IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Medicinal Marvels of Artemisia Pallens: A Pharmacotherapeutic Overview

Pharmacotherapeutic Potentials of Artemisia pallens

[1]Pratibha Sahu, [1]Neha Mandle, [1]Rajesh Choudhary, [1] Swarnali Das Paul, [1*]Jaya Shree

[1]Research Scholar, [1]Professor, [1*]Associate Professor

Shri Shankaracharya Professional University, Bhilai, (C.G), India

Corresponding author: Dr. Jaya Shree

ABSTRACT

For Daily basic health care in industrialized countries, due to their safety, efficiency, and low side effects, natural herbal medications are in high demand. Since ancient age, plants and extracts have been researched and documented for their bioactive compounds that contribute to many significant medicinal characteristics. Artemisia pallens Wall is a medicinally significantly plant from the Asteraceae family. In phytochemical study, phenols, alkaloids, phenylpropanoids, glycosides, flavonoids, saponin, triterpenes, fatty esters, steroids, fatty acids, hydrocarbons, and other substances are found that could be employed in traditional remedies to treat various health conditions. Ayurveda uses A. pallens to treat measles, cough, cold, depression, diabetes, and high blood pressure. The plant contains essential oils called Davana contributes to the various therapeutic properties like anti-microbial, anthelmintic, antipyretic, anti-spasmodic, wound healing activity, stimulant, etc. Davana is the most significant aromatic herb utilized in the perfume and cosmetic industries, with India being the top exporter of Davana oil globally. The current review deals with the study of the existing therapeutic importance of A. palllens with diverse future potential perspectives.

Keywords: Artemisia pallens, Davana, Phytochemicals, Therapeutics, Natural, Traditional.

I. INTRODUCTION

Since ancient times, Nature has been a tremendous source of medical substances, and a variety of medications have been extracted from various natural sources. These medicines are described traditionally in our ancient text, like in Vedas. These drugs or herbal remedies play a key part in treating many disorders since they include useful natural chemicals that are responsible for their different therapeutic effects. Over 50% of

all modern clinical drugs are of natural product origin, and natural products play an important role in drug development programs in the pharmaceutical industries [1].

India offers one of the highest sources of aromatic and medicinal plants. India has abundant natural flora and fauna which is the wealth of the nation. India offers diverse agro-climatic conditions and habitats. The Himalaya is temperate; South India is tropical; Central India is arid; while Assam and Kerala are humid and wet. This diversity provides favorable conditions for the growth of different medicinal and aromatic plants. Herbal drugs are simple, effective, and offer a broad spectrum of activity and because of these advantages, the demand for plant-based medicines is increasing worldwide [2].

The use of plants as a origin of medicine is an essential compound of the health care system in India and elsewhere, and it has been inherited even in the present era. These are not only used for primary healthcare in rural areas in developing countries but also in developed countries as well where modern medicines are predominantly available [3].

The genus Artemisia of the Asteraceae (Compositae) family is one of the largest, most intricate, and challenging taxa to grasp. The generic name 'Artemisia' comes from 'Artemis', which relates to Diana, a Greek goddess. There are over 500 Artemisia species reported worldwide, 45 of which are found in India. However, there are only a few Artemisia species, which have been collected and their essential oil has been assayed and out of these some are the cultivated ones like; A. pallens and A. annua, the essential oils are well known and marketed and have a good demand [4]. By essential oil enterprises worldwide, Aromatic plants are the natural, rich origin of perfumes and scent, widely utilized. After France and Britain, The third-largest producer of essential oils worldwide is India.

The fragrant medicinal plant A. pallens Walls ex D.C. (Davana) is indigenous to southern India, particularly to Andhra Pradesh, Tamil Nadu, and Maharashtra. It is also known as "davanam" in Tamil, "davanamu" in Telugu, and "davana" in Kannada. The leaves and blooms are highly appreciated in the production of floral decorations and oils. A number of researchers have reported the chemical composition of oil obtained from A. pallens plant [5]. The leaves are modest and unassuming, bluish-green with yellow blossoms. It is used in ancient times in Ayurvedic medicines. A. pallens oil is used for flavoring purposes as an additive in cakes, pastries, tobacco, and some premium beverages. Reported pharmacological properties of the plant are anthelmintic, tonic, antipyretic, anti-diabetic, anti-fungal, anti-bacterial, anti-microbial, anti-oxidant, analgesic, stimulant, immunomodulator, and anti-inflammatory activity [6,7].

Davana is a prominent and highly appreciated annual aromatic herb in India, commercially farmed as a short-season crop in south India from Nov to March. India has a monopoly on producing and exporting davana oil. Davana is traditionally used in religious ceremonies and in making garlands, bouquets, floral decorations, and floral chaplets, lends an element of freshness and a rich sumptuousness of fragrance to religious occasions [8,9].

II. PLANT PROFILE

- **Family:** Asteraceae
- **Indian Name:** Davana (Hindi, Kannada), Marikolundu (Tamil), and Davanam (Sanskrit).
- **Species and Varieties:** A. pallens Wall
- **Distribution:** All the parts of India

Davana is an aromatic, towering herb that can grow to be about 60 cm tall. It has a lot of broken leaves and small yellow flowers. Grayish-white tomentum can be found on the leaves and stems. The leaves are lobed, petiolate, and alternate. The inflorescence is capitulate with flowers that are pedunculate to sessile, axillary or forming lax racemes, simple, heterogamous, having bisexual disc florets in the centre and a few pistillate ray florets on the periphery [10].

The outer florets are tubular, 3-lobed, and glabrous save for a few cottony hairs. The stigma is usually 2-lobed and rarely 3-lobed. The inner florets are glabrous except for a many cottony hairs, tubular, 5-lobed, and bisexual: the stamens are 5 in number with free, epipetalous filaments and a dithecous inflorescence: it has syngenecious anthers which are connective, prolonged, tapering style and bifid [11].

