhand

Medicinal and aromatic plants play a very important role in the human health. In the world, herbalism flourishes as the method of rehabilitation of choice in many European and Asian continents (Al-Quran 2005). It is estimated that traditional knowledge, mostly plant based, medicinal treatment systems continue to provide health care to more than three-quarters of world's population of the earth (Prakash 2015). Mostly plant based medicinal system is used in developing countries. The reliance of majority of the population on these systems, is because of, the arranged remedies have been historical acceptance and easily availability, economical less expensive and highly effective (Azaizeh *et al.*, 2003). The peoples of different developed countries, were increased the use of plant based medicine for self-medication, that indicated the increasing the medicinal plant imports by these countries. Thus, there are evidences of positive attitudes towards herbal drugs and preparations. Mostly the medicinal and some aromatic plants are collected from the forests in the different forms like, fruits, roots, seeds, leaves, corms, tubers, rhizome and flowers (Edwards 1996). The collection of these medicinal and aromatic plants from the forests are not rewarding our requirements. In order to ensure the continuous supply of the medicinal and aromatic plants of standard quality, it is necessary to cultivate these plants in a systemic way for meeting the demands.

Uttarakhand is the place of temples, holly rivers and importantly place of gods. The god blasé his grace to give the plenty of miracle medicinal plants and also

aromatic plants (Gaur 1999). Large number of economically important medical and aromatic plant has been not exploited; someone exploited ruthlessly, as a result of many species has been extinct or are at the verge of extinction. Over the several years, different medical species are shrinking and there is growing concern to preserve them for mankind (Anthwala *et al.*, 2010 and Bentley and Trimen 1980). There are some plant species that are presently under human cultivation, but due to the continuous increasing demands of these plants, they are in scarcity and sometimes even adulterated material is made. While on the other hand, vast potential of cultivated lands are laying unutilized. Hence, keeping in view the demands of medical and aromatic plant; as well as agro-climatic conditions of the state, commercial cultivation of economic plants may be undertaken (Joshi and Joshi 2014).

Climatic Condition of Uttarakhand

Uttarakhand situated in Northern part of India and in the heart of Himalayas. Uttarakhand is the mixture of valley, hills and plains. It has high mountains and fertile lands and valleys. There are several rivers and streams in this area. Uttarakhand showed the different agro-climatic condition like, tropical and temperate, which is the reason, here maximum diversity is observed for different herb plants (Prakash, 2014). The only limiting factors is the area is irrigation, which is relatively less, but by use of the hi-tech techniques of cultivation and crop specific managements fulfill the requirements. These hi-tech techniques will ensures the maximum utilization of

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resources resulting into optimum profit margins and also provide the employment for peoples. During the period of July to September lies the monsoon season of Uttarakhand. The temperature ranges from 15 to 25 degrees Celsius at most of the places, during this time. The state receives approximately 90% of its annual rainfall in this season. It is also one of the most pleasant seasons of Uttarakhand.

Suitable Medicinal and Aromatic Plant Species

Depending upon the agro-climatic conditions and the existing demands in the domestic as well as in the world market, the cultivation of following economically important crops may be highly remunerative. The selection of crops has been done, keeping in view, the overall conditions of the state, but all the crops cannot be successfully cultivated in all the areas. The selection of economic crops for large scale cultivation may be done from among the following crops.

Sarpagandha (*Rauwolfia serpentina*) or 'Snakeroot'

Sarpagandha (*Rauwolfia serpentina*) or 'snakeroot' is a species of flowering plant in the family Apocynaceae. It is native to South and East Asia. Humid climate increases the quality of its products. Generally crop is propagated by seed. Its plants are ready for harvesting 18 months after planting. Average root yield varies from 1500 to 2500 kg/ha. Sarpagandha choornam is a unique Ayurvedic herbal powder solely for hypertension. It also relieves stress, anxiety and insomnia which are usually found associated with hypertension. Sarpagandha is an Ayurvedic plant which has been used for its medicinal properties. This plant has been used by Ayurveda for thousands of years as a remedy for various diseases such as hypertension, insomnia and even insanity. The plant has been mentioned by sage Charaka in his work, Charaka.

Senna (*Cassia angustifolia*)

Senna is one among the top ranked export oriented medicinal plants from India. The sennosides present in its plants is used as laxative. The drive leaves, pods and flowers and herbal concentrates are exported. In European market it is sold as herbal tea. It is cultivated as an annual crop in different states, usually in marginal soils requiring warm and dry weather throughout growing period. Three picking are generally practiced. Well dried material maintains light green to greenish yellow colour. An average

dry leaf yield of 600-700 kg/ha under rainfed conditions and 1500-2000 kg/ha under irrigated condition is harvested.

