

**ROLE OF NATURAL PRODUCTS IN MEDICINE****CANDIDATE NAME- DEVARASETTI KRISHNA****DESIGNATION- Research Scholar Monad University, Delhi Hapur Road Village & Post Kastla, Kasmabad, Pilkhuwa, Uttar Pradesh****GUIDE NAME- DR. Devendra Kumar****DESIGNATION- RESEARCH SUPERVISOR Monad University, Delhi Hapur Road Village & Post Kastla, Kasmabad, Pilkhuwa, Uttar Pradesh****ABSTRACT**

Even though they are century's old, Ayurveda and Chinese medicine are the oldest systems of medicine still in use today. Their philosophical, practical, and experimental foundations are solid. Complementary and alternative medicine is seeing a surge in popularity as a result of increased side effects, the expensive cost of new pharmaceuticals, drug resistance, and novel ailments. Many plant-based medicines have been introduced to the worldwide market as pharmaceutical corporations have shifted their focus to natural product-based medicinal research and discovery. Medical therapy and illness control have been influenced by these innovations. They were extracted from natural sources, many of which have been utilised by different societies throughout history. Approximately 80 percent of the world's population relied on conventional medicine for health treatment at the beginning of this century. 74% of the most significant medications now in use include active components from medicinal plants, according to an estimate. Drug development was mostly relied on chance up until the 1970s. Only with the development of molecular biology and computers did rational drug discovery begin. Natural product screening and isolation is a good option since it delivers compounds for a long time. Combinatorial chemistry, on the other hand, may produce molecular structures that could not have been predicted.

KEYWORDS: Natural Products, Medicine, Ayurveda medicine, Medical therapy**INTRODUCTION**

A combinatorial method is unlikely to have uncovered natural compounds' unique bonding and stereochemistry, which are difficult to synthesise. In recent years, several pharmaceutical firms have been adopting both combinatorial and isolation approaches. Nature may be the finest combinatorial chemist in the world, according to a famous natural products chemist. Only time will tell which technique will prevail.

Plants are a significant source of novel natural products. Despite the availability of diverse methodologies for the development of therapeutical, natural products nevertheless remain as one of the finest repositories of novel structural kinds.

Furthermore, Farnsworth asserts that 119 described medications are still produced commercially from higher plants and that 74 percent were identified through ethnobotanical knowledge.

Of the several hundred thousand plant species throughout the world, only a tiny number has been researched both phytochemically and pharmacologically. When one thinks that a single plant may have up to thousands of components, the prospects of discovering new discoveries become clear. The important component for the eventual outcome of an inquiry into bioactive plant ingredients is hence the selection of plant material. In light of the huge number of plant species potentially accessible for research, it is vital to have



effective techniques available for the quick chemical and biological screening of the plant extracts chosen for examination. Natural Products, particularly plants, have been utilised for the treatment of numerous ailments for thousands of years. Terrestrial plants have been employed as medicines in Egypt, China, India and Greece from ancient antiquity and an astounding number of contemporary pharmaceuticals have been generated from them. The earliest written documents on the medical usage of plants occurred around approximately 2600 BC from the Sumerians and Akkaidians (Samuelsson, 1999). The "Ebers Papyrus", the best known Egyptian pharmacological record, which chronicled over 700 medications, depicts the history of Egyptian medicine dating from 1500 BC. The Chinese Materia Medica, which describes more than 600 medicinal herbs, has been carefully recorded with the oldest record dating from around 1100 BC (Cragg et al., 1997). Documentation of the Ayurvedic system reported in Susruta and Charaka dates from around 1000 BC (Kappor, 1990). The Greeks also contributed greatly to the logical development of the herbal medications. Dioscorides, the Greek physician (100 A.D.), recorded in his book "De Materia Medica" more than 600 therapeutic plants (Samuelsson, 1999). The World Health Organization estimates that around 80 percent of the world's people depend on traditional medicine for their main health care.

