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Review Article

Properties of Medicinal Plants from India Used in Treatment of Tumor: A Focus on *Vanda tessellata, Ipomoea aquatica,* and *Semen armeninace*

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ABSTRACT

The anti-tumor characteristics of three Indigenous Indian medicinal plants: Vanda tessellata, Ipomoea aquatica, and Semen armeninace. Vanda tessellata, often known as 'Ranawara,' contains bioactive chemicals such as phenanthrenes and bibenzyls, which cause apoptosis, inhibit angiogenesis, and prevent metastasis. Ipomoea aquatica, also known as 'Kalmi Saag,' contains flavonoids, alkaloids, and polyphenols that inhibit tumor development, enhance immunological response, and reduce oxidative stress. Semen armeninace, also known as 'Musk melon seeds,' includes cucurbitaceous, flavonoids, and terpenoids that cause apoptosis, stop the cell cycle, and modify critical signaling pathways involved in carcinogenesis. The study emphasizes the medicinal potential of these plants, as well as the necessity for more research and clinical trials to use their anti-tumor characteristics fully. In addition to their existing therapeutic uses, future studies on these medicinal plants might focus on increasing bioavailability, improving dose forms, and investigating synergistic interactions with conventional cancer therapies. Furthermore, studies into the molecular processes behind their anti-tumor activities might lead to the discovery of new therapeutic targets. Incorporating pharmacogenomics and personalized medicine techniques may improve treatment options while assuring efficacy and reducing side effects. Collaboration among traditional medicine practitioners, pharmacologists, and oncologists can help translate these natural therapies into clinically viable medications. Overall, more research into Vanda tessellata, Ipomoea aquatica, and Semen armeninace has the potential to advance cancer therapy and improve patient outcomes.

Introduction

Cancer, defined as the uncontrolled development and spread of abnormal cells, is one of the most daunting problems to worldwide public health. Its impact reverberates across continents, claiming millions of lives yearly and putting enormous strain on global healthcare systems. Tumors appear in a variety of organs and tissues, including breast, lung, colorectal, and prostate cancer, presenting unique clinical difficulties. Cancer's cost extends beyond individual suffering to include emotional, social, and economic consequences for patients, families, and society as a whole. Despite advances in diagnostic and therapeutic approaches including surgery, chemotherapy, and radiation therapy, the search for more effective and accessible therapies continues *(Kuper H et al. 2002)*.

An environmental factor that contributes to cancer deaths includes tobacco, obesity, radiation, infection, heredity, stress, environmental pollutants, and lack of physical

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activity (lifestyle, economic, and behavioral factors). Smoking causes 90% of lung cancer. It also causes kidney, stomach, pancreas, larynx, and bladder cancer. Tobacco is responsible for about one in five cancer death cases globally. Physical inactivity, obesity, and diet are related to 30-35% of cancer deaths. Physical inactivity is believed to contribute to the cancer risk. More than half of the effect of diet is due to over nutrition. Some specific foods are related to specific types of cancers like a high salt diet causes gastric cancer, aflatoxin B1 causes liver cancer and chewing betel nut causes oral cancer. Exposure to ionizing and nonionizing ultraviolet radiation causes cancer (up to 10%). The source of ionizing radiation includes radon gas and medical imaging; this radiation is not particularly a strong mutagen. When radiation combines with other cancer-causing agents then it is more potent like radon with tobacco smoke. Prolonged ultraviolet ray exposure from sunlight leads to skin cancer.

Traditional medicine systems, particularly those based in countries such as India, have a wealth of plant treatments with potential anti-tumor capabilities. Exploring the characteristics and therapeutic potential of medicinal plants native to India, particularly Vanda tessellata, Ipomoea aquatica, and Semen armeninace, shows promise for adding to the armory against tumors and tackling the multifarious issues faced by cancer on a worldwide scale *(Kuper H et al. 2002)*.

