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Review Article

MEDICINAL VALUE OF ORNAMENTAL PLANTS

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Abstract: Gardens cannot be finished without the ostentatious, expensive investments of decorative plants. Human life is significantly impacted by ornamental plants, particularly flowering ones. They provide the surrounds with fresh air and let the environment's negativity to escape. Humans were fascinated by ornamental plants because of their unusual and alluring smell. Aside from aesthetics and the mentioned tradition. I practises, many ornamental plants also have additional economic purposes. A variety of drinks contain edible herbs that also have therapeutic benefits. Important domestic plants are very nutritious and can be cooked or eaten as salads. With these plants' numerous pharmaceutical uses, we hope that this review will raise awareness of their alternative applications.

Keywords: *Traditional medicine, Aesthetic, Economic, Edible, Pharmaceuticals*

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Introduction

Ornamental plants can provide multiple benefits to the environment, the economy, and human lifestyles [1]. Ornamental plants are being grown in homes, workplaces, and institutions to embrace the landscape because of their beautiful flowering and lovely attractive foliage [2] furthermore, floriculture agricultural goods are exported to nations such as the United States, Japan, the United Kingdom, the Netherlands, and Germany. Floriculture has created a plethora of career possibilities, particularly for plant breeders. Many flowers, including lotus, hibiscus, rose, pionia, and sunflower, are utilised by devotees to bring spiritual enlightenment to various gods and goddesses [3]. Growing decorative trees can aid in temperature reduction. *Nyctanthes arbor*-tristis, also known as night blossoming jasmine, is an excellent tree for lawns because it has white flowers with orange stalks and is used in 'gajaras,' 'poojas,' and Ayurvedic remedies [4]. Ornamental plants attract pollinators, which can feed them via nectar in their blooms, which has a high nutritional value for people as well [5].

Floriculture, as a specialized vocation, has emerged in the last two decades and is challenging global commerce against other emerging countries. Many attractive plants are utilized as indoor plants to add freshness to homes, hospitals, and other buildings. It has been shown that patients who have plants on their wards recover faster. Plants and flowers have long-term uplifting and uplifting impacts on human minds. Indoor air contaminants are minute particles that are difficult to remove physically, but indoor plants may do this laboriously [6]. *Hedera helix, Nephrolepis exaltata, Anthurium andreanum, Aglaonema modestum, Areca lutescens, Ficusalii, Chrysanthemum leucanthemum, Syngonium podophyllum, Chamaedoraea elegans, Dracena marginata, D. sanderiana, Epipremnum aureum, Clopophytium comosum, Sansevieria trifasciata, Philodendron, Spathiphyllum, etc*., are some ornamental indoor plants that contain volatile substances capable of removing formaldehyde, ammonia, benzene, xylene, carbon monoxide, chloroform, and other toxic compounds from the air [7].

The growing popularity of aesthetic plants, some of them are grown for medical purposes which contain various bioactive substances *i.e*., phenolic compounds, carotenoids, antioxidants, essential oils, and other secondary metabolites [8, 9].

Decorative plants such as *Ocimum* sp., *Nicotiana* sp., *Ixora, Aloe vera, Agave*, and others, as well as ornamental flowers such as roses, nasturtium, hibiscus, marigold, Calendula, and others, are often planted in homes and have various medical benefits. In addition, therapies derived from plants can be considerably cheaper and safer against free radicals than pharmaceutically created drugs. Carnations, for example, are well-known as a cut flower across the world, but the petals of this flower may be used to treat skin issues as well as alleviate weariness and stress. Many flowers are edible and can be used to flavour curries, sweets, chutneys, and hot drinks. For example, Japanese Honeysuckle, Woodbine Honeysuckle and Dandelion, have antioxidant qualities and can be used to flavour tea or syrups with anti-inflammatory characteristics [10]. Different ornamental plants which have medicinal properties are indicated [51]. Flowers have no caffeine, although other forms of tea include stimulants such as caffeine, theobromine, and xanthenes alkaloid. Hot drinks are offered for health in Europe due to the high nutritional qualities of several edible flowers, which have therapeutic effects. Lotus and Dahlia flowers are utilised in the production of puddings, cupcakes, pastries, and other pastry goods. Lotus is utilised to reduce blood sugar levels, regulate menstruation, and function as an anti-inflammatory agent, whilst Dahlias offer antibacterial and antiviral properties [11]. *Tagetes erecta* (Asteraceae) is an ornamental flower-like plant that is mostly used as a garden flower, in garlands, to decorate houses and banquets, and can be used as an analgesic and antioxidant [12]. Members of the Asteraceae family have attractive yellowish-white blooms that are used in antioxidant-rich drinks and to treat stomach aches [13]. Herbalists can tell you about the medicinal properties of specific plants. Some people may not comprehend the advantages of plants growing organically around them because they lack the necessary education. So, this article is made up of certain decorative plants that are good for medicinal purposes and other economic reasons, with floriculture being viewed as a different possibility to offer additional items. Calendula, Echinacea, Achillea, Acmella, and Tanacetum are five therapeutic plants of the Asteraceae family. The following are some decorative plants that are useful as flower crops and have medicinal use. Following are decorative plants and useful as flower crops having medicinal use.