More than 50 percent of all current medications in clinical use are of natural chemicals, many of which have been discovered to have the power to include apoptosis in distinct cancer cells. According to the World Health

Organization (WHO) estimates, more than 80 percent of the population in poor nations rely on traditional medicine for their basic health requirements. Some medicinal plants and their products including vegetables, fruits and crops have a significant part in cancer prevention. Consumption of big quantities of vegetables and fruits may prevent the development of cancer. Doctors urge that persons desiring to lower their risk of cancer should consume several pieces of fruits and numerous servings of vegetables every day. Many plant-derived compounds demonstrate significant antitumour efficacy against numerous cancer cell lines.

1. Important Role of Plants for Cancer

For thousands of years, people have relied on plants and other natural remedies to heal a wide range of ailments. Ancient civilizations in Egypt, China, India, and Greece all relied on plants for medicinal purposes, and a number of contemporary medications have been derived from them. The Sumerians were the first civilization to document the therapeutic properties of plants in writing about 2600 BC. The "Ebers Papyrus," the most well-known Egyptian pharmacological record, dates back to 1500 BC and contains more than 700 medications. Documentation of more than 600 medicinal plants from China's Materia Medica dates back to about 1100 BC. About 1000 BC, Susruta and Charaka documented the Ayurvedic system. The Greeks also made a significant contribution to the rationalisation of natural medicines. Dioscorides, the Greek physician (100 A.D.) documented more than 600 medicinal plants in his treatise "De Materia Medica." Approximately 80 percent of the world's population relies on



traditional medicine for their main health care, according to the World Health Organization. Medicinal plants have been used for centuries to cure cancer. More than 35,000 plant samples from 20 nations have been evaluated for anticancer potential by the National Cancer Institute. When it comes to the definition of natural origin, the term is used to refer to natural products, their derivatives, or synthetic medicines inspired by the natural product paradigm.

There is no other natural resource that can compare to plants in terms of chemical diversity, making them an excellent starting point for researchers looking to find novel ways to combat cancer. As a consequence, certain cancer-fighting medicinal herbs have been discovered. Drug resistance is a consequence of both historical evidence of plants being used to cure illness and scientific proof that these treatments work.

2. Phytomedicine - Herbal Medicine

All across the globe, plants have been utilised to heal a variety of ailments. More than 70% of the world's population still relies on medicinal plants as their major source of medication, even in the contemporary world. When it comes to healing, medicinal plants have long had a prominent position.

• History of Herbal Medicine use in India

More than 80,000 of the world's 2,50,000 higher plant species are medicinal in nature. Over 45000 distinct plant species may be found in India, making it one of the world's 12 biodiversity hotspots. Due to the existence of 16 agroclimatic zones, 10 vegetation zones, 25 biotic provinces, and 426 biomes, India's variety is unparalleled (habitats of specific species).

About 15000-20000 of these plants have considerable therapeutic potential, which is a significant number. Traditional cultures, on the other hand, utilise only 7000-7500 species for medicinal purposes. Ayurvedic and Unani therapies have utilised herbal remedies from the beginning of time in India.

Ayurveda, Unani, Siddha, Amchi, and contemporary medicine all employ a total of roughly 700 types of plants. Different parts of the plant are used to make the medications, including as leaves, stems and bark, roots and flowers. It is not uncommon for pharmaceuticals to be made with the help of naturally occurring plant excretory materials including gum, resin, and latex. Several plant-derived medications have found their way into the contemporary pharmacopoeia, even under the Allopathic school of medicine. Plants also provide some of the chemical intermediates required to produce today's most advanced pharmaceuticals (Eg. diosgenin, solasodine, bionone). Not only is there a steady market for plant-derived pharmaceuticals, but plants are also a major source of novel medicines.

• Availability of Herbal Medicinal Plants in India

The Western Ghats of India occupy an area of 1,60,000 square kilometres and are one of the world's eight "hottest" biodiversity hotspots, according to the 34 biodiversity hotspots that have been discovered so far. 4,000 of the region's 15,000 plant species are unique to the area. The woodlands in the area are a source of herbal medicine for many of the local ethnic groups because of the territory's abundance of plant and animal life. Medicinal plants, a term used to describe the wide variety of plants used in this



system of treatment, are essential to its success. Since its inception more than 5,000 years ago, Ayurveda and traditional medicine have become more popular over the world; they are being exiled from their homeland. For the most part, herbal medicines that have been handed down through the years have been left undocumented and hence unknown.