India's great biodiversity includes a variety of orchid species that captivate both academics and lovers with their unique flower patterns. While orchids have received attention for their aesthetic value, little study has been conducted on their therapeutic potential. Among these, Vanda tessellata stands out as an epiphytic orchid found in damp to dry deciduous woods across India *(Kushi L. H. et al. 2006)*. Its relationship with certain host plants, as well as its different blooming and fruiting times, highlight its ecological value. *V. tessellata* is notable for its various floral patterns and colors, which reflect climate fluctuations caused by deforestation and urbanization.

Traditional healers use its therapeutic characteristics, including antioxidant, cytotoxic, and antibacterial capabilities, to treat a variety of diseases. Aside from its medical use, *V. tessellata* serves an important ecological role by providing shelter and food for insects, bees, and spiders and aiding pollination efforts. Conservation efforts are critical to maintaining this orchid's ecological equilibrium in the face of changing landscapes and climate fluctuations *(Park S. et al. 2008)*.

Phytochemical Composition of Herbal Plants

Understanding the phytochemical constituents of herbal plants is critical for determining their medicinal potential and pharmacological properties. Phytochemicals, which include a wide range of bioactive molecules, are at the heart of traditional medical systems across the world. Researchers decipher the complex chemical profiles of these plants by thorough investigation and characterization, giving information on their modes of action and health-promoting qualities *(Goubran H. A. et al. 2014)*. This investigation into phytochemical composition not only supports ancient medical practices but also drives current drug discovery efforts, opening up intriguing pathways for the creation of novel medicines.

Vanda Tessellata

Vanda tessellata, sometimes known as 'Ranawara,' is an epiphytic orchid endemic to the Indian subcontinent. It has elongated, strap-shaped leaves and tessellated blooms with brilliant colors ranging from yellow, green, and brown to gray in the perianth, while the lip is pink, purple, or bluish-purple. This orchid grows in damp to dry deciduous woodlands and is frequently seen linked to certain host plants like Shorea robusta and Mangifera indica. Vanda tessellata is a monopodial common epiphytic orchid. It has broad, ovoid, strapped, fleshy leaves with color variation in flowers. It is a very common orchid species but fewer reports are available on its medicinal & ecological values *(Darshani et al. 2023)*. Keeping this in view, an attempt has been made to document its botany, medicinal, and ecological values through field and literature surveys. The survey was carried out during 2022-2023 in Odisha state. Results revealed that in many parts of India, among the tribal communities *V. tessellata* is used to treat many ailments like rheumatism, fever, inflammation, and earache. In the present study, photographs are provided, and discussed on various aspects of V. tessellate including conservation activities *(Dash P. K. et al. 2008)*.

V. tessellata has long been regarded in high regard in traditional Indian medicinal systems. Traditional healers have used various components of the plant, such as the roots, stems, leaves, and flowers as shown in Figure 1, are used to cure for a variety of diseases. Its traditional use ranges from treating digestive diseases, skin illnesses, and respiratory problems to acting as an aphrodisiac and overall health tonic *(Gupta C. et al. 2014)*.

In recent years, substantial studies have focused on identifying the bioactive chemicals found in Vanda tessellata, revealing insight into its medicinal potential. Notable chemicals discovered include phenanthrenes, bibenzyls, flavonoids, alkaloids, and terpenoids. These bioactive elements help *V. tessellata* produce a variety of therapeutic benefits (Table 1). Studies looking into the mechanisms of action of Vanda tessellata in tumor therapy

Fig. 1: Graphical representation of *V. tessellata*

Table 1: Mechanism of action of *V. tessellata*

MECHANISM OF ACTION OF V. TESSELLATA		
Apoptosis Induction	**Angiogenesis Inhibition**	**Metastasis Suppression**
• Phenanthrenes and bibenzyls found in V. tessellata have demonstrated the ability to induce programmed cell death (apoptosis) in tumor cells, thereby inhibiting their proliferation and promoting their elimination.	• Certain compounds within V. tessellata possess anti-angiogenic properties, preventing the formation of new blood vessels that supply nutrients to tumors. This inhibition of angiogenesis effectively starves tumors, impeding their growth and metastasis.	• Bioactive compounds in V. tessellata have been shown to interfere with the processes involved in tumor metastasis, such as cell adhesion, migration, and invasion. By disrupting these mechanisms, V. tessellata impedes the spread of cancerous cells to distant sites in the body.