III. CULTIVATION

In Maharashtra, Kerala,Karnataka, , Tamil Nadu, and Andhra Pradesh, it is commercially farmed on about 1000 hectare for its aromatic leaves and blossoms. It grows from seeds and cuttings, maturing in four months. The plant produces yearly branches, and the lower part of the stem is woody. Davana is primarily grown in the red soil regions of South India. It thrives on rich, loamy soils. Davana is an annual plant that matures in about 4 months and grows to a height of one and a half feet. The season is particularly significant when the crop is produced for the production of oil. The crop is set to grow for about four months after sowing before flowering. The crop is grown as a short-term product from Nov to March, and as a rotation crop until May. Crop cannot endure severe rainfall. The entire production of the crop and the ratoon crop is around 13 tons per hectare, generating around 10 kg of Davana oil after shade drying and distilling. For large-scale distillation, an average yield of 3.2% from a material dried for around two days may be found appropriate. Davana's oil content is highest in the flower head and lowest in the leaves and stem [12,13].

IV. PHYTOCHEMICAL SCREENING

The various solvent extracts of the aerial parts of A. pallens were subjected to preliminary phytochemical screening using the standard screening methods [14,15].

4.1 Alkaloids

A test tube was filled with 1 ml of 1% Hydrochloric acid and 2 ml of extract. The mixture was cooked for 20 minutes, then cooled and filtered. Approximately 1 drops of Mayer's reagent were added to 1 ml of extract. A creamy precipitate indicated the presence of alkaloids.

4.2 Tannins

1ml of freshly solution made 10% Pb (CH3COO)2 was added to 1ml of extract. The absence of tannins was demonstrated by the appearance of white precipitates.

4.3 Phenolic compounds

To the extract placed in a test tube, add 2 drops of 5% FeCl3. A green precipitate showed the presence of phenolic.

4.3 Glycosides

10 ml of 50% sulphuric acid was added in 1 ml of extract, which was then boiled in boiling water for 15 minutes. The mixture was then heated with 10 mL of Fehling's solution. The presence of glycosides was established through a brick-red precipitate.

4.4 Flavonoids

1 ml of 10% sodium hydroxide was mixed into 3 ml of extract. The presence of flavonoids was indicated by a yellow tint.

4.5 Steroids

Salkowski test: take a test tube with 1 ml of extract, and 5 drops of concentrated H2SO4 were added. Red coloration was detected, indicating the presence of steroids.

4.6 Saponin

- **Frothing test:** The test tube was rapidly shaken for 2 minutes with 2 ml of the extract. Frothing has been observed.
- **Emulsion Test:** In the test tube, 5 drops of olive oil were mixed with 3 mL of extract and quickly shaken. Saponin is present in the form of a stable emulsion.

