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Review Article

A Review Article on: An Overview of Medicinal Importance of Orchids

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Abstract

Medicinal plants have played important role in human life from dawn of time. They've long been foundation of traditional herbal treatment, and their pharmacological significance has prompted substantial research. Orchids are wide group of Angiosperms that belong to Orchidaceae family. Biological activity is suggested by number of substances extracted from various sections of orchid. Alkaloids are organic heterocyclic nitrogenous chemicals that have therapeutic properties in humans and other animals. Orchids with 0.1 percent or more alkaloids are found in 214 species across 64 genera. In addition to alkaloids, they include flavonoids, phenanthrenes, terpenoids, bibenzyl derivatives, and other physiologically active compounds. Several Indian tribes use orchid for medicinal purposes, according to current studies. Scorpion and snake bites, leucoderma, eczema, tumour, diahorrhea, earache, sexually transmitted diseases, dysentery, paralysis, acidity, cholera, wounds and sores, arthritis, syphilis, pregnancy, bone fractures, spermatorrhea, muscular pains, asthma were all discovered to have therapeutic potential in 88 orchid species of 45 genera. In light of various recent discoveries about the importance of these orchids, a comprehensive analysis of chemical constituents and biological activity, as well as a critical assessment of ethno pharmacological issues, is provided. Since a large variety of orchid species have been experimentally used to treat a wide range of diseases, some research work has been conducted to provide scientific data to legitimize the therapeutic use of diverse plants in the treatment of disorders. Goal of this study is to bring traditional and folkloric usage, pharmacological studies, and phyto-constituents extracted from Orchids family up to date and give complete analysis.

Keywords: Orchids; Medicinal Plants; Medicinal Properties; Traditional Use

Introduction

With approximately 20,000 species and 850 genera, the orchid family (Orchidaceae) is the second largest flowering plant family. This variety rises as you go closer to tropics, where epiphytic species prevail, accounting for over 73 percent of family [1]. Orchid seed germination is entirely dependent on symbiotic relationship with soil-borne fungus, most often Rhizoctonia spp. In contrast to the peaceful symbiotic connections between many other terrestrial plants and mycorrhizal fungus, this relationship includes a life-or-death struggle. Fungi are constantly attempting to penetrate cytoplasm of orchid cells in order to gain nutritional substances. Orchid cells, on other hand, limit infected hyphae's development and get nutrients by digesting them [2]. Antifungal chemicals are most likely involved in limitation of fungal growth. The wonderful spice known as *vanilla* is the only economically important product in this huge plant family. Orchids have various types of beautifully gorgeous flowers that are marketed commercially. *Vanilla* originates from genus *Vanilla,* which includes numerous kinds of perennial vines native to Mexico and tropical America.

Vanilla was first employed as flavor for chocolate by Aztecs, and it was transported back to Europe by Spanish conquerors for same reason. Orchid molecules have recently been shown to be useful in lowering fevers, treating impotence, raising white blood cell count, healing eye illnesses, alleviating fatigue and headaches, and, most critically, acting as anti-cancer agents. Some orchids, such as those belonging to genera Aerides, *Bulbophyllum, Cymbidium, Eulophia, Habenaria, Pholidota, Vanda,* and others, are used by Indian tribes to heal various maladies. Tubers of orchids like as *Habenaria and Eulophia*, known as "Amarkand," were used for blood cleansing, leprosy, insanity, youth, and vigour. Orchid molecules have recently been shown to be useful in lowering fevers, treating impotence, raising white blood cell count, healing eye illnesses, alleviating fatigue and headaches, and, most critically, acting as anti-cancer agents [3].