Ashwagandha (*Withaniasomnifera*)

Ashwagandha is popularly known as Indian ginseng. Plant is an erect, branching, perennial, under-shrub up to 1.5m in height. The plant is cultivated in soils that are unsuited for the other crops and requires little care. Dried roots are medicinally important, which are used for preparation of general tonics. Alkaloids present in its roots are active principles. It is a medicinal plant of repute due to its extensive use in Indian system of medicine. The various preparation and forms of 'Ashwagandha' viz., powder, decoction, oil, smoke, poultice etc., have been suggested for the cure of various diseases such as leprosy, nervous disorders, intestinal infections, venereal diseases, rheumatism and as a tonic for all kinds of weakness and also to promote vigour and stamina. Yield of fresh roots is about 500kg/ha whereas that of dry roots is about 150kg/ha.

Aloe (*Aloe barbadensis*)

Aloe is a dry land crop, requiring low input. Leaf is economically important which contains gel that is used as skin tonics and in different herbal cosmetic preparations. Recently the crop attained high demand in international market and it will have more export demand in future. Leaf sap is also medicinally useful. Its plants grow well in a wide range of soils. An average yield of about 100tonnes/ ha of fresh leaves can be expected.

Safed Musli (*Chlorophytum borivillianum*)

Safed musli is a major Indian medicinal plants used for the preparation of vital tonics. Dried fleshy root power is medicinal important. Saponins present in its fleshy roots are active ingredient. It is a new addition to cultivation. It has a vast potential in the international market because of its aphrodisiac property. It is a kharif sown crop, requiring well drained organic rich soil. Sowing is done after first shower. The crop is ready for harvesting within 120-150 days. Average fresh root yield is about 3000-5000 kg/ha.

Green Chirata (*Andrographis paniculata*)

Green chirata is commonly known as king of bitters. Its herbage contains andrographolide, which is used for the therapeutic purpose. The plant is well-known for its hepatoprotective, immunomodulant, antimalarial and

antipyretic actions. A kharif sown crop, its plants are transplanted in July and harvested in October/ November. An average dry herbage yield of 3500 kg/ha.

Kuth (*Saussurea lappa*)

Kuth is a perennial herb with 1-2 m height. The most useful part of the plant is its roots, which contains the alkaloids *saussurine*. It is commonly given in spasmodic diseases as a stomachache and tonic; it is given in advance stages of typhus fever, as a stimulant in cholera and as an alternative in chronic skin diseases and rheumatism. The root also contains 1.5% essential oil, which is used in perfumery and cosmetics. The roots are in demand in local as well as world markets.

Saffron (*Crocus sativus*)

Saffron is a small bulbous perennial, 15-25cm high plant, cultivated for its large, scented blue or lavender flowers. The stigma of the flowers, the saffron of commerce, is of medicinal value. Saffron thrives well in cold regions with warm or sub-tropical climates. They contain the bitter principle *picrocrocine*. Saffron is a mild stimulant, stomachache, carminative, antispasmodic, nerve sedative *etc.* It is a popular remedy for promoting menstruation or for soothing lumber pains. The maximum yield of saffron per hectare per year is around 15 lb.

Indian Belladonna (*Atropa acuminata*)

Plants of Indian belladonna are tall erect perennial upto 2 m in height. This plant has the same medicinal properties as the European *Atropa belladonna*. It contains two alkaloid *hyoscyamine* and *atropine*. The leaves and roots are used as a sedative, antispasmodic, narcotic and antihidrotics. They are a valuable antidote in opium and muscarine poisoning. The yield of leaves from a uniform belladonna crop varies between 500-600kg/ha and reaches upto 750kg/ha in subsequent years.

Worm Wood (*Artemisia annua*)

It is an aromatic and bitter shrubby plant. The leaf of the plant contain an active constituent namely *artemisinin*. The drug is in very high demand because of its anti-malarial properties. It is also main source of the drug "Afsanteen" used in India in chronic fever, swelling and inflammation of the liver. The yield of oil varies between 0.12 to 0.50%, which is known as "Wormwood Oil". Fresh wormwood oil is the best source of azulene (40 to 70%).

Tagara (*Valeriana wallicii*)

The most economical part of the plant is root, leaf and rhizome. The active constituent is monoterpene derivatives called *valepotraits*. They are 0.5% in European valerian and 2% in Indian valerian. It is used as stimulant, carminative, antiseptic useful in hysteria *etc.*

Patees (*Aconitum heterophyllum*)

Patees is a tall herb commonly found in western Himalayas. The plant thrives best in elevated environments. The dried tuberous root of the plant is used as antipyretic, aphrodisiac, anti-fertility and tonic. The main active constituent of this plant root is *aconitine*.