have yielded encouraging results *(Kumar A. et al. 2020)*. The bioactive compounds present in *V. tessellata* exert multifaceted effects on tumor cells, including:

Vanda tessellata has the potential to be a significant botanical resource in tumor treatment due to its bioactive chemicals, which have various and focused effects on cancer cells (Table 1). Further study into the mechanisms of action and clinical effectiveness of V. tessellata-derived compounds is needed to fully realize their therapeutic promise in tumor treatment *(Kumar S. et al. 2018)*.

Ipomoea Aquatica

Ipomoea aquatica, often known as 'Kalmi Saag' or 'water spinach,' is a semi-aquatic plant endemic to India and Southeast Asia. It is distinguished by its lush green foliage and exquisite white or pink blooms. This adaptable plant is grown primarily for its delicate shoots and leaves, which are highly valued for its culinary applications, particularly in stir-fries, soups, and salads. This plant is widely distributed all around the World, especially in India, Malaysia, Indonesia, China, Hong Kong, and some parts of the USA *(Kumar S. 2022)*. This plant is grown as an aquatic plant that grows abundantly in marshy areas. Various parts of the I. aquatica plant are used medicinally in Southeastern Asia and are reported to be useful for the treatment of high blood pressure and as an emetic in the treatment of opium and arsenic poisoning. The dried juice is reported to be a purgative, while the leaves and stems possess cooling action. Moreover, it is also traditionally used in the treatment of nervous and general debility, piles, worm infections, leucoderma, leprosy, jaundice, and liver complaints *(Tofern B. et al. 1999)*. Very few studies have been done on this plant. This includes the inhibition of prostaglandin synthesis, eye diseases, constipation, and hypoglycaemic effects. Phytochemical investigations of this plant have revealed the presence of carotenes such as β-carotene, cryptoxanthin, lutein, lutein epoxide, violoxanthin and neoxanthin, flavonoids such as mycertin, quercetin, luteolin and apigenin and some alkaloids *(Alkiyumi S. S. et al. 2012)*.

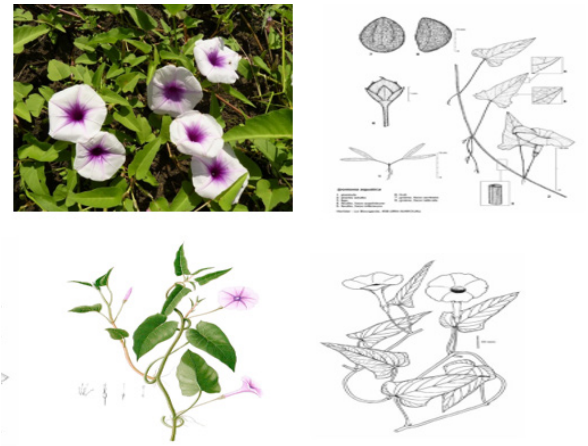

Fig. 2: Graphical representation of *I. aquatica*

Ipomoea aquatica (Figure 2) has traditionally been revered for its therapeutic benefits in many cultures. It is said to have cooling and detoxifying effects in ancient Indian medical systems such as Ayurveda, which makes it useful for aiding digestion, lowering inflammation, and treating illnesses such as jaundice and fever. It is also used as a diuretic to improve kidney function and a lactagogue to encourage milk supply in nursing women. Analyzing the bioactive components found in Ipomoea aquatica reveals a diverse range of phytochemicals, including flavonoids, alkaloids, polyphenols, and vitamins. These molecules contribute to its many pharmacological actions, including antioxidant, anti-inflammatory, antibacterial, and anticancer properties *(Samuel A. J. S. J. et al. 2012)*.