Antioxidant and trichogenous activity

In the last two decades, pharmacological exploration of *L. inermis* plant extracts have revealed strong nootropic, CNS depressant, antimicrobial, antioxidant, wound healing, anti-inflammatory, antipyretic, analgesic, hepatoprotective, tuberculostatic, diuretic, hypoglycemic, and antiparasitic properties [14]. Tepal extract inhibited carotene oxidation extensively, as well as strong NO radical scavenging and Cu2+chelating actions. It may be inferred that saffron tepals, particularly the leaves, are a valuable source of antioxidants and metal chelating chemicals [15]. Floral antioxidant activities (FRAP and 2,2-diphenyl-1-picrylhydrazyl—DPPH), total phenolic compound (TPC), total anthocyanin content (TAC), and ascorbic acid content (AAC) were measured in 126 individuals from 46 germplasm of *Clitoria ternatea* [16]. Siddhuraju, *et al*., (2002) [17] studied an antioxidant activity from different parts of Cassia fistula and they reported that highest super oxide radical scavenging was exhibited in bark and leaves extracts. The leaves of *Nyctanthes arbor*-tristis are bitter, tonic, anodyne, anti-inflammatory, digestive, Cholagogue, anthelmintic, depurative, sudorific, febrifuge, expectorant, diuretic, laxative, and trichogenous, and they are helpful for conditions such as obstinate sciatica, rheumatism, arthritis, inflammation, dyspepsia, helminthiasis, pruri Thorough phlegm expectoration is aided by eating bark together with betelnut and leaves. The bark is thought to be helpful for internal injuries and wound healing, including bone fractures, when combined with Arjuna bark (*Terminalia arjuna*) [18].

Adhirajan and Kumar (2003) [19] conducted an experiment on effect of petroleum ether extract Hibiscus rosa-sinensis on hair length of female albino rats and stated that dried powdered leaves extract showed significantly maximum hair length until the end the treatment course compared to control and 'Placebo' standard. Patel, *et al*., (2012) [20] studied the secondary metabolites and antioxidant properties of various plant parts of Hibiscus rosa-sinensis cultivars and they stated that leaves of hibiscus were found to possess highest amount of flavonoid in all cultivars compared to stem and root except for 'YELLOW' cultivar and they also stated that higher antioxidant capacity was observed from leaves of 'RED' cultivar. A quantitative assessment of bioactive phytochemicals of Nerium indicum was done by Dey, *et al*., (2012) [21] in west Bengal and they reported that highest percentage of alkaloid and saponin have been detected from roots of *N. indicum* which are used as antitumor and as antimalarial activity for medicinal purpose.

Anticancer activity

Catharanthus roseus, sometimes known as the Madagascar periwinkle, produces the powerful anticancer medicine vinblastine in modest amounts. Heterologous reconstitution of vinblastine production might give an additional supply of this medication. The identification of the biosynthetic genes is difficult due to the chemistry involved in vinblastine production. Here, we characterise two hydrolases that are required for the biosynthesis of vinblastine in this plant and identify the two missing enzymes: an oxidase and a reductase that isomerize stemmadenine acetate into dihydroprecondylocarpine acetate, which is then deacetoxylated and cyclized to either catharanthine or tabersonine via two hydrolases [22]. One of Taif, Saudi Arabia's most significant economic outputs is the Ward Taifi (Taif rose). In this study, the biological and phytochemical effects of fresh and dried Taif rose were examined. In contrast to the watery fractions, the 80% methanol extracts and -butanol fractions of dried and fresh Taif rose demonstrated strong radical scavenging activity against an artificial 1,1-diphenyl picrylhydrazyl (DPPH) radical with SC50 values. The American Cancer Institute's requirements were met by all samples' in vitro anticancer efficacy. Total phenolics and antioxidant activity showed a strong positive link, however there was no relationship between total phenolics and anticancer activity [23]. Dantu, *et al*., (2012) [24] resulted that the hydroalcoholic extract of *Tabernamontana divaricate* flowers has a moderate anticancer activity. As the concentration increased there was increased in the cell growth inhibition of cell.

