

## MUSHKBALA (*VALERIANA JATAMANSI*), MEDICINAL USES AND TRADE IN PAKISTAN

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### Abstract

Mushkbala (*Valeriana jatamansi*) is an important herbaceous drug collected from temperate forests of Pakistan for its medicinal value. In common with others, the supplies of this drug are dwindling due to over and un-controlled collection. Sustained production compatible with its survival through management plans and in-situ and ex-situ cultivation is recommended to meet the traditional and commercial needs. In addition, artificial cultivation of Mushkbala, on one hand, will reduce burden on its natural survival and, on the other, provide employment opportunities to the local population.

### Introduction

In spite of hard competition for various pharmaceutical products, large amounts of medicinal plants are still in use in traditional Ayurvedic and Greco-Arab system of medicines and as home remedies in Pakistan. The annual collection and use of medicinal plants, all over the country, was approximately 8,000 tons from about 75 plant sources with a market value of US \$ 3.98 million (Khan, 1985). Some of these are cultivated on farms while most others are collected from wild.

In addition to authorized extraction of Mushkbala, under hand collection also goes on and the drug so traded is not on the record of the forest departments. Local people also collect Mushkbala for domestic use as home remedy with unknown quantity.

As a result, there is no accurate information available regarding total extraction of Mushkbala from the forest areas of Pakistan. However, it is believed that this drug is being collected at a larger scale more than its production potential. Planned management is needed for its sustained production from the natural sources as well *in-situ* and *ex-situ* cultivation to supplement the supplies.

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Artificial cultivation will also provide additional job opportunities to the local population.

## STATUS OF MUSHKBALA IN PAKISTAN

The information reported in this paper are based on personal interviews and production/supply figures collected through questionnaires circulated among various forest divisions in the temperate areas of NWFP, Azad Jammu and Kashmir (AJ&K) and Punjab. The information so collected were also supplemented from secondary data sources.

### The Drug

Common name:	Mushkbala, Asaroon
Trade names:	Valeriana
Botanical name:	<i>Valeriana jatamansi</i> Jones
Synonyms:	<i>Valeriana wallichii</i> DC.
Family:	Valeriaceae

### Distribution

Mushkbala (*Valeriana jatamansi*) is distributed in temperate forest areas of Pakistan from Waziristan, Kurrum Agency, Chitral, Swat, Dir and Hazara in NWFP; Murree Hills/Rawalpindi in Punjab; Azad Kashmir and Northern Areas between 1,600 to 3,000 m elevation (Zaman & Khan, 1970 & 1972, Khan & Zaidi, 1989, Kazmi & Siddiqui, 1953).

### Habit and Life Cycle

Mushkbala is a pubescent, perennial herb growing as forest undergrowth, attaining 15-45 cm height; leaves radical and cauline; radical leaves long petiolate, cordate, ovate; cauline leaves much smaller, entire, simple or pinnate. The plant starts sprouting just after snow melt in April. Flowers appear in May and seeds ripen in June. Fruit is nearly globose and hairy. The plant regenerates naturally from seeds and rhizomes (Khan & Zaidi, 1989, Zaman & Khan, 1970).

### Constituents

Aromatic rhizomes and roots yield a sweet smelling essential oil (0.8 to 1%) and active constituents known as iridoid valeoportriates (Khan & Zaidi,



1989). The essential oil contains valerenal, valerenic acid, eugenyl esters and several alkaloids including actinide, valeramine, valerine and chatinine (ITC, 1982). Fresh roots contain an appreciable quantity of a water soluble physiologically active base (Zaman & Khan 1970).

## Uses

Pakistani Valeriana (*V. jatamansi*) is a good substitute of European Valeriana *V. officinalis* (Zaman & Khan, 1970). It is used in Ayurvedic, herbal and allopathic medicines, cosmetics and perfumery.