History

The Chinese were first to publish orchid books. In 1233, Chao Shih-Keng published Chin Chan Lan P'u, a book about 20 different orchid species and how to grow them. In 1247, Wang Kuei-hsueh wrote his Treatise on Chinese Orchids, which included 37 kinds of orchids. The first Western works on orchids were not published until 1741-1755, when Eberhard Rumphius (1628 - 1702) published his Herbarium Amboinense, which included two of the 12 volumes dedicated to orchids. Chinese orchids were undoubtedly the first to be produced and described, and they were nearly certainly the first to be described for medicinal purposes. Shên-nung recognized *Bletilla striata* and Dendrobium species in his Materia Medica of the 28th century BC, according to Chinese legend, according to Reinikka. 4000-year-old Sumerian clay tablet has first Middle Eastern account of plant cures, which included some orchids. Dioscorides, Greek who worked as Roman military physician, included two terrestrial orchids in his De Materia Medica. He popularised 'Doctrine of Signatures,' according to which plants were utilised for medical reasons based on their likeness to aspects of human body, such as form or colour. As result, orchid tubers are now utilised to treat testicular illnesses and to increase love [4].

Orchid phytochemicals and medicinal properties

Phytochemicals like flavonoids, alkaloids, bibenzyl derivatives and phenanthrenes, and other substances have been discovered in orchids. These phytochemicals have antibacterial, anticancer, anti-inflammatory, antiviral, and other properties. Orchid species contain variety of different phytochemicals. Cymbidium sp. produced 2, 6-Dimethoxy-1, and 4- benzoquinone, which has been linked to allergic reactions. Heptacosane and octacosanol are produced by *Vanda roxburghii* and showed considerable anti-inflammatory impact in carrageenan-induced oedema in rats and mice. Calanthoside was isolated from *Calanthe* discolour and *Calanthe* liukiuensis and shown to have activating impact on cutaneous blood flow. Habenariol, inhibitor of lipid peroxidation in human low density lipoprotein, has been isolated from *Habenaria repens*. Scopoletin and scoparone have been extracted from *Dendrobium densiflorum* and show anti-platelet aggregation action *in vitro*. Gastrol was isolated from the rhizomes of *Gastrodia elata*, and it was discovered to have relaxing effects on guinea pig ileum smooth muscle preparations [5]. Nidemin 9, 19-Cyclolanosta-24,24-dimethyl-25-en-3-yl-trans-p-hydroxycinnamate was produced by *Scaphyglottis livida* and the *Nidema boothi*. From *Agrostoohyllum brevipes, agrostophyllinol and agrostophyllinone* have been isolated. *Dendrobium monoliforme* methanolic extract was used to identify alkyl ferulates having antioxidative effects. Other antioxidants identified from Dendrobium sp. include cis and trans-Melilotoside, as well as dihydromelilotoside. Human colon cancer (HCT-8), human stomach cancer (BGC-823), (A549) human lung adenocarcinoma, human breast cancer (MCF-7) and human ovarian cancer (A2780), human hepatoma cell lines have all been shown to be cytotoxic by *Cremastra appendiculata*. Anti-tumor chemicals have also been discovered in *Bulbophyllum kwangtungense*. CymbidineA, a hypotensive and diuretic chemical derived from *Cymbidium goeringii*, and Cyclobalanone and 5-lanosta- 24,24-dimethyl-9(11),25-dien-3-ol, a dose-dependent antinociceptive and anti-inflammatory drug derived from *Scaphyglottislivida Kinsenoside*, generated by *Anoectochilus formosanus*, has antihepatotoxic effects [6].

