

## RESEARCH NOTES

### (I)

#### MAJOR AROMATIC OIL COMPONENTS OF DOMESTICATED *VALERIANA JATAMANSI* JONES (SYN. *V. WALLICHII* DC)

In the recent years there has been a sudden rise in the demand of herbal products and plants based drugs across the world which is leading to over exploitation. Habitat degradations due to biotic interferences is again causing a threat to the continued availability of medicinal plants and therefore, several authors (e.g. Uniyal *et al.*, 2002; Maikhuri *et al.*, 2001, etc.) have recommended ex situ conservation and domestication of medicinal plants.

Medicinally important *Valeriana jatamansi* Jones (Syn. *V. wallichii* DC) (family: Valerianaceae), an important medicinal herb is found in the temperate Himalayan region of India. In indigenous system of medicine, this 'Sugandhawala' is locally called 'tagar' or 'sumayan'. It is a perennial herbaceous plant which grows up to 60 cm in height and have long, woody rhizome/roots covered with fibers. The leaves are obovate to lanceolate, flowers are dark pink, clustered in the axils of the upper leaves. The rhizome is divided into a number of shaggy, scaly crowns from which the leaves are produced. It constitutes the official rhizomes or roots known as Indian valerian or *Muskbala* or *tagar* in trade. *Tagar* is an important ingredient of Ayurvedic formulations for the treatment of nervous unrest and emotional problems. The herb cures many troubles shooting problem and almost all part is used for treatment of hysteria, hypochondriasis, nervous disorders, mouth ulcers, epilepsy, depression, as a carminative and a tonic. It is used in the form of extract, infusion and tincture. The essential oil from the root is used for flavoring tobacco and beer (Farooqi and Seeramu, 2001) also.

Therefore, an attempt was made to domesticate this plant in different locations.

The plants of *Valeriana jatamansi* were collected from its natural habitat area in Chakrata growing at an altitudinal zone 6000-6500m. The plants were propagated and cultivated at 2 locations- one at temperate area Chakrata Herbal Garden of NWFP Division of Forest Research Institute (alt. 6000m) and other at sub-tropical area NWFP Nursery, Dehradun (alt. 700m). After 36 months and 18 months of planting at Chakrata and Dehradun respectively, the roots were

harvested (during November, 2008) and dried under shade. Aromatic oil contents from three samples (Dehradun, Chakrata and other collected from wild in natural areas) were determined and the major oil constituents were analyzed by GC/MS at Centre for Aromatic Plants (CAP) and constituent compounds were identified.

Oil content from temperate area cultivated plants (Chakrata) was highest (0.35%), followed by plants collected from the natural wild sources (Chakrata) (0.33%). Oil content of sub-tropical area (Dehradun) cultivated sample showed the minimum (0.23%). The result of the analysis showed 5 main chemical constituents in valerian oil. The quantity of the main constituents are in the order Eudesin-7(11)-en-4-nol, Camphene, Caryophyllene, Calarene and  $\alpha$ -muroloene.

Sub-tropical cultivated plants harvested after 18 months of planting showed the highest percentage of the main compound Eudesin-7(11)-en-4-nol (30.24 %). The temperate area cultivated plants (harvested after 36 months of planting) showed the compound (30.04%) and temperate natural area plants (23.89%). The content of Camphene is highest in cultivated Dehradun (12.29%) followed by natural wild Chakrata (11.60%) and cultivated Chakrata (10.21%).

It can be inferred that the oil composition significantly may vary in *Valeriana officinalis* L. due to the cultivar type, plant age, and/or harvesting time. (Letchamo Wudeneh, *et al.*, 2004)

Vegetative growth performance of the plant cultivated at temperate Chakrata after two and half year showed a mean root length 9.0 cm with main root diameter 12.93mm. The root from natural wild showed a mean root length 6.2 cm with a mean root diameter 6.04 mm. Roots of the plant from sub-tropical area Dehradun showed a mean root length 8.6 cm with a mean root diameter 11.14 mm in one and half year old plants. The vegetative plant growth performance in sub-tropical area (Dehradun) is good. The species may be introduced for cultivation in subtropical areas also by providing good drainage and detailed study is expected to yield important finding.

**Table 1***Aromatic chemical constituents of Valeriana jatamansi in different location and harvesting time.*

| Site                                                                             | Mean Root length (cm) | Mean Root Diameter (mm) | Oil content (%) | Major aromatic compounds | %     |
|----------------------------------------------------------------------------------|-----------------------|-------------------------|-----------------|--------------------------|-------|
| Plant root harvested after 18 months of planting in Sub-tropical (Dehradun) area | 8.6                   | 11.14                   | 0.23            | Eudesm-7 (11)-en-4-o1    | 30.24 |
|                                                                                  |                       |                         |                 | Camphene                 | 12.29 |
|                                                                                  |                       |                         |                 | Caryophyllene            | 8.04  |
|                                                                                  |                       |                         |                 | Calarene                 | 5.47  |
|                                                                                  |                       |                         |                 | α Murrolene              | 4.87  |
| Plant root harvested after 36 months of planting in Temperate (Chakrata) area    | 9.0                   | 12.93                   | 0.35            | Eudesm-7(11)-en-4-o1     | 30.04 |
|                                                                                  |                       |                         |                 | Camphene                 | 10.21 |
|                                                                                  |                       |                         |                 | Caryophyllene            | 6.51  |
|                                                                                  |                       |                         |                 | Calarene                 | 5.89  |
|                                                                                  |                       |                         |                 | α Murrolene              | 3.13  |
| Plant root harvested from natural habitat (Chakrata) area                        | 6.2                   | 6.04                    | 0.33            | Eudesm-7(11)-en-4-o1     | 23.89 |
|                                                                                  |                       |                         |                 | Camphene                 | 11.60 |
|                                                                                  |                       |                         |                 | Caryophyllene            | 4.99  |
|                                                                                  |                       |                         |                 | Calarene                 | 4.41  |
|                                                                                  |                       |                         |                 | α Murrolene              | 1.31  |

Analysis: GC/MS profile (CAP/TM/01)

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