## Medicinal

The roots are aromatic and are used in herbal medicine as *sedative*, *carminative* and *antispasmodic*. Very useful in the treatment of *hysteria*, *epilepsy* and *neurosis*. Used as remedy for nervous exhaustion and associated *insomnia* and *excitation*. Also effective in the treatment of habitual *constipation* and scorpion sting (ITC, 1982, Zaman & Khan, 1970, Kazmi & Siddiqui, 1953).

Mushkbala under the name of Asaroon is used in nine herbal preparations (5 Maajoons and 4 Jawareshes) under the Hamdard Pharmacopeia, "Qarabadain-e-Hamdard" (1968). These are used for treatment of a variety of diseases given as under:

Preparation	Used for the treatment of
<b>Maajoons</b>	
Maajoon-e-talakh,	Hemiplegia, Bells Palse, Parkinson syndrome, tremor, epilepsy, stomach and liver complaints, backache and constipation
Maajoon-e-Jalinoos Luluvi	Debility, aphrodisiac, blood purity, complexion
Maajoon-e-Khazar	Deafness due to age
Maajoon-e-Murravehul-azwah	Hypothermia, debility, nerve tonic, aphrodisiac and loss of memory
Maajoon-e-Nisian	Loss of memory, nerve tonic and improve intelligence
<b>Jawareshes</b>	
Jawaresh-e-Jalinoos	Indigestion and Urinary complaints
Jawaresh-e-Hodsherin	Indigestion and loss of appetite
Jawaresh-e-basbasa	Indigestion, piles and flatulence
Jawaresh-e-Falafili	Indigestion, flatulence and gaseous discharge



*Other*

The essential oil from Mushkbala is used as flavouring agent and in the cosmetic industry (ITC, 1982) and perfumery. Rather it is the basic ingredient of all quality perfumes because of its fixing properties.

**Natural Reserve of Mushkbala**

Results of quantitative surveys conducted in different temperate Forest Divisions of NWFP and Punjab are given in table 1.

Table 1. Crude drug reserves of Mushkbala in the temperate forest areas of the provinces of NWFP and the Punjab (Pakistan)

Forest Divisions	Year of Survey	Crude Drug Reserves (Tonnes)	
		Green	Air Dry*
Gallis Forest Division (Zaman & Khan, 1971)	1971	491	147.3
Kaghan Forest Division (Zaman, et al, 1972)	1972	494	148.2
Dir Forest Division (Zaman, et al, 1972)	1972	145	43.5
Chitral Forest Division (Zaman et al, 1972)	1972	5	1.5
Murree Forest Division (Khan & Ahmad, 1976)	1976	247	74.1
Rawalpindi North Forest Division (Khan & Ahmad, 1976)	1976	95	29.5
Total		1,477	443.1

\* Corrected for 70% moisture content

The results of surveys reported in Table, 1 estimated a quantity of crude Mushkbala as 1,477 tonnes of fresh and 443.1 tonnes of air dry rhizomes in whole of the area. Gallis and Kaghan Forest Divisions were the richest sources of Mushkbala in NWFP. A reserve of about 910 tonnes of crude drug was estimated from the forest areas of Sharda and Keran Forest Divisions of AJ&K (Chaudhry, 1991).

But these quantitative estimates of drug reserves are not enough to project the quantity of Mushkbala available in temperate forest areas, as the surveys are limited to reserved forest only and a vast tract of forest land lying outside, where Mushkbala also grows naturally, is not included.



Therefore, these surveys present a very different picture about the quantity of Mushkbala than actual. The reported figures if taken as such are alarmingly misleading. Fresh quantities have to be looked against air dry weight (only 30% of the fresh drug). Moreover, what is there in the forest can not all be harvested. In these survey reports sustained yield has not been worked out for different forest divisions.

## Supplies

The data on the extraction of Mushkbala from various forest divisions in the moist temperate forest areas of NWFP and AJ&K over the past five years (1994-95 to 1998-99) were collected through questionnaires and are reported in Table 2.