In traditional medicine, orchids are used

Orchids have been utilised as traditional medicines in many nations for long time. Chinese are without doubt first to produce and describe orchids, and they are almost probably first to describe orchids for therapeutic purposes. Chinese were also first to publish orchid-related literature. For ages, orchids, particularly Dendrobium species, have been utilised as medical plants in many nations. In traditional Chinese medicine, over 40 Dendrobium

species are still utilised. Other genera of medical orchids that are heavily exploited include *Acampe, Aerides, Coelogyne, Crepidium, Dactylorhiza, Gastrodia, Eulophia, Flickingeria, Otochilus, Pholidota, Satyrium, and Vanda*. Orchids such as *Brachycorythis obcordata, Coelogyne cristata, Dactylorhiza hatagirea, Otochilus porrectus, Rhynchostylis retusa, Satyrium nepalense, and Vanda* cristata are still widely utilised in Trans-Himalayan area, whereas orchids such as *Cypripedium himalaicum, Dendrobium densiflorum* native community has traditionally used Vanda for its anti-inflammatory qualities. Indian Vanda does have anti-proliferative properties against variety of malignancies, including carcinoma, lung cancer, and stomach cancer. Some orchid species, such as *Habenaria fusifera, Habenaria pantlingiana, and Habenaria roxburghii*, have been used as antidotes against scorpion, snake, and bug attacks [7].

No	Species name	Common name	Habitat	Family	Plant Part	Medicinal Uses
1	*Acampe papillosa (Lindl.)*	Rasna (Sanskrit)	Epiphytic	Orchidaceae	Roots Leaf	Fresh colleted roots are used to deal rheumatism and paste of roots are rapidly on scorpion and the snake bites [8]. Mixture of garlic and leaf paste extremely used for stomach illness (due to the acidity) [10].
2	*Acampe carinata (Griff.)*	Rasna (Sanskrit)	Epiphytic	Orchidaceae	Roots	Paste of roots are used to treat rheumatism and uterine diseases, sciatica, scorpion and the snake bites [9].
3	*Aerides multiflo-rum Roxb*	Draupadi puspa	Epiphytic	Orchidaceae	Complete plant	Cuts and wounds are treated by using the juice of the entire plant [10].
4	*Acampe praemorsa (Roxb.)*	Rasna (Sanskrit)	Epiphytic	Orchidaceae	Roots	To treat arthritis, fresh root paste made from Asparagus recemosus is administered orally on an empty stomach [11].
5	*Arundina graminifolia (D. Don)*	Bamboo orchid	Terrestrial	Orchidaceae	Rhizome	Rhizome paste is used to treat wounds that have been infected with bacteria [10].
6	*Bulbophyllum cariniflorum Rchb. f.*	Sumura	Epiphytic	Orchidaceae	Roots	A combination of dried root, cow milk, and black pepper is used to induce abortion in women who are 2–3 months pregnant [12].
7	*Calanthe sylvatica (Thour.) Lindl*	Pakha Phool (nepal)	Terrestrial	Orchidaceae	Complete Plant Flowers	-The use of whole plant components for epistaxis [13]. - flowers have been used to control nasal bleeding [14].
8	*Cleisostoma williamsonii (Rchb.f.) Garay*	-	Epiphytic	Orchidaceae	Complete Plant	The paste of whole plant have been used as an astringent [15].
9	*Coelogyne corymbosa Lindl.*	Umbrella Like coelogyne	Terrestrial	Orchidaceae	Pseudo - bulb	The juice of pseudobulb have been used as healing material for burn wounds [16].
10	*Coelogyne cristata Lindl.*	Crested coelogyne	Epiphytic	Orchidaceae	Pseudo - bulb	The gum of pseudobulb have been used at sores [17].
11	*Coelogyne fuscescens Lindl*	Ocher Yellow	Epiphytic	Orchidaceae	Pseudo - bulb	The paste of pseudobulb eat directly for stomach ache [18].