Katuka (*Picrorhiza kurroa*)

Katuka is a perennial herb with an elongate stout, creeping rootstock. Plants may be cultivated at higher altitudes in the Himalayas. *Picroside I* and *II* and *kutkoside* are the bitter compounds found in the plant. It is also contains *apocyanin*. The drug is popularly used in India as a bitter tonic, cathartic, stomachic and febrifuge including anti-malarial. It is also useful in cure of different types of jaundice and especially useful in hepatitis.

Gloriosa (*Gloriosa superba*)

Gloriosa is a beautiful herbaceous, tall glabrous, branching leaf tip climber about 1 to 3 m tall. The useful part of the plant is tuberous rootstock and seeds. It contains *superbine*, *gloriosine* and 1.3% *colchine*. Flowers also contain *luteolin*. The tuber is useful in chronic ulcers, leprosy, inflammation piles, thirst *etc.* The leaf juice is used for killing lice in hair, root powder is given in rheumatic fever.

Jatamansi (*Nardostachys jatamansi*)

This is an erect perennial herb, 10 to 60cm high. The plant is propagated by cutting of under gourd parts and sometimes by seeds. It is valued for its rhizome. The roots of jatamansi contain *valeranone*, which is also known as *jatamansone* and it possess sedative properties. It can be used as substitute for *valeran*, useful in intestinal colic, weak antibacterial and anti-protzoal hypotensive conditions.

Isabgol (*Plantago ovata*)

The husk of seed contains colloidal mucilage mainly consisting of *xylose*, *arabinose*, *galacturenic acid*

with *rhamnose* from the mucilage. The mucilage is approximately 30% by weight of whole seed. In addition, the seed also contains some oil and small amount of *glycoside*, *aucubin* and *tannin*. It is used to control chronic constipation, diarrhea and dysentery. In addition to its medicinal use psyllium seed mucilage is employed as a stabilizer in ice creams and as an ingredient of chocolates and other food materials.

Galanga (*Kaempferia galanga*)

Galanga is used for both medicinal and aromatic purposes. Its rhizome contains essential oils, which are used in flavouring and perfumery. They are also diuretic, expectorant and carminative. Galanga grown in well drained, humus rich soil is suitable for its cultivation. Its plants are propagated by rhizomes. The rhizomes are ready for harvesting after 6 months. Rhizomes yield may vary from 3000 to 4000 kg/ha.

Palmarose (*Cymbopogon martii* var. *motia*)

Palmarose is popularly known as Roshagrass, which yields palmarosa oil and has high demand in international market. The essential oil is extracted mainly from its inflorescence and used in perfumeries and cosmetics. Oil yield is about 0.2 to 0.3%.

CONCLUSION

Large number of economically important medical and aromatic plant has been not exploited; someone exploited ruthlessly, as a result of many species has been extinct or are at the verge of extinction. These hi-tech techniques will ensure the maximum utilization of resources resulting into optimum profit margins and also provide the employment for peoples.

REFERENCES

- Al-Quran, S. (2005). Ethnobotanical survey of folk toxic plants in southern part of Jordan. *Toxicon*, 46: 119-126.
- Anthwala, A., Gupta, N., Sharma, A., Anthwal, S., and KI-Hyun, K. (2010). Conserving biodiversity through traditional beliefs in sacred groves in Uttarakhand Himalaya, India. *Resources, Conservation and Recycling*, 54: 962-971.
- Azaizeh, H.S., Fulder, K., Khalil, Said, O. (2003). Ethnomedicinal knowledge of local Arab practitioners in the Middle East Region. *Fitoterapia*, 74:98-108.
- Bentley, R. and Trimmen, H. (1980). Medicinal Plants. *International Book Distributor*, Dehradun.
- Edwards, D.M. (1996). Non Timber Forest Products (NTFPs) from Nepal: Aspects of trade in Medicinal and aromatic plants. FORESC Monograph. Forest Research and Survey Center, Kathmandu, Nepal, 9.
- Gaur, R.D. (1999). Flora of District Garhwal with ethnobotanical notes, Transmedia Publications, Media House, Srinagar Garhwal.
- Joshi, B.C. and Joshi, R.K. (2014). The Role of Medicinal Plants in Livelihood Improvement in Uttarakhand. *Int. J. Herbal Medicine*, 1(6): 55-58.
- Prakash, R. (2014). Traditional Uses of Medicinal Plants in Uttarakhand Himalayan Region. *Scholars Academic J. Biosci.*, 2(5): 345-353.
- Prakash, R. (2015). Medicinal Plants Used By Tribal Communities: A Study of Uttarakhand Himalayan Region, *Int. J. Humanities & Social Sci. Invention*, 4(2): 55-61.