Table 2. Extraction of Mushkbala (kg) from NWFP and AJ&K

Forest Divisions	Years					
	1994-95	1995-96	1996-97	1997-98	1998- Dec.99	Average for Division
Sharda (AJ&K)	-	2,336	100	-	-	1,218
Dir (Malakand)	16,469	44,881	49,247	38,110	10,064	31,754
Kalam (Malakand)	-	-	-	8,584	5,661	2,849
Swat (Malakand)	14,023	51,393	26,011	40,367	13,653	29,089
Alpuri (Malakand)	10,915	37,441	17,464	24,383	29,341 upto Feb 1999	23,909
Siran (Hazara)	1,480	-	296	-	-	348
Kohistan (Hazara)	10,545	18,123	6,845	15,762	23,125	14,880
Total	53,432	154,174	99,963	127,206	81,844	
Average	7,633	22,025	14,280	18,172	11,692	

(extraction figures supplied by the forest divisions were in Maunds which were converted to kilogram by multiplying with 37)

As shown in Table 2 at the average 103.3 tonnes (53.4 - 154.2) of Mushkbala were collected annually, from various forest divisions in Malakand



and Hazara (NWFP) and AJ&K over the past five years from 1994-95 to 1998-99. Forest divisions of Dir, Swat and Alpuri (Malakand) and Kohistan (Hazara) showed the highest and regular yearly extraction of the drug. The total annual production of Mushkbala is less than half of the market demand of 282 tonnes/annum (Khan, 1985). Khan and Zaidi, 1991 reported an annual production of 148 tonnes of Mushkbala from different parts of Pakistan. However, these figures of production are for the quantities for which royalty has been paid to the forest departments or transport permit issued. But in most cases the drug escapes un-noticed. Therefore, the actual quantities coming to the market in big cities are higher than the production figures available with the forest departments.

### **Foreign Trade**

Mushkbala is an important item of drug export from Pakistan. However, the latest export figures did not fell at hand. During 1973-74, about 346 tonnes of roots and rhizomes of Mushkbala worth Rs.4.002 million were exported from Karachi to different countries of the world (Khan, 1976). The price of the Pakistani Valeriana in the market of Federal Republic of Germany in July, 1881 was DM 6.50/kg and in the London market (1980-82) fluctuated between 1,140-2,090 pound Sterling/tonne (ITC, 1982).

### **Conclusions**

#### **Quantitative Surveys**

Quantitative surveys have reported considerable reserves of Mushkbala, in the forest areas of Pakistan. The figures on the size of reserves give a very rosy picture. But the data reported if taken as such are alarmingly misleading. The reported quantities of drug are mostly fresh and green and air dry yield is only 30% of the fresh drug. Moreover, what is there in the forest can not all be harvested because the roots and rhizomes of only certain rotation age and maturity are of economic value. In these survey reports there is no mention of the sustained yield to be harvested annually without detriment to the resource potential.

#### **Pull of Demand**

The demand for Mushkbala as drug and raw-material for cosmetic industry will exist both at home and abroad. These needs are, however, to be met with.



The forest departments shall have to adopt a very conservative policy of extraction/production of this drug to meet the demand otherwise, illegal extraction and trade will boost up under the pull of demand, which may cause uncontrolled damage to the resource as well as deprive the forest department of their legitimate income through departmental sale and extraction of this drug.

### **Lack of Sustained Supply Management**

There is no management policy on the collection and extraction of Mushkbala either departmentally, through lease holders or general public. In accessible areas over collection is a problem while the other being remote are under exploited. Sustained Management Plans for the collection of medicinal plants including Mushkbala need to be prepared to legitimately benefit from the resource as well as to ensure sustainability and survival of the drug plants.