12	*Coelogyne punctulata Lindl.*	-	Epiphytic	Orchidaceae	Pseudo - bulb	The residents of Nagaland pound dried pseudobulb into a powder, which they apply to burn injuries [19]. It provides instant pain relief and aids in wound healing [13].
13	*Dendrobium amoenum Wall*	Lovely Dendrobium (himalayas)	Epiphytic	Orchidaceae	Shoots	Extraction of fresh shoots acts as an antibiotic, inhibiting the growth of bacteria in wounds and ulcers [13].
14	*Dactylorhiza hatagirea (D. Don)*	'panchaule' (Nepali), (himalayas)	Terrestrial	Orchidaceae	Tubers	Burns, tonic, wound healing, and bleeding control. It's also an uncooked food. It has been used to treat fevers and a variety of other illnesses [20].
15	*Dendrobium crepidatum Griff.*	Shoe-lipped, Mei-Gui Shi Hu (china)	Epiphytic	Orchidaceae	Psudobulbs	Fracture and displaced bone are treated using paste [21].
16	*Dendrobium longicornu Lindl.*	Chang Ju Shi Hu (china)	Epiphytic	Orchidaceae; Juss.	Full plant	Plant juice have been used to treat fevers, and boiling roots are fed to livestock with coughs [21].
17	*Dendrobium normale Falc.*	Blue orchid	Epiphytic	Orchidaceae	Full plant	The whole plant uses for their tonic properties [8].
18	*Eulophia campestris Wall*	Salibmisri (Hindi); Amrita, Virkanda (Sanskrit); Hattipaila (Nepali)	Terrestrial	Orchidaceae	Tuber	The tuber has been used as an appetiser, aphrodisiac, and alterative in traditional medicine as; purify blood in heart problems [8].
19	*Flickingeria macraei (Lindl.) Seidenf.*	Bonga taini	Epiphytic	Orchidaceae	Pseudobulb	the juice of Pseudobulb extremely used as tonic and used to heal skin allergies [23].
20	*Habenaria acuminata Lindl.*	Kakoli, Chandal	Terrestrial	Orchidaceae	Tuber	The tuber has been used as tonic [10].
21	*Pleione maculata (Lindl.)*	-	Epiphytic	Orchidaceae	Rizome	Rhizomes are used to treat the liver complaints [13].
22	*Nervilia plicata*	Satram dumpa	Terrestrial	Orchidaceae	Whole plant	Decoction of various parts of plants are used to treat cough, urinary problems, diarrhea, asthma [13].
23	*Malaxis acuminata D.*	Rishbhaka, Bandhura, Indraksa, Matrika (Sanskrit)	Terrestrial	Orchidaceae	Pseudobulb	Decoction of pseudo-bulb are used to treat fever in Nagaland [19]. and also used for treatment of burning, bleeding and as a cooling agent [13,24].
24	*Luisia trichorrhiza*	-	Epiphytic	Orchidaceae	Roots	Roots paste is prepared with ginger and turmeric to cure jaundice and root extract also help to reduce pain of human muscles [13,25].

25	*Liparis odorata (Willd.) Lindl*	-	Terrestrial	Orchidaceae	Leaf	Juice of the leaves are used to treat burned parts of body, cancerous- ulcers and gangrene [1324].
26	*Vanda cristata Lindl*	Cha-Chun Wan Dai Lan (China)	Epiphytic	Orchidaceae	Leaf	Leaves are utilized as energetic tonic and expectorant [13].
27	*Rhynchostylis retusa(L.). Bl.*	Draupadi mala (Hindi)	Epiphytic	Orchidaceae	Whole plant	Rheumatism is treated with the leave and Cuts and wounds are treated with root juice and whole plant paste used for treatment of many skin infections [22].
28	*Bulbophyllum lilacinum Ridl.*	Pargasa	Epiphytic	Orchidaceae	Pseudobulbs	Fluid is collected from cleaned pseudo bulbs by pressing and preserved in a sealed jar overnight before being blended with water and consumed as a cold drink. It relieves weariness and restlessness while keeping the body energized [11].
29	*Oberonia caulescens Lindl*	Xia-Ye Yuan Wei Lan (China)	Epiphytic	Orchidaceae	Tuber	The tubers are used as medicine for treatment of liver disorders [13].
30	*Vanda tessellata (Roxb.) Hook. ex G. Don.*	Rasna, Vanda (Hindi)	Epiphytic	Orchidaceae	Roots, leaf, whole plant	In Chota Nagpur (India), the Juice of leaves used for treatment of fever. Plants also help to heal the snake bite and roots are used to treat dyspepsia, rheumatism- fever and sexually transmitted disorders [11,24].