Ipomoea aquatica has received attention in tumor therapy due to its possible anticancer characteristics. Several modes of action underpinning its tumor-inhibitory activities have been identified via studies. One technique includes inducing apoptosis, or programmed cell death, in cancer cells, which inhibits their growth and promotes removal by the body's immune system *(Akanitapichat P. et al. 2010)*. Furthermore, bioactive chemicals in Ipomoea aquatica have been demonstrated to interfere with signaling pathways involved in cancer cell proliferation and metastasis, hence slowing tumor progression. Furthermore, Ipomoea aquatica's antioxidant qualities aid in reducing oxidative stress, which has been linked to cancer formation and progression. By scavenging free radicals and minimizing cellular damage, this plant may help guard against carcinogenesis and improve the efficacy of traditional cancer therapy *(Mohan S. et al. 2010)*.

Overall, Ipomoea aquatica appears as an important botanical resource with potential therapeutic implications in tumor therapy. Its historic use, together with the recent scientific study on its bioactive constituents and methods of action, highlights its importance in both traditional and contemporary medicine for cancer prevention and general health and well-being.

Table 2: Mechanism of action of *S. armeninace*

MECHANISM OF ACTION OF SEMEN ARMENINACE			
Apoptosis Induction	**Angiogenesis Inhibition**	**Modulation of Signaling Pathways**	**Antioxidant Activity**
• Compounds such as cucurbitacins and flavonoids have been shown to induce programmed cell death (apoptosis) in cancer cells, thereby inhibiting tumor growth and metastasis.	• Certain constituents of Semen Armeninace, including flavonoids and terpenoids, have demonstrated the ability to inhibit the formation of new blood vessels (angiogenesis) that are essential for tumor progression and metastasis.	• Bioactive compounds in Semen Armeninace can interfere with key signaling pathways involved in tumor development and progression, such as the PI3K/Akt and MAPK pathways, thereby exerting anti-cancer effects.	• The antioxidant properties of Semen Armeninace help in neutralizing reactive oxygen species (ROS) and reducing oxidative stress, which plays a crucial role in cancer initiation and progression.

Mechanisms of Action in Tumor Treatment of Ipomoea Aquatica

Ipomoea aquatica, often known as "Kalmi Saag," is a medicinal plant native to India that is noted for its anti-tumor qualities. Several investigations have shown the processes that underpin its success in tumor therapy. Ipomoea aquatica's bioactive components, including flavonoids, alkaloids, and polyphenols, have anti-tumor properties through a variety of mechanisms. Flavonoids, for example, have been shown to suppress tumor cell growth and promote apoptosis, or programmed cell death, in cancer cells. The alkaloids in Ipomoea aquatica have cytotoxic effects on tumor cells, causing them to die. Polyphenols also contribute to anti-tumor action by inhibiting angiogenesis, which is the process by which tumors generate blood vessels to support their growth *(Mohan S. et al. 2010)*.

Semen Armeninace

Semen Armeninace, often known as Musk Melon Seeds, is a plant species native to India and Central Asia. It belongs to the Cucurbitaceae family and is distinguished by its trailing vines, lobed leaves, and bright yellow blooms. The plant produces tiny, oval-shaped seeds with a stiff, thick covering and a musky odor, thus the name. For millennia, traditional medical systems like Ayurveda have valued Semen Armeninace for its therapeutic benefits. The seeds are frequently used in a variety of forms, including powdered, decoction, and oil extracts, to treat a variety of health issues. Traditionally, it was used to treat digestive problems like constipation, indigestion, and bloating. It is also used to maintain kidney function, treat urinary diseases, and increase overall energy and stamina *(Shu Tang et al. 2024)*.