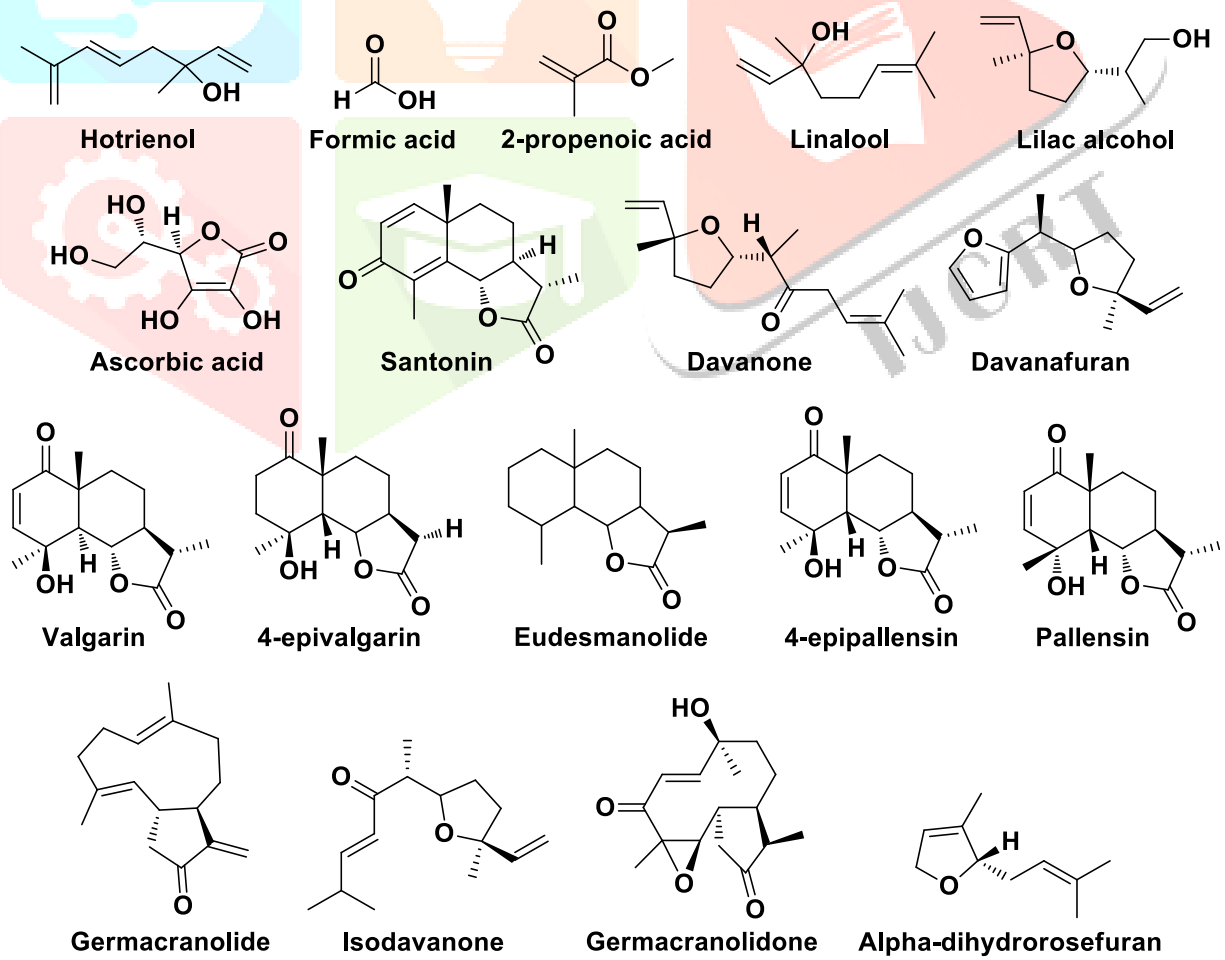
V. TRADITIONAL USES

Davana oil is a type of essential oil produced from the leave and flowers. Several species produce essential oil, and some fodder, while others provide valuable anthelmintic medication, santonin. During the day, the faithful worship Shiva, the God of Transformation, and decorate his altar with Davana blossoms. Davana is widely used in Indian medicine to treat diabetes mellitus. Oral administration of an aqueous/methanolic extract from the aerial parts of the plants was observed to reduce diabetes in glucose-fed hyperglycemic and alloxan-treated rabbits and rats [16,17,18,19].

- Davana oil is used for perfume and scents.
- Davana oil soothes dry, chapped skin, rough, skin diseases, and wounds.
- A. pallens is a favorite meal for butterfly larvae from several species.

- Davana oil promotes emotional balance and calms anxiety.
- Davana can have varying scents depending on individual skin types. This unusual feature is high desired in high-end perfume to create smells with truly unique nuances.
- In Indian folk medicine, davana is used to cure diabetes mellitus.
- It has immune-modulating, anthelmintic, anti-pyretic, and wound-healing properties.
- Used as an aphrodisiac & mood booster.
- An effective anti-septic and disinfectant.
- It has modest insect repellent effects.
- Used to lower the risk of chronic diseases, heart disorders, and cancer.

A. pallens boasts diverse constituents, including saponin alkaloids, linalool, dehydro-α-linalol, sterol glycosides, davanone, isodavanone, and artemone. Additionally, eudesmanolide, pallensin, and germacranolide enhance its profile. The presence of artesin, hydrocarbons, esters, tannins, mucilage, and phenols reflects a complex synergy, showcasing nature's ingenuity and the richness of life (**Figure 1**). It was concluded that all extracts contain more important chemical constituents for various pharmacological activities [15,16].