Table 1

Antimicrobial activity

A number of orchid family members have been shown to be effective inhibitors of gramme positive and gramme negative bacteria, as well as robust antimicrobial agent. *In vitro*, gastrodianin, a protein isolated from the orchid *Gastrodia elata*, was discovered to have antifungal properties. Gastrodianin is closely related to mannose-binding proteins discovered in other orchids, some of which show antifungal properties *in vitro*. Antimicrobial activity has been shown in methanolic extracts from several orchid sections. Methanolic extract produced from leaves of *Spiranthus mauritianum* inhibited gram-positive bacteria and had anti-inflammatory properties. Methylene chloride extract from *Galeola foliate* leaves and stem bark has antibacterial activity against both Gram positive and Gram negative bacteria, however it was shown to be inactive against moulds. Vanillin, the principal flavour component of *vanilla,* is a membrane active molecule that dissipates ion gradients and inhibits respiration. Vanillin shows antibacterial effects against *E. coli* bacteria*. E. coli*, *Listeria innocua, Lactobacillus* plantarum The antimicrobial activity of vanillin and vanillic acid isolated from *Vanilla planifolia* was investigated against several strains of *listeria, Listeria seeligeri, Listeria innocua, Listeria grayi,* and it absolutely was discovered that the mix of vanillin and it's acid had additive inhibitory impacts, especially at low pH. *Bletilla striata* herb extract shows antioxidant and antibacterial properties. The antifungal chemicals lusianthrin (C15H12O3) and chrysin were discovered in an ethanol- extract of the seedlings of *Cypripedium macranthos var. rebunense*. Lusianthrin, which protects adult plants while maintaining a potentially deadly symbiotic connection for germination, has been found to be a more efficient antifungal chemical than chrysin [25].

Anticancer/antitumor

Water decoction of the whole plant of *Anoectochilus formosanus Hayata* showed a high tumour inhibitory effect after subcutaneous

implantation of CT-26 murine colon cancer cells into BALB/c mice. In mice, water extract elicited immunological responses such as lymphoid tissue development and peritoneal macrophage phagocytosis of Staphylococcus aureus. The anticancer effect of *A. formosanus* may be connected to its potent immunostimulating impact. Another study discovered that a methanolic extract of *A. formosanus* causes apoptosis in MCF-7 cells. Cirrhopetalanthrin was isolated from the tuber of *Cremastra appendiculata (D. Don*) Makino and showed non-selective moderate cytotoxicity against human colon cancer (HCT-8), human hepatoma (Bel7402), human stomach cancer (BGC-823), human lung adenocarcinoma (A549), human breast cancer (MCF-7), and human ovarian cancer (A2780) cell lines with IC50 Bulbophyllum is an Orchidaceae genus with about 1000 species found in Asia, America, and Africa, chiefly phenanthrenes and bibenzyls. *Bulbophyllum odoratissimum* is a bulbophyllum with a strong smell. In China, Nepal, Sikkim, Bhutan, India, Burma, Thailand, Laos, and Vietnam, Lindl is frequently used in traditional medicine. During a search for bioactive compounds in medicinal plants in Yunnan, China, researchers discovered the phenanthrene derivative 3,7-dihydroxy-2,4,6-trimethoxyphenanthrene in the complete Bulbophyllum odoratissimum plant. Chemical reduced proliferation of human leukaemia cell lines K562 and HL-60, human lung adenocarcinoma A549, human hepatoma BEL-7402, and human stomach cancer cell lines SGC-7901 with IC50 values of 14.23, 10.02, 3.42, 15.36, and 1.13 mg/ml, respectively [26].