### **Lack of Effective Control from the Forest Management**

Even if the management plans are prepared for Mushkbala and the yield is calculated and prescribed under the principles of sustained management, it is a general phenomenon that the public bodies including the forest departments always lack necessary vigilance in the implementation of the plan prescriptions. As a result the resource is left at the mercy of lease holders/contractors and the result is the ruthless destruction of the resource. A mechanism needs to be evolved to make the forest department effective in the implementation of prescribed restrictions.

One approach could be that the forest department itself perform all operations, right from the collection, curing, transportation and final sale of the drug thereby leaving no room for the vested interest of a third party.

## **Recommendations**

### **General**

It is a known fact that the use of plant drugs, as remedies for human ailments, is facing very hard competition from synthetic and semi-synthetic allopathic medicines in Pakistan. Therefore, the traditional system of herbal medicine shall have to face serious threats in future. However, the medicinal plants in Pakistan are to play their role to cure human diseases among the poor



rural folks and a hope for those disappointed from other systems of medicine.

Medicinal plants are also to be protected and preserved as part of biodiversity and ecosystems and to provide the genetic ingredients for the evolution of new varieties of plants and as substrates for synthesis of more potent drugs for the cure of deadly diseases.

Nevertheless, there are certain plants which also have other economic uses and Mushkbala is one of these. Though their importance in traditional uses and as source of medicines may decline, but their modern uses in perfumery, cosmetics and synthesis of medicine may stand high. Such uses will have extended demand of these plants species collected from different sources. In the following paragraphs some recommendations are made to maintain the sustained supplies of Mushkbala for local use as well as surplus production for export, compatible with its survival.

### Supplies from the Wild Sources

Because of medicinal and other uses the demand for Mushkbala both at home and abroad will exist and may expand in future. Under this situation the extraction of this drug from wild can not totally be depended upon. Decrease in natural supplies, associated with increase in price will trigger over the uncontrolled collection upto the last survivor. Management Plans for the production of Mushkbala from different temperate forest areas of NWFP, AJ&K and Punjab must be drawn and implemented. This, on one hand, will preserve the resource and, on the other, will maintain market supplies in a legitimate and sustainable manner.

### Artificial Cultivation

To supplement the natural supplies of Mushkbala *in-situ* and *ex-situ* cultivation of this drugs is very practicable.

Artificial regeneration techniques of Mushkbala from seeds and vegetative means (rhizomes & roots) are already known and have been further studied at the Pakistan Forest Institute, Peshawar. The findings of these studies are given as under:

- i. It is estimated that under artificial conditions Mushkbala yield 180-390



kg/ha of dried rhizomes at a rotation of 3 years (Khan & Zaidi, 1989).

- ii. Taking the average production of 285 kg/ha/annum, an area of 300 ha would be enough to meet the local demand of about 282 tonnes of Mushkbala without touching the natural resource.
- iii. If the export of this drugs is also a policy, the size of the additional area can be calculated based upon the above assumptions and foreign demand.
- iv. The village farmers could also be motivated for the artificial cultivation of this drug by providing incentives of training, fertilizers, small loans and surety of marketing.

### **Additional Benefits of Artificial Cultivation**

The artificial cultivation of Mushkbala in addition to supplementing the natural supplies and relieving the pressure on wild resources has also other advantages like:

- i. The drug can be cultivated artificially at lower elevations than their natural range. This makes the more land available, more intensive cultivation, longer growing season, shorter rotation and more production.
- ii. The artificial cultivation of this drug will also improve job opportunities due to the involvement of people in different cultural operation including harvest, transport and marketing.

### **Research Needs**

- i. Research would be needed to increase the yield of Mushkbala under cultivated conditions.
- ii. Artificially cultivated (*in-situ/ex-situ*) Mushkbala may differ in quality manifested as changes in active constituents. Research would be required to study the differences in the active constituents of the drug collected from wild and cultivated sources.
- iii. Studies are recommended to explore the possibilities of growing



### **Mushkbala in combination with agricultural crops.**

- iv. Economic analysis need to be carried out to calculate the net return from the cultivation of Mushkbala in comparison to conventional agricultural crops.

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