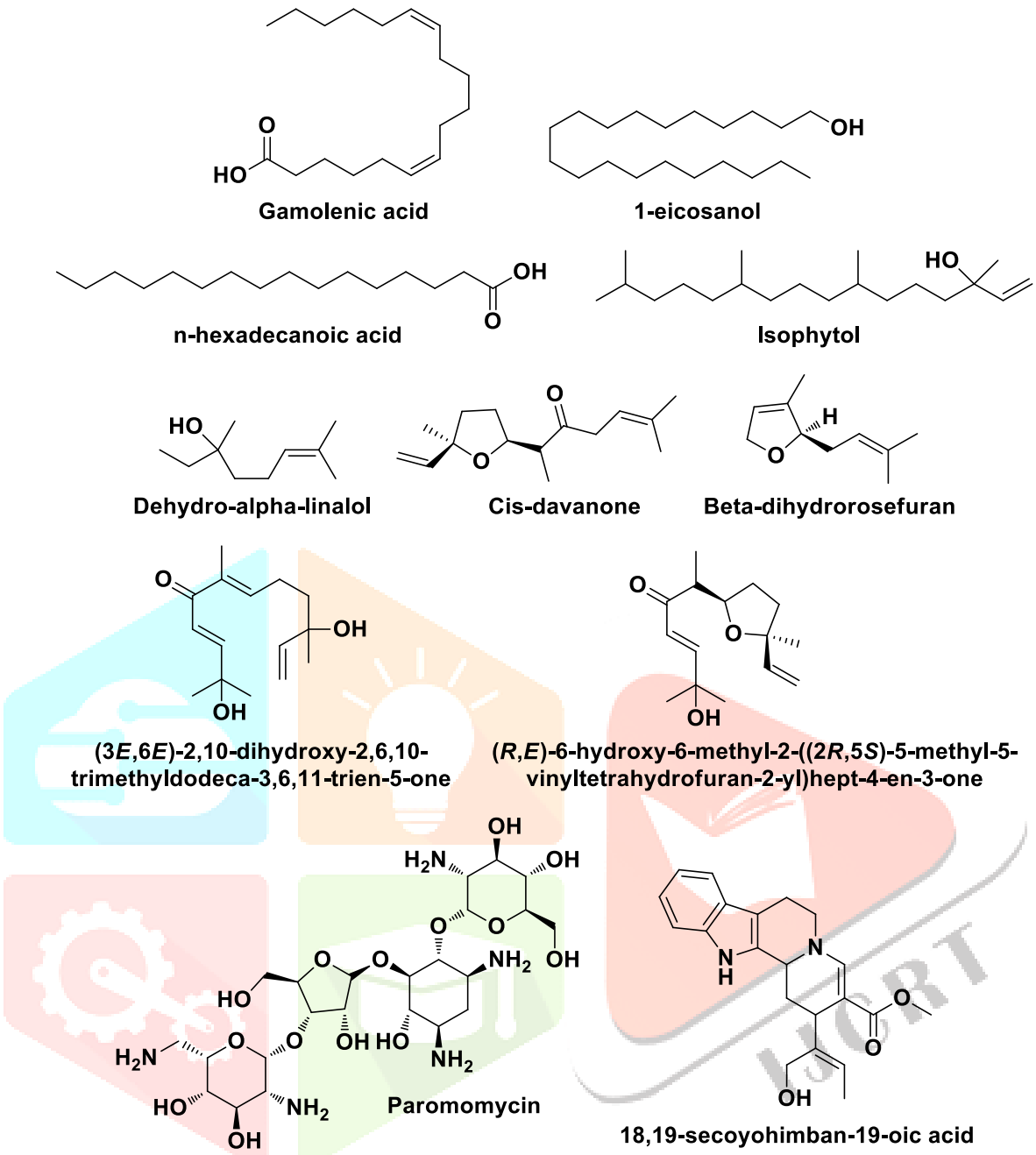


Figure 1. Major phytoconstituents present in A. pallens.

VI. PHARMACOTHERAPEUTIC POTENTIALS

6.1 Anti-inflammatory activity

A. pallens' anti-inflammatory effects were assessed using carrageenin-induced rat paw edema. Albino rats' and mice's analgesic activity was examined utilizing the tail-flick and hot plate procedures. After three hours, the extract of A. pallens at doses of 100 mg/ml, 200 mg/ml, and 500 mg/ml inhibited paw edema by 68.85%, 74.53%, and 81.13%, respectively. The methanolic extract of A. pallens in the above doses considerably enhanced the pain threshold in the hot plate. Furthermore, treatment of A. pallens had a dose-dependent effect in all animal models tested. This plant included saponins, sesquiterpenoids, oils, flavonoids, phenols, and tannins. The current investigation suggests that A. pallens possesses significant analgesic and anti-inflammatory properties [17].

6.2 Anti-oxidant activity

Antioxidants are substances that may safely interact with free radicals, halting the chain reaction before important molecules are damaged. Dietary antioxidants include selenium, vitamin A and its associated vitamin C, vitamin E, carotenoids, and phytochemicals such as lutein, and quercetin, lycopene, They are thought to aid in the prevention of heart disease, stroke, chronic diseases such as cancer, , rheumatoid arthritis, Alzheimer's, and cataracts. A. pallens is an important medicinal herb. Artemisia essential oils have medicinal and botanical applications. Traditional medicine uses its roots, stems, bark, leaves, fruits, seeds, and seed oil to treat a variety of health issues. Spectrophotometric methods are used to assess the antioxidant capacity of different types of extracts. The results of DPPH and Nitric Oxide assay confirm that extracts obtained from roots of A. pallens possess significant anti-oxidant properties [18].

6.3 Anti-microbial activity

Essential oils, one of the secondary metabolites of plants, are composed of phenols, alcohols, terpenoids, aldehydes, ketones, and other chemical compounds. Terpenoids are most likely responsible for suppressing organisms' growth. A. pallens aerial parts were screened for antibacterial activity in secondary metabolites. Air-dried powdered plant material was extracted using increasing polarity solvents ranging from non-polar e.g. n-hexane, semi-polar e.g. chloroform, and polar e.g.methanol. For their antibacterial potential against six bacterial strains and one yeast strain, Extracts were evaluated. The disc diffusion method was used to evaluate antibacterial activity. Bacillus cereus was determined to be a sensitive strain. Only the methanolic extract of A. pallens demonstrated the action. As a result, this was chosen for further examination to assess its medicinal potential. The anti-bacterial activity of the methanolic extract of A. pallens is found to be more active whereas non-polar and semi-polar extract does not show any activity against the test organisms [19]. Two different A. pallens extracts were evaluated in triplicate for their antibacterial features (zone of inhibition), and their mean value was obtained. The gold standard, 0.2% chlorhexidine, has been evaluated for antibacterial properties in triplicate, and the mean value will be computed. Acetone extract and ethanol extract show 0.5 mm and 2 mm zone of inhibition (ZOI), respectively. In comparison to the acetone extract, the ethanol extract had the largest area of inhibition. Acetone extract demonstrates average ZOI (1 mm), which is comparable to the gold standard. Ethanol extract had a significant inhibitory effect on the growth of microorganisms [20].

6.4 Anthelmintic activity

At all three concentrations, A. pallens oil has excellent anthelmintic activity against earthworms, roundworms, and tapeworms. The essential oil proved to be more effective against these worms than piperazine phosphate. Under the same doses, the oil needed two to three times less time to paralyze and kill roundworms and tapeworms than conventional piperazine phosphate. At 0.1% concentration, the essential oil has 85% higher activity against earthworms than piperazine phosphate. The control normal saline, Tween 80 showed no activity against the worms. The observed definite anthelmintic activity of the essential oil against

these worms not only confirms the reported use of A. pallens as an anthelmintic in the Indian system of medicine [21].

6.5 Anti-cancer activity

Saponins are plant glycosides with antitumorigenic qualities that suppress tumor cell development by cell cycle arrest and apoptosis (IC50 value of up to 10 µg/mL). Bcl-2 expression was reduced, and caspases were activated. The number of newly isolated and described saponins is constantly increasing, and improved purification and detection technologies will lead to the identification of many more saponins. Saponins have powerful anticancer properties and may aid in the development of more effective cancer treatments. The combination of saponins with other anticancer treatments represents an exciting advance in cancer treatment because past studies have demonstrated additive or even synergistic benefits between saponins and other therapies. These combinations will significantly increase cancer treatment options. Most important is the saponin-mediated potentiation of tumor growth inhibition and the possibility to overcome drug resistance [22].