Diseases that cause convulsions

The rhizomes of *Gastrodia elata*, a medicinal herb, have long been used to treat convulsive diseases like epilepsy in eastern countries, including South Korea, and they continue to play an important part in Asian traditional medicine. Methanol extract of G. elata rhizomes protects hippocampal neurons from acute global ischemia in a gerbil model. Furthermore, it was revealed that an aqueous extract of *G. elata* rhizomes inhibited the JNK pathway, lowering PC12 cell death caused by serum deprivation. Bis(4-hydroxybenzyl) sulfide and N6-(4-hydroxybenzyl) adenine riboside, both isolated from *G. elata,* were shown to prevent serum deprivation-induced apoptosis in PC12 cells and bind A2A-R. *G. elata* contains vanillyl alcohol, a free radical scavenger that may be responsible for the anticonvulsant properties of the plant. The fact that superoxide radicals produced by iron salt injection into the rat brain play a major role in ferric chloride-induced seizures supports this conclusion. Furthermore, at least in part, the anticonvulsant effect might be due to the vanillyl alcohol component. In totally amygdala-kindled episodes, which is an animal model of chronic epilepsy used to identify anticonvulsants, isolated vanillin and vanillyl alcohol from *G. elata*, on the other hand, displayed anticonvulsant action [27].

Goodyerin (C36H40O19) is a flavonol glycoside extracted from of *Goodyera schlechtendaliana* (complete plants) that has been utilised as a substitute for the crude drug *Anoectochilus formosanus*. It was isolated from whole plants of *Goodyera schlechtendaliana*. The pharmacological properties of goodyerin were studied in mice for their effects on spontaneous locomotor activity, pentobarbital-induced hypnosis, and anticonvulsant efficacy against picrotoxin-induced convulsions. Goodyerin's sedative and anticonvulsant effects were dose dependent [28].

Anti-inflammatory activity

Anti-inflammatory activities have been discovered in several orchid species. In rats and mice, *Vanda roxburghii* has a substantial anti-inflammatory effect in carrageenan-induced oedema. Phenyl butazone's anti-anrthritic activity was shown to be lower. Heptacosane and octacosanol, both extracted from roots of *Vanda roxburghii*, have been shown to have anti-inflammatory properties. Plants are high in long chain of alkanes and alkanols (ranging from C-27 to C-32) which have anti-inflammatory effects. After carrageenan administration, the anti-inflammatory effect of an ethanolic extract from *Anoectochilus formosanus* leaves was delayed for 4 hours. *Anoectochilus formosanus* has also been shown to exhibit histological changes. The use of this orchid reduced lymphocyte and kupffer cell infiltration near main veins. An ethanolic extract from *Gastrodia elata* rhizomes suppressed angiogenesis, decreased acetic acid-induced vascular permeability, and reduced exudate formation, nitric oxide (NO) level, and leukocyte (WBC) migration in a chick chorioallantoic membrane experiment. When RAW264.7 cells are stimulated with lipopolysaccharide, it inhibits nitric oxide generation as well as cyclooxygenase-2 and nitric oxide synthase expression. *Pholidota chinensis* is an orchidaceae species that contains a variety of triterpenes, cyclopholidonol, and cyclophlidones. In RAW264.7 murine macrophage-like cells, an ethyl acetate extract of *Pholidota chinensis* pseudobulb has a significant inhibitory effect on nitric oxide production [29].

Antidiabetic

Aqueous extracts of *Anoectochilus formosanus* rhizomes showed antihyperglycemic and antioxidant activities in diabetic rats, as well as significant decreases in fasting blood glucose, serum fructosamine, triglycerides, and total cholesterol. Renal lipid peroxidation (RLP) levels were much lower in extract-treated diabetic rats, although concentrations of renal - reduced glutathione (GSH) were crucially higher. *Dendrobium candidum* has anti-hyperglycemic action, and its processes include promoting insulin secretion from beta cells and suppressing glucagon secretion from cells, as well as decreasing liver glucogen breakdown and increasing liver glucogen synthesis [30].