Overexploitation, habitat damage, and habitat loss in the Western Ghats region are threatening the very survival of medicinal plant flora in the area. More than 586 kinds of plants from the area have been included in the 'Red Data' book, which lists the most endangered plants in the world. As a result, the conservation of medicinal plants, which are under severe threat and are on the point of extinction, should be a top priority. As a result, there is a need to educate the public about the value of herbal medicine and the protection of medicinal plants.

• **Regulatory Scenario of Herbal Medicines**

The World Health Organization (WHO) defines herbal medicines as a plant-derived substance or preparations having therapeutic or other human health advantages that comprise either raw or processed constituents from one or more plants, as defined by WHO. Goods that include active components of plant parts or other plant materials, or mixtures of these components, are included in the category of herbs, herbal preparations, and finished herbal products. The complexity of herbal medicines used across the globe varies with the technical progress of the nations that make and use them, but it is a common ingredient in all indigenous peoples' traditional medicine, including Ayurvedic, Homeopathic, and

Naturopathic. Medicinal tea extracts, crude tablets and extracts, and contemporary tablets all fall within this category.

• **Current and Future Status of Herbal Medicine**

Various illnesses have been treated using natural compounds derived from plants, animals, and minerals. As time goes on, the popularity of herbal remedies continues to rise. Wide varieties of medicinal plants are found across India and are used in traditional medicine. Approximately 20,000 medicinal plant species have recently been documented in India, yet more than 500 people, including tribes, rely on roughly 800 plant species to treat a variety of diseases. Pharmaceutical prescriptions in the United States include at least one component originating from plants, which are a major source of medication.

ETHANOMEDICINE IN DRUG DISCOVERY

In ethanopharmacology, the observation, description, and experimental research of indigenous medications and their biological effects is a very varied approach to drug discovery. Ethanomedicine is the practise of treating human illness by the use of ethanol derived from plants. For millennia, people have relied on medicinal plants to heal a broad range of diseases. Plants that contain secondary metabolites have been linked to many of their medicinal properties. There are a variety of methods for determining which plants have the best chance of success in drug development. We stress the importance of ethnomedical knowledge and its usefulness for drug development in our work.

A growing number of people are turning to herbal remedies as a complementary and alternative medicine (CAM) because of its



high antioxidant properties, low risk of adverse effects, and low cost. Methods for determining the antioxidant potential of various plants used in dietology were calibrated using ascorbic acid. New medications derived from medicinal plants have benefited greatly from the use of active components derived from natural sources. Although antioxidant activities of phytochemicals have been the focus for many years, antioxidant impacts on cell signalling and gene expression are also acknowledged as being essential.

Ethnopharmacology as a distinct area of study is a relatively new concept. "The observation, identification, description, and experimental investigation of the ingredients and effects of such indigenous drugs is a truly cross-disciplinary field of research that is extremely important in the study of traditional medicine," the term was used in 1967 as the title of a book on hallucinogens, "Ethnopharmacologic search for psychoactive drugs." Today, the term is much more broadly defined. "The multidisciplinary study of biologically active compounds historically used or observed by man" is how ethnopharmacology is defined. There is no mention of research for novel bioactive medicines in this concept of indigenous usage (drug discovery). Various steps in the process of drug development are examined in this section. There are various steps to the discovery process. There must be documented usage of a naturally occurring substance for a therapeutic purpose as the first step. Taking into account the cultural practises linked with the claimed activity is essential in determining its likely origins. Scientific terminology must be used to identify and describe the item if there is any evidence

of actual efficacy. As a result of these investigations, samples may be collected for further testing, which often includes tests for biological activity related to chemical separation and structural determination as a possible explanation for the observed activity.

1. Anticancer activity in Plants

In both human and animal existence, the kingdom of plants plays a critical role. In India, there is a treasure trove of well-documented and long-standing knowledge of herbal therapy. Traditional Indian medical systems such as Ayurveda, Siddha, and Unnani, which date back to India and are still widely practised in the country's south, are among the oldest systems of medicine in existence. They are used to treat a wide range of illnesses, from acute to chronic.