Semen Armeninace seeds contain a wide variety of bioactive substances that contribute to their medicinal properties. Cucurbitacins, flavonoids, terpenoids, alkaloids, and phenolic compounds are some examples. Cucurbitacins, in particular, have been thoroughly researched for their anti-inflammatory, antioxidant, and anticancer activities (Table 2). Flavonoids have antioxidant and anti-inflammatory properties, whilst terpenoids are lethal to cancer cells. Alkaloids and phenolic chemicals both contribute to the plant's medicinal activity. Semen Armeninace has a high potential for tumor therapy, thanks to its cytotoxic and anti-proliferative characteristics *(Blesso C. N. 2019)*. The bioactive compounds present in the seeds exert their effects through multiple mechanisms: Semen armeniacae amarum (SAA) is a Chinese traditional medicine and has long been used to control acute lower respiratory tract infection and asthma, as a result of its expectorant and antiasthmatic activities. However, its mutagenicity in vitro and in vivo has not yet been reported. The Ames test for mutagenicity is used worldwide. The histidine contained in biological samples can induce histidine-deficient cells to replicate, which results in more these colonies than in negative control cells, therefore false-positive results may be obtained *(Brown M. S. et al. 2006)*. So, it becomes a prerequisite to exclude the effects of any residual histidine from samples when they are assayed for their mutagenicity. Chinese traditional herbs, such as SAA, are histidine-containing biological samples, and need modified Ames tests to assay their in-vitro mutagenicity. Semen Armeninace appears to be a viable option for tumor therapy due to its rich phytochemical content and multiple modes of action. Further study and clinical trials are needed to fully understand its therapeutic potential and maximize its application in cancer treatment *(Cao X. et al. 2010)*.

Pharmacological Activities of Herbal Plants

In recent years, research into herbal plants and their pharmacological effects has acquired substantial traction in the field of cancer, particularly tumor therapy. Herbal

medicines, which have long been valued in traditional medical systems, are now being acknowledged for their potential to open up new therapeutic paths. The complicated interaction of bioactive chemicals in these plants has piqued scientific interest, prompting an investigation into their methods of action against malignancies *(Chakraborty A. et al. 2022)*. As traditional therapies frequently have side effects and limited success, the search for alternative, more holistic alternatives has grown. Understanding the pharmacological properties of herbal plants has promise not just for supplementing existing medications, but also for opening the path for safer and more effective cancer treatments.

Vanda Tessellata

Vanda tessellata, or the "Blue Vanda," holds a rich history in traditional medicine across Southeast Asia. It has been used to treat a variety of diseases and is currently receiving interest for its potential in tumor therapy *(Dash P. K. et al. 2008)*. This orchid species includes a wide range of bioactive chemicals, including alkaloids, flavonoids, and terpenoids, which have a variety of pharmacological properties relevant to cancer treatment. According to studies, its antioxidant and anti-inflammatory qualities counteract *(Gupta C. et al. 2014)* the oxidative stress and inflammation that are related to cancer growth. Furthermore, extracts have been demonstrated to have cytotoxic effects on cancer cells, triggering apoptosis and perhaps altering immune responses to malignancies. Compounds in Vanda tessellata may potentially suppress angiogenesis, which is critical for stopping tumor development and metastasis. Despite encouraging results, further study, particularly clinical trials, is needed to fully understand its therapeutic potential and ensure safe and effective usage in cancer treatment. Vanda tessellata stands as a promising candidate for the development of novel anti-tumor agents, offering hope for improved cancer therapies *(Qadir M. I. et al. 2014)*.

Ipomoea Aquatica

Water spinach, or Ipomoea aquatica, has long been used to cure a wide range of illnesses in traditional medical systems. Its pharmacological promise, especially in the therapy of tumors, has been shown by scientific investigation. Ipomoea aquatica contains bioactive substances including phenolic, alkaloids, and flavonoids that have cytotoxic and antioxidant properties that are useful for cancer treatment *(Karthikeyan K. et al. (1999)*. While its cytotoxic actions cause cancer cell death and impede proliferation, its antioxidant qualities aid in the fight against oxidative stress *(Pandey K. et al. 2012)*, which is a prelude to the growth of tumors. Furthermore, Ipomoea aquatica contains chemicals that may hinder angiogenesis, a crucial step in the formation of tumors. More investigation is required to properly comprehend its therapeutic effectiveness and safety profile. Nevertheless, the investigation of Ipomoea aquatica highlights the potential use of natural substances in the creation of cutting-edge anti-tumor *(Kanojia K. et al. 2022)* medications, providing cancer patients with other treatments.