Antioxidant property

Several orchid chemicals have been discovered to have high antioxidative properties. Ephemeranthone, a dihydrostilbene take from the ethanol - extract of *Ephemerantha lonchophylla spp.* leaves, has been found to have significant antioxidative activities *in vitro* reduction of human (LDL) low density lipoprotein. Another dihydrostilbene isoamoenylin extracted from the *Dendrobium amoenum var* (epiphytic) roots. denneanum showed important antioxidative action. Cismelilotoside, dihydromelilotoside, and trans-melilotoside were discovered to be strong antioxidants in *Dendrobium aurantiacum* stems. *Dendrobium monoliforme and Dendrobium tosaense* have also yielded antioxidative chemicals such as alkyl ferulates and quercetin. *Dendrobium nobile* ethanolic extract was discovered to have antioxidative properties comparable to or greater than ascorbic acid. Lindl that have DPPH radical scavenging activity. Hydroxybenzaldehyde, hydroxybenzyl alcohol, vanillin and its alcohol, all obtained from *Gastrodia elata* leaf methanolic extract, have been shown to exhibit antioxidant characteristics. Many phenanthrenes extracted from the ethanolic extract (60%) of the *Pholidota yunnanensis* air dried plant were shown to have DPPH (screening antioxidant activity of plant extracts) free radical scavenging activity [31].

Diuretic

Cymbidium goeringii makes a monomeric peptidoglycan with 4 amino acids and two amino sugars respectively (D-alanine(C3H7NO2), meso-diaminopimelic amino acid, Dgultamic amino acid, and L-valine amino acid) (Nacetylglucosamine and 1,6-anhydro-N-acetylmuramic acid). This chemical has diuretic and hypotensive effects. Compound gigantol was reported to have significant inhibitory effects on prostaglandin E and LPS-induced NO formation in RAW 264.7- cells in a separate study. In RAW 264.7- cells, gigantol inhibited inducible nitric - oxide synthase (iNOS) and cyclooxygenase - 2 (COX-2) protein and mRNA synthesis in a concentration-dependent manner, confirming these findings. Furthermore, gigantol reduces the release of TNFalpha (tumour necrosis factor alpha), interleukin-1beta (IL-1beta), and interleukin-6 (IL-6) and has a dose-dependent influence on their mRNA expression levels [32].

Antivirus

Four mannose (Man)-, three nacetylglucosamine (GlcNAc) n-, ten nacetylgalactosamine/galactose(GalNAc/Gal)-, one 5-acetylneuraminic acid (alpha-2,3-Gal/GalNAc)-, and one 5-acetylneuraminic acid (alpha-2,6-GalNAc)-, Mannose-specific lectins from the *Cymbidium hybrid* (CA)- orchid species, *Epipactis helleborine* (EHA) (terrestrial), and *Listera ovata* (LOA) - (terrestrial) were significantly inhibitory to HIV-1 and HIV-2 in MT-4 cells, as well as anti-human cytomegalovirus- (CMV) and respiratory syncytial virus (RSV) and influenza virus activities. In another investigation, plant lectins isolated from *Listera ovata* suppressed infection of MT-4 cells by human and simian immunodeficiency viruses- HIV-1 and HIV-2 and simian immunodeficiency virus at doses equivalent to dextran sulphate (molecular weight, 5,000 [DS-5000].). Plant lectins that target -(1-3)-D- and -(1-6)-Dmannose-disrupt one stage of the HIV replication cycle when virions attach to cells. *Gastrodia elata* produced a -D- (1->4)-glucan with a -(1->4) linked branch connected to O- 6 branch sites with various branch degrees. These coronaviruses cause serious human and animal disease, and their importance has extended as new human coronaviruses including SARSCoV, HKU1, and NL63 have appeared [33].