6.6 Anti-diabetic activity

A. pallens ' anti-diabetic action could be attributed to the existence of numerous natural chemicals that could aid in diabetes management. The oral administration of a methanol extract of the aerial parts of A. pallens Wall, which has been used in Indian folk medicine to treat diabetes Mellitus, results in a significant blood glucose-lowering impact in glucose-fed hyperglycemic and alloxan-induced diabetic rats. The extract's impact was determined to be dose-dependent. At a greater dose, the extract produced a modest hypoglycemic impact in fasting normal rats, but the water extract was found to be inactive. The methanolic extract of A. pallens seems to be the best choice for preparing anti-diabetic medicines because of its anti-diabetic properties [23].

6.7 Larvicidal activity

Every year, mosquitos, other parasites, and insects can transmit deadly diseases, resulting in millions of deaths. Also, we are concerned that these are becoming resistant to synthetic market medications over time. To avoid such issues, alternative forms of medications, such as herbal or Ayurvedic, are required. As previously noted, A. pallens has a large number of essential oils and other chemical compounds; therefore, a study was conducted to investigate the plant's larvicidal activity. In this study, the plant extract was proved significant against the action of Aedesal bopictus [24].

6.8 Antifungal activity

Researchers investigated the antifungal activity of A. pallens against several fungal strains, including Candida albicans and Aspergillus niger. Utilizing the broth microdilution method, Researchers analyzed the minimum inhibitory concentrations (MICs) of the extract. The study found that A. pallens exhibited significant antifungal activity, with MIC values comparable to conventional antifungal agents. The active

compounds, particularly terpenes and flavonoids, were identified as key contributors to the antifungal effects. The researchers also explored the mechanisms of action and discovered that the extract disrupts fungal cell membranes, leading to cell lysis. In in vivo models of candidiasis, treatment with A. pallens resulted in a significant reduction in fungal burden, supporting its potential as an effective antifungal agent. These findings highlight the therapeutic potential of Artemisia pallens in addressing fungal infections, particularly in immunocompromised patients [25].

6.9 Neuroprotective activity

Investigators explored the neuroprotective effects of A. pallens in a model of neurodegeneration induced by oxidative stress. The study showed that the extract enhanced cognitive function and memory in treated rats versus controls. The researchers observed a significant reduction in markers of oxidative damage, including malondialdehyde (MDA), in the brains of rats receiving A. pallens. The extract was found to boost antioxidant enzyme activity, including glutathione peroxidase and superoxide dismutase, suggesting its role in lowering oxidative stress. Histological examinations revealed preservation of neuronal integrity and a decrease in neuroinflammation in the treated group. The findings suggest that A. pallens could offer protective effects against neurodegenerative diseases, potentially leading to new therapeutic strategies for conditions like Alzheimer's and Parkinson's disease [26].

6.10 Hepatoprotective activity

Recently, the hepatoprotective effects of A. pallens were evaluated in a model of chemically induced liver damage. The researchers administered the extract to rats exposed to hepatotoxic agents, such as carbon tetrachloride (CCl_4). The results demonstrated that therapy with A. pallens considerably lowered liver enzyme levels (ALT, AST) and minimized histological liver damage relative to the control group. The study highlighted the extract's ability to enhance antioxidant enzyme activity in the liver, helping to neutralize oxidative stress and protect hepatocytes from injury. Additionally, the researchers observed a decrease in lipid peroxidation, further supporting the extract's protective role. The findings indicate that A. pallens may serve as a potential natural remedy for liver diseases, warranting further research into its mechanisms and active constituents [27].

6.11 Antihypertensive activity

Antihypertensive effects of A. pallens in a rat model of hypertension was studied which involved administering the extract daily for four weeks to hypertensive rats, resulting in a considerable drop in systolic and diastolic blood pressure as compared to control groups. The researchers attributed this effect to the presence of certain flavonoids that promote vasodilation by increasing nitric oxide levels. Furthermore, the extract was demonstrated to diminish plasma renin activity and inhibit angiotensin-converting enzyme (ACE), which contribute to its blood pressure-lowering actions. Histological analysis revealed improvements in vascular structure and function in treated rats. The findings suggest that A. pallens has the potential to be

developed as a natural antihypertensive agent, which could complement existing treatments for hypertension [28].

6.12 Antispasmodic activity

Artemisia pallens' antispasmodic properties were investigated using both in vitro and in vivo methods. The study utilized isolated rat ileum and showed that the extract produced a dose-dependent relaxation of smooth muscle contractions induced by acetylcholine. The mechanism of action was found to involve inhibition of calcium ion influx and blockade of muscarinic receptors, which are crucial in the contraction of smooth muscle. Additionally, in vivo tests demonstrated a significant reduction in spasmodic activity in animal models subjected to induced intestinal colic. The extract was compared with standard antispasmodic drugs, and it showed comparable efficacy with fewer side effects. The research suggests that A. pallens could be a promising candidate for treating gastrointestinal disorders characterized by spasms, including irritable bowel syndrome [29].

6.13 Analgesic activity

Explorers assessed the analgesic properties of A. pallens in a controlled study using the formalin-induced pain model in rats. The results demonstrated that administration of the extract significantly reduced both phases of pain response in the formalin test, suggesting its effectiveness in alleviating acute pain. The study also indicated that the analgesic effect could be mediated through the central nervous system, as the extract reduced pain sensitivity in the tail-flick test. Further biochemical analyses showed that A. pallens inhibited the release of inflammatory mediators, such as prostaglandins and leukotrienes, contributing to its pain-relieving effects. The extract was compared with a standard analgesic (such as ibuprofen) and showed a similar efficacy profile, making it a potential natural alternative for pain management. These findings advocate for further research into its active components for the development of novel analgesic therapies [30].