Semen Armeninace

Semen Armeniacae, or bitter apricot seed, boasts a rich history in traditional Asian medicine for its purported medicinal properties, notably in tumor treatment. Amygdalin, the main ingredient, metabolizes into cyanide, which some people believe targets cancer cells specifically. Its effectiveness and safety are still debatable, though. Pharmacologically, amygdalin, which may cause cytotoxicity in cancer cells, is thought to have anti-tumor properties in semen armenace *(Mancini M. et al. 1998)*. It also has immunomodulatory and anti-inflammatory properties, which may enhance immune responses and change the tumor microenvironment in addition to traditional cancer treatments. Empirical research is necessary to confirm its safety and effectiveness in the treatment of cancer, even with its long history of usage. Though more study is required to clarify its processes and guarantee its safe integration into clinical practice, semen armeninace offers a potential route for inquiry in tumor treatment *(Soldani C. et al. 2002)*.

Therapeutic Potential of Herbal Plants

With plants like Vanda tessellata, Ipomoea aquatica, and Semen Armeniacae emerging as viable prospects, the therapeutic potential of herbal treatments in cancer treatment has drawn growing interest *(Bhatt K. et al. 2023)*. An understanding of their prospective benefits for oncological therapy can be gained from investigating their anti-tumor mechanisms and preclinical data. Traditional medicine holds Vanda tessellata, a member of the orchid family, in high regard for its therapeutic qualities, which may include anti-cancer benefits. Similar fascinating pharmacological actions have been demonstrated by Ipomoea aquatica, sometimes referred to as water spinach, indicating that it may have anti-tumor capabilities that need further investigation *(Oyagbemi A. A. et al. 2010)* (Table 3). Furthermore, bitter apricot seed, or Semen Armeniacae, has a long history of traditional usage and is presently being studied for possible cytotoxic effects on cancer cells. Investigating the preclinical data about these plants should lead to new therapeutic approaches for the treatment of cancer in addition to a deeper comprehension of their processes *(Park Y. J. et al. 2006)*.

Comparative Analysis of Anti-Tumor Properties

Comparative studies of the anti-tumor capabilities of Semen Armeniacae, Ipomoea aquatica, and Vanda tessellata's bioactive components and pharmacological activities present interesting opportunities. Preclinical investigations have shown that the alkaloids, flavonoids,

Table 3: Therapeutic potential of the herbal plants and their mechanism

Herbal plant	*Therapeutic potential*	*Anti-tumor mechanisms*	*Preclinical evidence*
V. tessellata	Potential anticancer properties due to bioactive compounds	Induction of apoptosis in cancer cells through various pathways	*In-vitro* studies demonstrate inhibition of cancer cell proliferation and induction of apoptosis
I. aquatica	Rich in antioxidants and bioactive compounds, suggesting anticancer effects	Suppression of tumor growth through modulation of oxidative stress	Animal studies indicate reduced tumor volume and metastasis with *I. aquatica* treatment
S. armeninace	Historical use in traditional medicine for cancer treatment, though controversial	Proposed cytotoxic effects on cancer cells, attributed to amygdalin	Limited preclinical evidence; some studies suggest potential anti-tumor effects, but further research is needed for validation

and phenolic chemicals found in Vanda tessellata have lethal effects on cancer cells *(Patil P. S. et al. 2010)*. On the other hand, Ipomoea aquatica contains carotenoids, polyphenols, and flavonoids that have anti-inflammatory and antioxidant qualities that may help explain its possible anti-tumor implications. In addition to other bioactive substances including flavonoids and triterpenoids, amygdalin, which has generated controversy owing to its potential use in cancer treatment, is what distinguishes semen armeniacae *(Peter M. 2013)*.