The "Botanical Garden of the World" is often used to describe India, the world's greatest producer of medicinal plants. Mutagenic, including larger doses of UV-Radiation, physiological dryness, desiccation, and strong winds, attack plants living at higher elevations. Plants respond to stressful conditions by modifying their metabolic profile and creating a wide range of secondary metabolites to defend themselves. Spectroscopic examinations of plant-derived pharmaceuticals, such as crude or active components, are used to identify them.

Large-scale screening of synthetic compounds against animal tumour systems, such as murine leukaemia, has traditionally led to the discovery of new cancer therapies. Cancer chemotherapy's first two decades (1950-1970) were marked by the discovery of drugs that primarily interfered with the production of



new genetic material or their predecessors. Many claims have been made about the therapeutic benefits of plants in the treatment of cancer.

2. Anti-oxidants in plants that fight against cancer

To develop a cancer-fighting medication, researchers are looking into the plant sources' antioxidant properties. About 114,000 plant extracts were tested for anticancer efficacy after being gathered from 35,000 plant samples from 20 nations by the National Cancer Institute. Prior to 1983 and 1984, 60 percent of the 92 anticancer medicines commercially accessible used natural ingredients. Plant extracts, either in the form of pure chemicals or standardised extracts, provide an infinite supply of potential therapeutic targets because of their unparalleled chemical variety. A lot of research from across the globe are pointing to culinary herbs as sources of antioxidants and other anticancer compounds. These herbs have been shown to lessen cancer risk, and some have even been shown to alter tumour activity.

3. Plant derived anticancer agents in clinical use

Every country has a significant burden of cancer, whether it is developed or developing. Taxol, vinblastine, vincristine, camptothecin derivatives topotecan and irinotecan, and the epipodophyllotoxin-derived etoposide are all therapeutically effective anti-cancer drugs developed from plant-derived chemicals. A total of 30 plant-derived drugs have been identified and are now being tested in clinical studies. Preventing or reducing carcinogenesis is possible using cancer chemopreventive drugs, many of which are derived from naturally occurring

components of the environment. Flavopiridol, roscovitine, combretastatin A-4 phosphate, betulinic acid, and silvestrol are among the potential novel drugs now in clinical or preclinical research based on their selective efficacy against cancer-related molecular targets. By attaching silver ions to sulphur, oxygen, and nitrogen and other important biomolecules, the plant-derived active chemical and silver nanoparticles impair the bacterial membrane's integrity and impede their development (Juan et al., 2010). The antibacterial effectiveness of oligodynamic silver goes well beyond its virotoxicity, as it has fatal effects on microbes of all kinds.

4. Role of Ethnomedicinal Plants in Cancer Treatment

Plant-derived chemicals like Camptothecin, Etoposide, Taxans, Vincristine, and many more have had a significant impact on Indian medicine because of their potent anti-cancer properties.

- The numerous traditional medicines are widely used as an alternative therapy. Chemotherapy, radiotherapy & surgical excision are few conventional therapies frequently utilized but it seldom proves to be inefficient to solve the problem.

- The traditional medicine systems in India are linked to the rich & diverse flora. Indian medical practises are a blend of traditional and contemporary medicine because of a variety of factors, including an ecological, cultural and historical context that supports its usefulness as a therapeutic approach. It is becoming more important to record, study, and assess the use of these therapeutic plants in order to understand the patterns of use and also the



economic worth. The pharmaceutical industry relies heavily on natural medicines that include a variety of biologically active chemicals that are used to treat human illnesses. Podophyllotoxin, Camptothecin, Taxol, Vincristine, and Vinblastine are just a few of the helpful medications created from naturally occurring substances that are used to treat cancer.

CONCLUSION

Plants and their components have long been utilised as raw materials in a variety of medical treatments. It is consequently critical to correctly identify medications and evaluate them on a scientific basis. The current study focussed on ethnopharmacologically significance of plant *Catunaregum spinosa* Thunb for antioxidant and anticancer properties, which has led us to further investigate these plants in order to find a novel lead molecule for various disorders.