Antimicrobial activity

Using a disc diffusion test, the antibacterial properties of C. officinalis extracts was assessed against a panel of bacteria and fungi obtained from patients at the Belfast City Hospital (BCH).

Most of the bacteria examined responded better to methanol extract of *C. officinalis* than ethanol extract in terms of antibacterial activity. When compared to Fluconazole, both methanol and ethanol extracts demonstrated outstanding antifungal efficacy against the investigated fungus strains [25]. In comparison to other Gram-negative infections and multidrug resistant *Klebsiella* species, *C. ternatea* alcoholic extract is a more effective antibacterial agent. Additionally, research is needed to determine the active components in the alcoholic extracts of *C. ternatea* that can be used to treat infections [26]. In many nations, medicinal plants like *Sesbania grandiflora* and *Hibiscus sabdariffa* are frequently used to cure a variety of ailments brought on by various bacteria. In the current investigation, the antibacterial properties of hibiscus and sesbania extracts were investigated. *Escherichia coli*, *Staphylococcus aureus,* and *Pseudomonas aeruginosa* were the three bacteria against which the antibacterial activity of the plant extracts was examined. In contrast to the ethanolic stem and root extracts of *S. grandiflora*, the aqueous extract of *H. sabdariffa* demonstrated high antibacterial activity in this investigation. The study's findings suggest that the effects of both extracts were concentration-dependent. In compared to Sesbania extract, Hibiscus extract had the strongest inhibitory efficacy against all bacterial strains at a dosage of 500 mg/mL [27]. Specifically in West and Southeast Asia, the tropical and warm climate zones are home to the *Jasmine sambac* species. It has been demonstrated that *J. sambac's* essential oil possesses antioxidant properties. However, there is a dearth of knowledge on antibacterial activity, particularly with reference to oral microbes [28].

Antimicrobial activity tests using the broth micro-dilution procedures on 96-microwell plates were used to identify extracted and purified compounds from lotus leaves during a search for chemotherapeutic drugs inhibiting probable peridontitis bacteria. For periodontitis, quercetin derived from lotus leaves may be a useful antibacterial agent [29]. With inhibitory zones, the lotus leaf's ethanol extract has antibacterial efficacy against *B. subtilis* and *S. aureus* [30]. Aneja, *et al*., (2010) [31] studied an experiment on microbial activity of *Barleria prionitis* bark extracts against dental caries causing oral pathogens by agar well diffusion method and they revealed that among the treated bacteria it showed the highest zone of inhibition against *bacillus* sp.

Dasgupta, *et al*., (2012) [32] reported that Mexican marigold leaf extract has maximum antibacterial properties for *Acinetobacter bamannii* and *Propinoni bacterium* acne while minimum was for *Streptococcus pnummoniae*. Therefore, marigold has antibacterial effect against air borne disease causing gram positive and gram negative bacteria against skin infection causing bacteria. Sharmila and Gomathi (2010) [33] evaluated antibacterial activity of leaf extracts of *Crossandra infundibuliformis* against pathogenic bacteria. They noted that ethanol extract of *Crossandra infundibuliformis* showed maximum antibacterial activities against *Pseudomonas aeruginosa*.

Analgesic and antidiabetic activity

Swiss albino mice were used in an acetic acid-induced writhing testing to test the analgesic efficacy of *D. pinnata* leaf. Each test extract demonstrated measurable analgesic efficacy. The petroleum ether and chloroform extracts were determined to be the next most potent, respectively, after the methanol extract [34]. Steroids, flavonoids, glycosides, and terpenoids have all been found in Bougainvillea glabra leaves, or MEBG. Our research into the potential analgesic, anti-inflammatory, and anti-pyretic properties of Bougainvillea glabra leaves was driven by the compounds' pharmacological interest as well as the plant's historic usage in medicine. Using the mouse tail immersion method, the analgesic activity of MEBG was investigated [35]. *Bougainvillea glabra* leaves (MEBG). Dulcis herb whole and *F. Racemosa* fruit has both central and peripheral analgesic effects [36]. *Bixa orellana*, sometimes known as annatto, is a natural food colouring that has been employed for several medicinal uses. According to certain theories, annatto may have the ability to lower blood sugar levels. When administered to rats with severe diabetes mellitus, anatto exerts a hypoglycemic effect. Although this impact lasted for a while, it became more noticeable two hours following medication delivery [37]. Trans-dehydrocrotonin (t-DCTN), a bioactive diterpene derived from the well-known medicinal plant *Croton cajucara*, has antidiabetic actions (*i.e*., a decrease in hyperglycaemia and hypertriglyceridaemia) [38].