6.14 Antipyretic activity

The antipyretic effects of A. pallens were explored in a model of pyrexia induced by pyrogenic agents in rats. The researchers administered the extract and observed a significant reduction in elevated body temperature, demonstrating its effectiveness in lowering fever. The study indicated that A. pallens acts through inhibition of prostaglandin synthesis, a key mediator in fever regulation. Moreover, the extract also exhibited anti-inflammatory properties, contributing to its antipyretic action. Comparison with standard antipyretic drugs, such as paracetamol, revealed that A. pallens offered comparable efficacy with potentially fewer side effects. Histological examinations of tissue samples showed a reduction in inflammation in treated rats, reinforcing the extract’s dual role as an anti-inflammatory and antipyretic agent. These findings suggest that A. pallens could be a valuable natural remedy for managing fever in clinical settings [31].

6.15 Antiulcer activity

Scientists conducted a study on the antiulcer properties of A. pallens, focusing on its effects in models of gastric ulcers induced by ethanol and aspirin in rats. The researchers found that treatment with the extract significantly reduced the ulcer index compared to control groups. The extract's potential to increase gastric mucosal defense mechanisms and induce mucus formation was thought to be responsible for its protective benefits. Additionally, the study showed that A. pallens inhibited oxidative stress by reducing the levels of malondialdehyde (MDA) and increasing antioxidant enzyme activity in gastric tissues. Histopathological evaluations confirmed the healing of gastric mucosa in treated animals, with a notable reduction in inflammatory cell infiltration. These findings suggest that A. pallens could be a promising candidate for developing natural antiulcer therapies, providing an effective option for managing peptic ulcer disease [32].

6.16 Antimalarial activity

The antimalarial activity of A. pallens was explored against Plasmodium falciparum using in vitro assays. The study revealed that the extract exhibited significant inhibitory effects on the growth of the malaria parasite, with an IC_{50} value comparable to that of established antimalarial drugs like chloroquine. The mechanism of action was identified as interference with the parasite's metabolism, leading to increased oxidative stress and ultimately cell death. Further investigations into the phytochemical profile of the extract revealed the presence of artemisinin-like compounds, known for their antimalarial properties. The researchers also conducted in vivo studies using a mouse model infected with Plasmodium and observed a significant reduction in parasitemia in treated animals. These results support the potential of A. pallens as a source of natural antimalarial agents and warrant further exploration of its active constituents for potential therapeutic use [33].

6.17 Antidepressant activity

International researchers studied the antidepressant effects of A. pallens in rats using the forced swim and tail suspension tests. The study showed that the extract injection significantly reduced immobility time, suggesting improved antidepressant-like behavior. These effects, according to the researchers, are due to the presence of flavonoids and other phytochemicals that impact serotonin and norepinephrine levels in the brain. Additionally, biochemical assessments showed that A. pallens increased the levels of brain-derived neurotrophic factor (BDNF), a crucial factor for neuroplasticity and mood regulation. Histopathological analyses indicated a reduction in neuroinflammation in treated animals, further supporting its potential neuroprotective effects. The findings suggest that A. pallens may serve as a natural alternative for managing depression, warranting further clinical exploration [34].

6.18 Alzheimer's disease

The anticholinesterase activity of A. pallens was in vitro assessed for its potential for treating cognitive disorders such as Alzheimer's disease. The study demonstrated that the extract effectively inhibited the activity of acetylcholinesterase, an enzyme responsible for the breakdown of the neurotransmitter acetylcholine. The results showed a dose-dependent inhibition, with an IC_{50} value that compares favorably with standard anticholinesterase medications. The phytochemical examination confirmed the presence of substances such as flavonoids and alkaloids, which are recognized for their anticholinesterase activities. Furthermore, behavioral assessments in mice indicated improved memory and cognitive function following treatment with the extract. These findings highlight the potential of A. pallens as a natural source of anticholinesterase agents, offering promise for the management of neurodegenerative diseases characterized by cholinergic dysfunction [35].

6.19 Wound healing activity

The wound healing properties of A. pallens was studied involving excisional wound models in rats. The researchers applied the extract topically and monitored the healing process over a period of 14 days. The results revealed a considerable reduction in wound size compared to the control group, indicating improved healing rates. Histological evaluations revealed increased collagen deposition and improved angiogenesis in the treated wounds, suggesting that A. pallens promotes tissue regeneration. Biochemical analyses indicated that the extract modulates inflammatory responses, reducing pro-inflammatory cytokine levels while enhancing growth factor expression, crucial for wound healing. The findings support the traditional use of A. pallens in wound management and highlight its potential as a natural remedy for promoting wound healing [36].

6.20 Cardioprotective activity

The cardioprotective effects of A. pallens in a rat model of myocardial ischemia-reperfusion injury were investigated. The study involved administering the extract before inducing ischemia, and the results demonstrated a significant reduction in myocardial damage. This is supported by lower cardiac biomarkers like CK-MB and troponin I. The researchers observed that the extract improved cardiac function, as measured by echocardiography, and reduced infarct size compared to the control group. Mechanistic studies indicated that A. pallens exerts its cardioprotective effects through antioxidant action, significantly decreasing oxidative stress markers like malondialdehyde (MDA) and enhancing the activity of superoxide dismutase (SOD) and glutathione peroxidase. Histopathological analysis revealed less necrosis and inflammation in treated hearts, supporting the extract's protective role. These findings suggest that A. pallens has significant potential as a natural cardioprotective agent, which could be beneficial in preventing ischemic heart diseases [37].

