

Beauty with Boon- *Dendrobium* spp.

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Abstract:

Orchids are well known for their aesthetic qualities and are often used as decorative items in homes, offices, and public places. They are admired for their good looks and practical uses of them. *Dendrobium* is the second-largest genus in the family Orchidaceae. It exhibits a vast diversity in vegetative and floral characteristics and is of considerable interest due to its broad geographic distribution and the high value of hybrids as a floricultural commodity. In China, the “immortality herb” or “gold in medicine” or the No. 1 of the 9 “Chinese immortality herbs”- all refer to *Dendrobium*. Besides innumerable health benefits and medicinal properties, *Dendrobium* has been used for cosmetics and fragrance products. Here, some of the aspects of the multifarious *Dendrobium* are discussed.

Introduction:

The medicinal orchids belong mainly to the genera namely *Calanthe*, *Coelogyne*, *Cymbidium*, *Cypripedium*, *Dendrobium*, *Ephemerantha*, *Eria*, *Galeola*, *Gastrodia*, *Gymnadenia*, *Habenaria*, *Ludisia*, *Luisia*, *Nevilia*, *Orchis*, *Thunia*, *Vanda* and *Vanilla*. In the Ayurvedic system of medicine, there is one rejuvenating herbal formulation, ‘Astavarga’ that is prepared from orchid species i.e., Jivak (*Microstylis wallichii*), Rishbhaka (*Malaxis muscifera*), Riddhi (*Habenaria intermedia*) and Vriddhi (*H. edgeworthii*) are orchids. Orchids are enriched with phytochemicals such as stilbenoids, anthraquinones, pyrenes, coumarins, flavonoids, anthocyanins and anthocyanidins, chroman derivatives, lignans, simple benzenoid compounds, terpenoids, steroids, alkalines, amino acids, mono- and dipeptides, Alkaloids and higher fatty acids which play a vital role for immunity development and curing other critical diseases of individuals.

The most prominent medicinal plants (Sarkar et al., 2022; Ghosh et al., 2022; Kar et al., 2022; Darro & Khan, 2023) and orchids used in traditional Chinese medicines are various *Dendrobium* spp used to make the drug Shihu [particularly *D. catenatum* Lindl., *D. loddigesii* Rolfe, *D. moniliforme* (L.) Sw. and *D. nobile* Lindl.)] (Teoh 2016; Leon and Lin, 2016). Fresh or dried stems, blossoms and canes are eaten. *Dendrobium* is a type of orchid that is generally yellow, white or pink in color. The plant has a long, thin stem that is used for various herbal

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and medicinal treatments. The Chinese believe that the tonic extracted from the *Dendrobium* plant is 'yin' in nature and can be used to treat ailments ranging from stomach pain, heatstroke, dry mouth and sores in the mouth. *Dendrobium* is considered a safe herb when consumed in the recommended dosages. Too much of *Dendrobium* in any form can cause convulsions and may even affect the heart and lungs. Research is still being conducted on the interactions of *Dendrobium* with other drugs or medications.

Dendrobium – Multidimensional Uses:

As Food:

In US, *Dendrobium* is famous as a food orchid. In Japan and Singapore, mature canes of many soft-cane *Dendrobium* are used for making sauces. Besides these, many preparations and food decorations are done using *Dendrobium* (Singh et al., 2016).

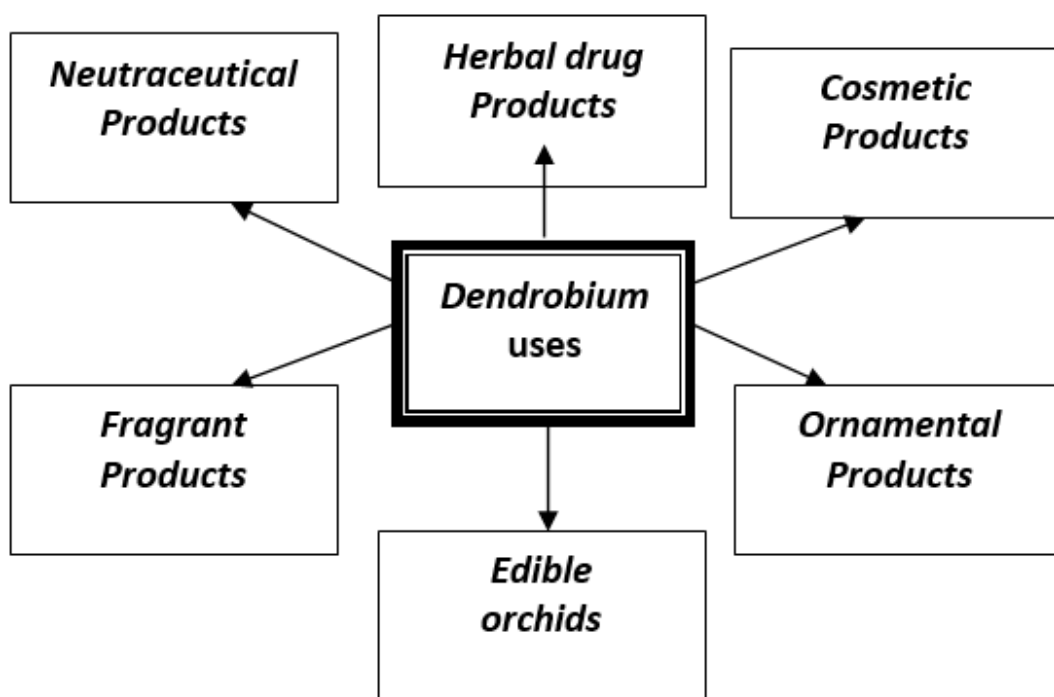


Figure 1. *Dendrobium* uses

Table 1. *Dendrobium*spp used as food

Name and part	Country	Uses
<i>D. kingianum</i> pseudo-stem	Australia	Food
<i>Dendrobium</i> flowers	Thailand	Deep fry
<i>D. longicornu</i> flowers	Nepal	pickle
<i>Dendrobium</i>	Hawaii	salad
<i>D. salaccense</i> fragrant leaves	Malaysia	Condiment for rice
<i>D. cathenatum</i> canes	China	Healing tea

