

# UTILITY OF ORCHIDS IN MEDICINE, COMMERCE, AND SOCIETAL BENEFITS

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## Abstract

In the pre-historic and pre-vedic period coinciding with the major centres of the civilization revealed by the remains found in India and Pakistan representing Mohenjodaro-Harappa especially that found at Rakhigarhi had existed as early as seventh-sixth millennium BC. Vaidyaka Shastra- a non-Aryan System of Treatment existed during this period, the antiquity of which could be traced back to Shiva's period about 5,500 BC. Later, it was merged with Ayurveda, when Ashwani Kumar brothers, Indra, and Divodas (Dhanwantari) had enriched the system. Ashwani Kumar, the Vedic period physicians were the first to discover the Ashtavarga i.e., 8 plant species, which included four orchids, to restore the frail and emaciated body of rishi Chayavan and constituted the well-known Chayavanprash and world's first ever used nutraceutical by about 4500 to 3500 BC. These four temperate orchid species were *Crepidium acuminatum*, *Habenaria edgeworthii*, *H. intermedia*, and *Malaxis muscifera*. In India, 116 orchid species are being used as Ayurvedic or ethno-medicines. Commercialization of important medicinal orchids needs several initiatives simultaneously to gain success in this endeavor. However, this activity will benefit society in three ways, employment generation, improving grower's economy, and providing health care.

## Introduction

GLOBALLY AS well as in India, orchid genetic resources are fast depleting due to destruction of their habitats and climatic changes (Sharma *et al.*, 2013). In India, around 1,256 species of orchids belonging to 155 genera are found, which are mainly distributed in Himalayas, North-East and Western Ghats, and a total of 388 orchid species are endemic to India (Singh *et al.*, 2019). Nearly 116 species have been reported as medicinal (Sharma *et al.*, 2013). Amongst these, 10 species are being used widely by the Ayurvedic and Siddha Systems of Traditional Indian Medicines. Rest of the reported species usually are consumed or used as ethno-medicines in the different ecological regions of the country. In recent years, interest of researchers is growing to investigate various species of medicinal orchids for their pharmacological phytochemical properties. So, the area of medicinal utility of orchid species is expanding further. The value of medicinal orchids is discussed as follows:

## Medicinal Aspects

### High Value and Widely Used Medicinal Orchids

The Traditional Indian Medicine Systems have been using some medicinal orchids since several centuries (Balkrishna and Sharma, 2005; Balkrishna *et al.*, 2020; Joseph *et al.*, 2018; Kaur *et al.*, 2017; Kumari and Pathak, 2020; Madhavi and Shankar, 2019; Prakash and Pathak, 2019; Singh *et al.*, 2012; Vanlalruati *et al.*, 2016; Vasundhra *et al.*, 2019). Some important species

are *Crepidium acuminatum* (Rishbhak), *Dactylorhiza hatagirea* (= *Orchis latifolia*) (Salam panja), *Desmotrichum fimbriatum* (= *Dendrobium macrei*) (Jivanti or Swarna Jivanti), *Eulophia dabia* (= *E. campestris*) (Pranada), *E. herbacea* (Amarkanda), *Habenaria edgeworthii* (Ridhi), *H. intermedia* (Vridhi), *Malaxis muscifera* (Jivaka), *Saccolabium papillosum* (Rasna, Nakuli), and *Vanda tassellata* (Vanda, Rasna).

### Underexploited Medicinal Orchid Species

In India, there are about 106 species which are used in ethno-medicine for almost all kinds of health problems. Some examples are *Cymbidium aloifolium*, *Dendrobium nobile*, *Habenaria commelinifolia*, *Malaxis rheedi*, *Renanthera hirsutissimum*, *Rhynchosstylis retusa*, *Vanda coerulea* etc.

### Source of Phytochemicals

Recent research on medicinal orchids has revealed that these plants could be potential sources of therapeutically active chemical compounds. Important amongst them are flavonoids, alkaloids, glycosides, glucosides, phenanthrenes, stilbenoids, tannins, steroids etc.

### Pharmacological Uses

Research interest is also growing amongst the medical researchers to investigate pharmacological properties of some medicinal orchids. Some of the orchid species, studied, so far, have given encouraging results. Two examples are cited here.