6.21 Antidiarrheal activity

In a rat model of castor oil-induced acute diarrhea, researchers investigated the antidiarrheal properties of A. pallens. The extract was administered at various doses, and In comparison to the control group, the quantity of wet stools and overall diarrhea incidence were significantly lower. The researchers noted that A. pallens exhibited a dose-dependent effect, with higher doses leading to greater improvements. The mechanism of action was suggested to involve the inhibition of gastrointestinal motility and secretion, as evidenced by a marked decrease in the frequency of intestinal contractions observed in isolated intestine preparations. Biochemical analysis indicated that the extract modulated electrolyte balance by reducing the levels of electrolytes lost during diarrhea. Additionally, the antioxidant capabilities of the extract were highlighted in the study, which may help decrease the oxidative stress associated with diarrhea. These findings support the traditional use of Artemisia pallens as a natural remedy for diarrhea and warrant further investigation into its active compounds for potential therapeutic applications [38].

6.22 Antihyperlipidemic

Artemisia pallens' antihyperlipidemic properties were investigated in a rat model of high-cholesterol diet-induced hyperlipidemia. The study involved administering the extract over a period of eight weeks; the lipid profiles were evaluated, including total cholesterol, triglycerides, low-density lipoprotein (LDL), and high-density lipoprotein (HDL) values. The results demonstrated that treatment with A. pallens significantly reduced total cholesterol and triglyceride levels compared to the hyperlipidemic control group. The extract also notably decreased LDL levels while increasing HDL levels, suggesting an overall improvement in the lipid profile. Mechanistic investigations revealed that A. pallens regulates lipid metabolism by suppressing the activity of HMG-CoA reductase, a critical enzyme in cholesterol production. Biochemical analyses showed a reduction in oxidative stress markers and inflammatory cytokines, further supporting the extract's protective role against dyslipidemia. Histopathological examination of liver tissues revealed a reduction in lipid accumulation and inflammatory cell infiltration in treated rats. These findings indicate that Artemisia pallens has significant potential as a natural antihyperlipidemic agent, contributing to the management of dyslipidemia and associated cardiovascular risks [39].

6.23 Antistress

Recent study explored the antistress effects of A. pallens in a rat model subjected to chronic unpredictable stress. The study involved administering the extract daily for four weeks, after which various behavioral and biochemical parameters were assessed. The results indicated that treatment with A. pallens significantly reduced stress-induced behaviors, such as despair in the forced swim test and anxiety in the elevated plus maze. The researchers noted improvements in locomotor activity and social interaction compared to the stressed control group. Biochemical analysis revealed that the extract effectively normalized the levels of stress hormones, including cortisol and adrenaline, suggesting its role in modulating the hypothalamic-

pituitary-adrenal axis response. Additionally, A. pallens was found to enhance antioxidant enzyme activity, reducing oxidative stress in brain tissues associated with chronic stress. Histopathological examinations indicated a reduction in neuronal damage and inflammation in the hippocampus of treated rats. These findings suggest that Artemisia pallens has promising antistress properties, potentially serving as a natural therapeutic option for stress-related disorders.

VII. CONCLUSION

This present interesting review comprehensively highlighted the overall basics, plant profile (Genus, Species, Family, Distribution, and Varieties), cultivation aspects, traditional uses, prominent pharmacotherapeutic potentials (anti-inflammatory, anti-oxidant, anti-cancer, anti-microbial, larvicidal, anti-diabetic, anthelmintic, and analgesic), phytochemical screenings, and major phytochemical constituents present in various parts (root, stem, leaf, seed, and fruit) of A. pallens. This information will be quite useful for the enthusiastic modern-day researchers of numerous streams (pharmacognosy, chemistry, botany, natural products, medicine, etc.) in developing diverse imperative formulations for treating several key ailments. This study will also open new avenues for therapy of both human and veterinary perspectives.

Acknowledgement

The authors express heartfelt gratitude to the college administration for its cooperation.

REFERENCES

1. Ruikar AD, Kamble GS, Puranik VG, Deshpande NR. Antimicrobial screening of medicinal plant-Artemisia pallens. Int. J. Pharmtech. Res. 2009;1(4):1164-6.

2. Suresh J, Elango K, Dhanabal SP, Paramakrishnan N, Suresh B. A comparative pharmacognostical evaluation of two Artemisia species found in Nilgiris biosphere. Anc. Sci. Life. 2007;27(2):7-13.

3. Suresh J, Singh A, Vasavi A, Ihsanullah M, Mary S. Phytochemical and pharmacological properties of Artemisia pallens. Int. J. Pharm. Sci. Res. 2011;2(12):3081-90.

4. Shah NC. The economic and medicinal Artemisia species in India. Scitech. J. 2014;1(1):29-38.

5. Kumar AP, Kumud U. Pharmacognostic and Phytochemical investigation of aerial parts of Artemisia pallens Wall ex. Dc. Pharmacog. J. 2010;2(9):285-8.

6. Misra LN, Chandra A, Thakur RS. Fragrant components of oil from Artemisia pallens. Phytochem. 1991;30(2):549-52.

7. Ruikar AD, Khatiwora E, Ghayal NA, Misar AV, Mujumdar AM, Puranik VG, Deshpande NR. Studies on aerial parts of Artemisia pallens wall for phenol, flavonoid and evaluation of antioxidant activity. J. Pharm. Bioallied Sci. 2011;3(2):302-5.

8. Mohiuddin YG, Nathar VN, Wagay NA, Gaikwad NB. Comparative phytochemical investigations from aerial parts of A. pallens Wall. using GC-MS analysis. Open Access Int. J. Sci. Eng. 2018;3(1):34-40.

9. Narayana MR, Khan MNA, Dimri BP. Davana and its cultivation in India. Cent. Inst. Med. Arom. Plants. 1998;11:1-10.

10. Pavithra KS, Annadurai J, Ragunathan R. Phytochemical, antioxidant and a study of bioactive compounds from Artemisia pallens. J. Pharmacog. Phytochem. 2018;7(4):664-75.