Though the pharmacological actions of each plant seem intriguing, it is important to point out potential synergistic effects as well as downsides. Combining the bioactive substances from several plants might increase the effectiveness of treatment by producing synergistic anti-tumor effects. However, some issues need to be carefully considered, including toxicity, bioavailability, and standardization of herbal extracts. Cautious interpretation of results is also required due to contradictory information about the safety and effectiveness of certain chemicals, such as amygdalin in Semen Armeniacae *(Verma S. M. et al. 2002)*.

There are important ramifications for clinical translation and potential future study areas. Developing successful anti-tumor medicines requires an understanding of the synergistic interactions and potential side effects of combining bioactive chemicals from Vanda tessellata, Ipomoea aquatica, and Semen Armeniacae. To ensure that these botanicals are safe and effective in treating humans, clinical trials are necessary before they can be included in standard cancer therapy regimens. Further investigations have to concentrate on clarifying the fundamental mechanisms of action, refining extraction techniques, and standardizing herbal formulations to guarantee uniformity and repeatability of outcomes *(Zhou Y. et al. 2008)*.

Challenges and Future Directions

Numerous restrictions and difficulties arise while researching medicinal plants for the treatment of tumors. Herbal extracts are difficult to investigate systematically due to their variable content, inconsistent manufacturing techniques, and unclear mechanisms of action. Predicting these plants' safety and efficacy is difficult because of the intricate relationships that exist between the bioactive substances they contain and the human body. The research process is further complicated by the requirement for thorough clinical trials to confirm their medicinal potential and address worries about toxicity and adverse effects. The goal of future research on medicinal plants as a tumor treatment should be to overcome these obstacles and fill up important information gaps. Clinical investigations can benefit from improved consistency and repeatability through dosage form optimization, such as the creation of standardized extracts or formulations. To understand their therapeutic potential and find new targets for medication, it is crucial to investigate the molecular processes behind the anti-tumor activities of medicinal plants. Furthermore, studying how herbal medicines and traditional cancer treatments work in concert may help create more potent treatment plans. Progressing our knowledge and application of medicinal plants for tumor treatment requires close collaboration between contemporary oncology and traditional medicine. Plant candidates that show promise can be more easily identified and quickly moved from research into clinical practice when traditional knowledge is combined with modern research methods. Furthermore, by fostering information sharing and reciprocal learning, multidisciplinary partnerships between researchers, medical professionals, and traditional healers might eventually assist patients by providing more thorough and individualized cancer care solutions.

Conclusion

Plants are the major source of secondary metabolites and an important source of pharmaceutical drugs. Herbal drug treatment is an ideal choice as it is comparatively cheaper and may be highly recommended to poor and rural people for the effective treatment of cancer. Anticancer agents discovered from medicinal plants have played an important role in cancer treatment. It is documented that medicinal herbs have rich anticancer potential due to their immune-modulatory and antioxidant properties, and at the forefront whenever we talk about anticancer remedies, they are a significant source of synthetic and/or herbal origin. Bioactive compounds significantly influenced

cancer research in various aspects. Secondary metabolites from medicinal plants inhibit DNA damage, arrest the cell cycle, inhibit the tumor cell angiogenesis, and induce apoptosis thus preventing the cancer. Researchers must pay attention to the scientific rigor of studies of herbal drugs in the future to improve their status. The growing potential of medicinal plants to cure tumors, especially Vanda tessellata, Ipomoea aquatica, and Semen Armeniacae. These herbs show a range of pharmacological actions and bioactive chemicals, suggesting that they may be able to fight cancer cells. They provide viable options for supplemental or alternative medicines to traditional treatments while encountering obstacles including standardization and safety issues. Prioritizing studies to clarify their molecular processes, developing optimal dose forms, and carrying out thorough clinical trials are essential stages in the future. To fully use these botanicals and provide hope for better cancer care techniques and patient outcomes, traditional medicine practitioners and contemporary oncologists must work together.

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