Other medicinal properties

Ethyl ether derived from tuber of *Bletilla striata* has been shown to have antihelminthic properties *in vitro* against cercaria, excysted metacercaria, and Clonorchis sinensis adults. In rabbits, methanolic extract derived from *Dendrobium monoliforme* rhizomes has antipyretic properties. Shihunidine and shihunine, which are found in fresh stem of *Dendrobium loddigesii*, have inhibiting impact on rat kidney's Na+-K+ ATPase. Sesquiterpene glycosides containing alooaromadendrane, emmotin, and picrotoxane type aglycones found in stem of *Dendrobium nobile*

have immunomodulatory action. Moscatilin, bibenzyl derived from *Dendrobium nobile*, has antimutagenic action against UV radiation, furylfuramide, 4-nitroquinoline-1-oxide, benzo[a]pyrene, and aflatoxinB. (1). Calanthe discolour LINDL. and Calanthe liukiuensis methanolic extract S, Obisdesmoside, calanthoside, glucoindican, calalikiuenoside, calaphenanthrenol, tryptanthrin, indirubin, isatin, and indicator are all components of SCHLTR, which have hair-restorative and skin-blood-flow-promoting properties. *Vanda roxburghii* ethanolic extract has wound-healing properties. Leaves of *Acanthephippium bicolor Lindley* have been found to be one of greatest herbal medicines for Urinary Tract Infection, and they may be used as herbal and scientific medicine at any time of year since they are not affected by seasons. Moscatilin, moscatin diacetate, and moscatilin isolated from stem of D*endrobium loddigesi* have significant antiplatelet action. Moscatilin, homoeridictyol, scoparone, scopoletin, and gigantol, all derived from *Dendrobium densiflorum Lindl*. ex Wall stem, were discovered to have antiplatelet aggregation activity *in vitro*. Scoparone is one of these compounds that has high antiplatelet aggregation action. Methanolic preparations of *Gastrodia elata* rhizomes also contain polysachharide that inhibits platelet aggregation and prevents thrombosis. *Anoectochilus formosanus* rhizome aqueous extract has antihyperglycemic and antioxidant properties. In diabetic rats, extract lowers fasting blood glucose, fructosamine, triglycerides, and total cholesterol [34].

Future aspect

Extensive study is still needed before orchid species can be completely recommended for therapeutic purposes. Intensive care and habitat management are highly suggested because to their tiny population size and restricted range. medicinal orchids have received very little attention in terms of commercial cultivation. Only with human assistance can species that have been threatened as result of human actions survive. Plant tissue culture might be one of most effective alternatives for reducing strain on medical orchid populations and ensuring their long-term viability [35].

Conclusion

Orchids are well-known for their lovely blossoms, but their therapeutic properties are less well-known. However, number of chemicals with therapeutic effects have been identified from various portions of plant. Animal models have been used to identify and test antimicrobial, anticancer, anti-inflammatory, antioxidative, antidiabetic, neuroprotective, and antiallergic chemicals, however clinical trials employing orchid plant components are uncommon. focus on clinical studies will open up new avenue for using herbal medicines to treat ailments. orchid components still need to be thoroughly studied, with extensive experimental trials, before they can be accepted as medical suggestions. In addition, orchid's rich natural gene pool is dwindling at alarming rate, owing to over-exploitation for medicinal and decorative uses. Many species have already gone extinct in wild, including Liparis olivacea, and many more are on verge of extinction. Recent developments in conservation biology and biotechnological techniques have opened way for preservation of plant biodiversity; nevertheless, relatively little effort has been made to commercialise therapeutic orchids, putting them under even more stress [36]. As result, in addition to supporting artificial propagation, any acquisition of wild orchids should be prohibited at all levels, and public awareness for successful conservation should be raised.

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