The bioactive chemical makeup of medicinal plants' various sections varies. There are reports of the blossom and leaves of *C. auriculata* L. having anti-diabetic properties. Instead of the flower, *C. auriculata L.* buds are traditionally used to cure diabetes. Compared to flower extract, *C. auriculata* L. bud extract may be able to better manage diabetes [39]. Sengar, *et al.,* (2015) [40] reported that ethanol root extracts of *Jasminum sambac* has moderate effect of analgesic activity as concentration increased there was reduced in writhing count. Judy, *et al*., (2003) [41] concluded that extract from leaves of Lagerstroemia speciosa standardized to 1% corcolic acid (Glucosol TM) showed significant reduction in blood glucose level.

Increasing blood count, Vulnerary and antiulcer activity

Aloe plants, particularly Aloe vera (*Aloe barbadensis* Miller), are recognised for their medical benefits all over the world. *A. vera* is said to provide several medicinal benefits, particularly in accelerating the recovery from burns, frostbite, and wounds. This species also possesses anti-fungal, anti-inflammatory, hypoglycemic, and gastroprotective effects. Several research have demonstrated the vulnerarily-active properties of systemically or topically applied aloe gel material, however other investigations found that it had no effect or only delayed the healing of wounds [42]. Calendula's leaves and petals have vulnerary, antiphlogistic, antiseptic, antispasmodic, aperient, cholagogue, diaphoretic, and emmenagogue properties [43]. Traditional uses for the medicinal plant *Bauhinia purpurea* (Fabaceae) include the treatment of ulcers and other conditions. Studies on the antiulcer activity of the plant's aqueous extract were carried out to determine the pharmacological qualities of *Bauhinia purpurea's* leaf [44]. Because of *Bauhinia purpurea* contains flavonoids, saponins, and other polyphenols, its methanol extract displayed anti-ulcer action [45]. Ethnomedicine's usage of *Aloe buettneri* in treating gastroduodenal ulcer illness and evidence that using the extract in large dosages for an extended period may have hazardous consequences [46].

Kannan, *et al*., (2007) [47] reported that treatment of ethanol extract of *Nyctanthes arbotristis* leaves found significantly increased the total count of white blood cells (RBC). Yaha, *et al*., (1990) [48] stated that ethanolic extract from rhizome of *Aplinia galangal* significantly decreased gastric secretions and ulcer in rats. The Zingiberaceae family includes *Alpinia galanga* (Linn.) as one of its significant therapeutic plants. Due to the plant's anti-fungal, anti-tumor, antimicrobial, anti-inflammatory, anti-diabetic, antioxidant, and antiulcer characteristics, various portions of the plant are employed in the treatment of numerous ailments. Numerous active substances, including 1, 8-cineol, 1-S-1-acetoxychavicol acetate, 1-S-1-acetoxyeuginol acetate, 1-bisabolene, 1-bergamotene, 1-pinene, 1-Sitosteroldiglucoside (AG-7), 1-sitsterylArabinoside (AG-8), and 1-acetoxychavicol acetate (also known as galangal acetate) and 1-hydroxy [49]. An evaluation of wound healing activity of root of *Mimosa pudica* was carried out by Kokane, *et al*., (2009) [50] resulted that methanolic extract of *Mimosa pudica* root exhibited good wound healing activity.

Conclusion

The ornamental plants have great aesthetic merits and many also have therapeutic value since they contain a variety of beneficial bioactive compounds. These can be used as herbal medicines in complementary and alternative medicine. It affects an animal or human's physiological or cellular processes. Because herbal medications have minimal danger of adverse effects, demand for plant-based medicinal systems has risen steadily in recent years. Many nurseries are advertising their hybrid variants, which may be used both as decorative and therapeutic plants.

It has been proposed that in order to make our surroundings pleasant and peaceful, we should grow a certain number of decorative plants there. There are several plants that may be eaten straight from the plant, but their precise qualities and dosage should be understood. Since they have no negative effects, the general population can utilise them with ease. Flowers contain a lot of power that has yet to be uncovered. Growing these beautiful plants has a bright future since they may be utilised for commercial medical purposes in addition to being used as decorative plants.

Application of research: Study of medicinal value of ornamental plants

Research Category: Medicinal Plants

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Study area / Sample Collection: Navsari Agricultural University, Navsari, 396450

Cultivar / Variety / Breed name: *Aloe barbadensis* Miller

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