As Cosmetics and Fragrance ingredients:

The mucilaginous content of orchids makes them ideal for moisturizing and emollient agents due to the many links formed by hydrogen bonding, which maintains optimum water balance in the dermal tissues. These orchids are used to fight free radicals, increase skin immunity, and reduce aging. Orchid flowers are widely valued for their ornamental and fragrant properties and are used for decorations. Fragrance of the orchid flowers is due to aromatic volatile oils in floral parts. The release of fragrance is diurnal in nature. Aromatic oils from orchids are extracted by hydro- and steam-distillation, Maceration and Supercritical fluid extraction & Headspace technology (Kanlayavattanukul and Lourith, 2022).

Table 2. *Dendrobium* spp. used as cosmetics and fragrances

Name	Part used	Type of Product
<i>Dendrobium moniliforme</i> , <i>D. amoneum</i> , <i>D. bellatum</i> , <i>D. candidum</i> , <i>D. cariniferum</i> , <i>D. chrysotoxum</i> , <i>D. cretaceum</i> , <i>D. crystallinum</i> , <i>D. densiflorum</i> , <i>D. falconeri</i> , <i>D. gibsonii</i> , <i>D. hookerianum</i> , <i>D. nobile</i> , <i>D. williamsoni</i> , <i>D. fimbriatum</i> , <i>D. transparense</i>	Flowers, seeds, leaves and root	Perfume, Essential oils
<i>D. phalaenopsis</i>	Flower extract	Skin conditioning agents in cosmetic products
<i>D. chrysotoxum</i>	Stem extract	Anti-aging component in lip and eye cream
<i>D. nobile</i>	Whole plant extract	Skin Conditioning Component in Toner

As Nutraceuticals and Herbal Drugs:

The term “Neutraceutical” was coined by Stephen L. De Felice (1995) by combining two words- Nutrition and pharmaceutical. A Neutraceutical is any substance that may be food or part of a food and it provides medical or health benefits, disease-prevention or treatment. These include any dietary supplements, herbal products, isolated nutrients, and processed food (Prasad and Achari, 1996). The root of the concept is deeply connected to the Indian system of medicine, ‘Ayurveda’. Some components called ‘AajasrikRasayana’ in Ayurveda tell about the food products that can be consumed daily to improve health quality and help prevent stress and diseases.

One such preparation is Shi-hu, which is an ancient Chinese medicine derived from *Dendrobium*. The most widely used one is *D. nobile* for treating kidney and lung diseases, stomach disease, red tongue, dry mouth, swelling, hyperglycemia, atrophic gastritis, diabetes etc. (Bulpitt et al., 2007). Besides, it is also used for longevity, as an antipyretic, as an aphrodisiac, for treatment of weakness due to thirst, impotence, leucorrhoea, entropion, menstrual pain, as an anti-cancer agent (Miyazawa et al., 1997).

Stem extracts from *D. chrysotoxum* are used in herbal supplements for cataracts, conjunctivitis, glaucoma, and hypertension. Also, these extracts are used in products to resolve phlegm and alleviate cough, ling heat, dryness and chronic cough.

As source of Phytochemicals:

Orchids are reported to produce phytochemicals, including alkaloids, flavonoids, carotenoids, anthocyanins and sterols. Alkaloids and flavonoids are most important for their biological roles. The first alkaloid to be isolated from orchids was dendrobine from *Dendrobium nobile* (Bose et al., 2017). The leading genus for phytochemical production is *Dendrobium* (Zhang et al., 2007). Secondary metabolites and phytochemicals are known to be used in various medicines (Singh et al., 2016; De, 2022).

Table 3. Medicinal uses of some *Dendrobium* spp.

Name	Component	Used for
<i>Dendrobium amoneum</i>	Isoamoeylin	Antioxidative & antibacterial activity
<i>D. densiflorum</i>	Homoeriodictyol	Anti-platelet aggregation activity
<i>D. chrysotoxum</i>	Erianin, Dendrochrysanene	Antiangiogenic activity, Anti-inflammatory activity
<i>D. nobile</i>	Dendrobine, Dendrosides, Nobilin	Immunomodulator and antioxidative activity
<i>D. moniliforme</i>	Dendromonilisides, Alkyl ferulates, Dendrobine	Stimulation of proliferation B cells and inhibition of T cell proliferation, Antioxidative activity, Antipyretic activity
<i>D. loddigesii</i>	Shihudine, Shihunine, Moscatilin	Inhibits Na ⁺ -K ⁺ ATPase activity in rat kidney, Anti-cancer agent

As Ornamental plants:

Dendrobium makes ideal houseplants. Along with their pretty colors and decorative qualities, growing *Dendrobium* at home can eradicate pollutants and toxins from the air and create a clean environment (Ramesh et al., 2019).



D. nobile



D. Chrysotoxum



D.densiflorum



D. candidum

Figure 2. Photographs of some *Dendrobium* spp. (Reproduced from the internet)

Conclusions:

Apart from its beauty, *Dendrobium*spp are full of medicinal and other qualities that benefit human society. Economic contribution of these *Dendrobium*spp is also very high. These orchids are generally inhabitants of high altitudes. Proper knowledge of their habit, habitat, and applicability can be useful for their cultivation and conservation.

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