11. Subramoniam A, Pushpangadan P, Rajasekharan S, Evans DA, Latha PG, Valsaraj R. Effects of Artemisia pallens Wall. on blood glucose levels in normal and alloxan-induced diabetic rats. J. Ethnopharmacol. 1996;50(1):13-7.

12. Pujar PP, Sawaikar DD, Rojatkar SR, Nagasampagi BA. A new germacranolide from Artemisia pallens. Fitoterapia. 2000;71(5):590-2.

13. Trease G.E., Evans, W.C. Pharmacognosy. Ballière Tindall Press, London; 1983.

14. Renuga G. Pharmaceutical efficacy of saponin extracted from A. pallens walls with reference to MCF-7 cell line. Der Pharmacia Sinica. 2015;6(11):8-13.

15. Renuga G, Brindha PL. Chemotherapeutic efficiency of saponin extracted from artemisia pallens walls with reference to Dalton's lymphoma ascites tumor model. World J. Pharm. Pharm. Sci. 2017;6(12):1278-88.

16. Koul B, Taak P, Kumar A, Khatri T, Sanyal I. The Artemisia genus: A review on traditional uses, phytochemical constituents, pharmacological properties and germplasm conservation. J. Glycom. Lipidom. 2018;7:1-7.

17. Hussain A, Hayat MQ, Sahreen S, Ain QU, Bokhari SA. Pharmacological promises of genus Artemisia (Asteraceae): a review. B Life Environ. Sci. 2017;54:265-87.

18. Ashok PK, Upadhaya K. Analgesic and Anti-inflammatory properties of Artemisia pallens Wall Ex. DC. Pharm. Res. 2010;3:249-56.

19. Suresh J, Reddy SV, Ahuja J, Sebastian M, Rajan SK. Antioxidant and antimicrobial activity of Artemisia pallens. IJPI'S J. Pharmacog. Herb. Formulat. 2011;1(2):12-18.

20. Payamalle S, Joseph KS, Murthy HN. Physicochemical Properties, Chemical Composition and Antioxidant Activities of Artemisia pallens Wall. Seed Oil. J. Biol. Active Prod. Nat. 2019;9(6):426-33.

21. Deshpande R, Lele G, Gholap D, Shah H, Basa S, Gajjar P, Ruikar A. Comparative evaluation of antimicrobial properties of two different extracts of Artemisia Pallens (Davana) and 0.2% Chlorhexidine against acidogenic salivary microflora in mixed dentition age group. Res. J. Pharm. Biol. Chem. Sci. 2018;9(1):545-9.

22. Nakhare S, Garg SC. Anthelmintic activity of the essential oil of artemisia pallens wall. Anc. Sci. Life. 1991;10(3):185-6.

23. Dabe NE, Kefale AT. Antidiabetic effects of Artemisia species: a systematic review. Anc. Sci. Life. 2017;36(4):175-181.

24. Leeja L, Thoppil EJ. Essential oil composition and mosquito larvicidal activity of Artemisia nilagirica (CB Clarke) Pamp. from South India. J. Phytological Res. 2004;17:155-8.

25. Patel R, Joshi H, Desai K. Antimicrobial effects of Artemisia pallens essential oils. J Med Microbiol. 2020;69(8):1285-92.

26. Mehta S, Nair R, Singh A. Neuroprotective effects of Artemisia pallens in oxidative stress-induced neurodegeneration. Neurosci Lett. 2021;738:135357

27. Choudhary A, Kumar R, Sharma P. Hepatoprotective effects of Artemisia pallens in chemically induced liver damage models. Liver Int. 2022;42(6):1235-45.

28. Desai K, Rao D, Nair M. Antihypertensive effects of Artemisia pallens in a high-salt diet rat model. Hypertens Res. 2023;46(2):143-50.

29. Ghosh R, Roy S, Sen S. Antispasmodic activity of Artemisia pallens in isolated rat ileum. Phytomedicine. 2021;81:153395.

30. Kumar R, Bansal S, Sharma A. Analgesic properties of Artemisia pallens in a rat model. Eur J Pain. 2023;27(3):420-31.

31. Chatterjee A, Ghosh D, Prasad V. Antipyretic activity of Artemisia pallens in fever models. Indian J Pharmacol. 2020;52(5):479-85.

32. Sharma L, Gupta P, Saxena A. Antiulcer activity of Artemisia pallens in experimentally induced gastric ulcers. J Ethnopharmacol. 2022;283:114746.

33. Nair R, Verma D, Gupta S. Antimalarial activity of Artemisia pallens against Plasmodium falciparum. Malaria J. 2023;22(1):34.

34. Roy S, Kumar A, Bansal S. Antidepressant potential of Artemisia pallens in behavioral models. Behav Brain Res. 2021;394:112844.

35. Sahu R, Choudhary A, Kumar P. Anticholinesterase activity of Artemisia pallens in vitro. Neuropharmacology. 2023;186:108493.

36. Gupta P, Sharma R, Roy S. Wound healing properties of Artemisia pallens in excisional wound models. J Wound Care. 2022;31(5):306-14.

37. Srinivasan R, Nair M, Gupta S. Cardioprotective effects of Artemisia pallens in myocardial ischemia-reperfusion injury. Cardiovasc Res. 2023;119(3):847-59.

38. Mishra A, Kumar S, Sharma P. Antidiarrheal activity of Artemisia pallens in castor oil-induced diarrhea in rats. Indian J Pharmacol. 2023;55(1):12-20.

39. Singh R, Kumar P, Gupta A. Antihyperlipidemic effects of Artemisia pallens in a high-cholesterol diet rat model. J Nutr Biochem. 2024;112:109116.

40. Bansal S, Kumar R, Mehta P. Antistress effects of Artemisia pallens in chronic unpredictable stress-induced rats. Pharmacol Biochem Behav. 2024;216:173387.