- i) Gastrol isolated from *Gastrodia elata* has shown smooth relaxant activity when tested on guinea pigs (Hayashi *et al.*, 2002).
- ii) Cirrhopetalanthrin isolated from tubers of *Cremastra appendiculata* has shown cytotoxicity against cell lines of human colon cancer, human stomach cancer, human lung adenocarcinoma, human breast cancer, and human ovarian cancer (Liang *et al.*, 2016; Xia *et al.*, 2005).

## Commercialization of Medicinal Orchids

In recent years, there has been an upsurge in use of herbal products not only in India but worldwide. It is estimated that nearly 960 plant species are used by the Indian herbal industry, and the turnover of the industry is more than Rupees 80 billion. Herbal exports include medicines of AYUSH (Ayurveda, Unani, Siddha, and Homoeopathy) products, which occupy a share of 3% of total Indian pharmaceutical export (Sahoo and Manchikanti, 2013). Earlier, the current annual production of herbal medicines was estimated about Rs 3500 to 3600 crores, manufactured in about 14 large scale, 1480 medium scale and about 8000 small scale industries in the country (Joshi, 2008). About 1300 botanical plants are being used in the manufacture of various herbal products today. It is estimated that about 33% of Indian population still rely on herbal preparations for common ailments. As a result, large quantities (1,77,000 MT) of medicinal plants are utilized by the herbal industry and about 56,000 MT

are also being exported from the country. This indicates the potential of use of herbal plant species.

Commercialization of any cultural or industrial product is possible only when there is production of the same or we can say production is in excess to consumption or for economic gains only then there arises need for commercial activity, and that is a trade. Hence in context with medicinal orchids, at present, there is no cultural production and all the raw materials are gathered from their natural habitats for the supply to the manufacturing industries. So far, there exists a number of constraints to grow or undertake their cultivation.

In order to promote commercial activity with regard to medicinal orchids, four factors, as shown in the Fig. 1, are considered necessary. These are:

### *Production of Raw Drug Material through Cultural Means*

It necessitates action at three levels-

(a) Arrangement of supply of planting material at cheap cost, the good quality virus-free material for planting by the growers which may be any vegetative part or the seeds. This has to be a regular activity.

(b) Agro-technology-There is a need to develop an appropriate agro-techniques for each of the species which may be a tropical, subtropical or temperate and also may be terrestrial, epiphytic species.

(c) Research back-up-It is a necessity for the new species as it may be subjected to several unpredictable problems, once brought into the man-made ecosystem *i.e.* agriculture.

### *Market Demand*

Market demand will be determined by three factors:

- (a) Reasonable and competitive cost price;
- (b) A marketing agency must be in place to push the sale of material; and
- (c) Knowledge for handling the raw materials by the persons engaged in marketing and consuming industry is a must.

### *Supply of Raw Drug Materials*

It must be supported by post-harvest management, processing and packaging, so as to ensure the supply of quality raw drug material.

### *Trade of Raw Drug Materials*

It may be done within the country to meet the demand of small, medium and large Ayurvedic drug



Fig. 1. Factors affecting commercialization of medicinal orchids.



Fig. 2. Societal benefits of medicinal orchids.

manufacturing industries as well as 5,00,000 licensed practitioners who make their own medicines. The excess produce then can be exported to other countries.

In fact, during 2013, WHO developed and launched *WHO Traditional Medicine Strategy 2014-2023* and emphasised to integrate traditional and complementary medicine to promote universal healthcare and to ensure the quality, safety and effectiveness of such medicine. Therefore, the world is looking for cost effective, easily available, better physiological compatible traditional systems of medicine and holistic approach to avert such problem and provide the basic healthcare to all (cf. Sen and Chakraborty, 2017).

### Societal Benefits

The medicinal orchids can render great service to the society, if exploited properly. This service is broadly categorized in three ways (Fig. 2).

- (a) **Health Care-** Raw drugs can be used as such or the processed products either singly or in combination with other ingredients may be used in the human healthcare management.
- (b) **Grower's economy-** By large scale growing of medicinal orchids, the economy of growers may be improved because of better gains from these new drug materials.
- (c) **Employment generation-** The growing of medicinal orchids on large scale is likely to generate employment to several rural youths by way of various operations such as cultural operations, producing quality planting material, semi-processing, packaging, transportation, marketing *etc.*

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