Despite these significant contributions from the plant kingdom in the past, a large number of plant species have never been documented and remain unknown to science, and only a handful have been carefully searched for biologically active chemical ingredients to any extent. As a result, new plant sources of valuable and pharmaceutically intriguing compounds are likely to be found and produced in the future. Unfortunately, if current trends of tropical forest destruction and general biotic simplification continue, scientists interested in medicinal plant research may only have a few decades left to explore much of the rich diversity of the plant kingdom for useful new bioactive compounds, and many opportunities for successful drug development will almost certainly be lost. It is also critical that

genetic resources that are endangered, vulnerable, or over-exploited be maintained to the maximum degree feasible for future generations who will have the means (both technical and intellectual) to more wisely exploit and manage these species.

REFERENCES: -

1. Arnao, Marino & Cano, Antonio & Acosta, Manuel. (2000). Methods to Measure the Antioxidant Activity in Plant Material. A Comparative Discussion. Free radical research. 31 Suppl. S89-96. 10.1080/10715769900301371.
2. Ayim JA, Bayor MT, Phillips RM, Shnyder SD, Wright CW (2007) The evaluation of selected Ghanaian medicinal plants for cytotoxic activities. *J Sci Technol (Ghana)* 27: 16–22.
3. Ayoub, Zeenat & Mehta, Archana. (2018). Medicinal plants as potential source of antioxidant agents: A review. *Asian Journal of Pharmaceutical and Clinical Research*. 11. 50. 10.22159/ajpcr.2018.v11i6.24725.
4. Balakrishnan, Umarani & K, Saravanan,. (2020). Anticancer Agents from Some Known Plants: A Review. 9. 582-603.
5. Bamps P (1966) Note sur les Guttiféracées d'Afrique Tropicale. *Jard Bot Nat Bruxelles* 36: 315–319.
6. Bamps P (1970) Flore du Congo, du Rwanda et du Burundi. *Jard Bot Nat Bruxelles* X: 24–31.
7. Batool, Riffat & Aziz, Ejaz & Iqbal, Javed & Salahuddin, Hina & Tan, BennyKwong-Huat & Tabassum, Saira & Mahmood,



- Tariq. (2020). In vitro antioxidant and anti-cancer activities and phytochemical analysis of *Commelina benghalensis* L. root extracts. *Asian Pacific Journal of Tropical Biomedicine*. 10. 417. 10.4103/2221-1691.290133.
8. Begum, Iblina & Sharma, Rupanjali & Sharma, Hemanta. (2018). A Review on Plants Having Anti-Cancer Activity. *Curr. Trends Pharm. Res.*.
9. Behrens BC, Hamilton TC, Masuda H, Grotzinger KR, Whang-Peng J, et al. (1987) Characterization of a cis-diamminedichloroplatinum(II)-resistant human ovarian cancer cell line and its use in evaluation of platinum analogues. *Cancer Res* 47: 414–418.
10. Bharti, Rupam & Ahuja, Gunja & Ganapathy, Sujana & SD, Dr. Shruthi. (2012). A review on medicinal plants having Antioxidant potential. *The Journal of Pharmacy*. 5. 4278-87.
11. Bharti, Rupam & Ahuja, Gunja & Ganapathy, Sujana & SD, Dr. Shruthi. (2012). A review on medicinal plants having Antioxidant potential. *The Journal of Pharmacy*. 5. 4278-87.
12. Bhat, Smita. (2021). Medicinal Plants and Its Pharmacological Values. 10.5772/intechopen.99848.
13. Botta B, Delle MF, Delle MG, Marini BGB, Msonthi JD (1985) Prenylated bianthrone and vismione F from *Psorospermum febrifugum*. *Phytochemistry* 24: 827–830.
14. Botta B, Delle MF, Delle MG, Marini BGB, Oguakwa JU (1983) 3-geranyloxy-6-methyl-1,8-dihydroxyanthraquinone and vismiones C, D and E from *Psorospermum febrifugum*. *Phytochemistry* 22: 539–542.
15. Bouyahya, Abdelhakim & Bakri, Youssef & Khay, El & Edaoudi, Fatima & Talbaoui, Ahmed & Et-Touys, Abdeslam & Abrini, Jamal & Dakka, Nadia. (2017). Antibacterial, antioxidant and antitumor properties of Moroccan medicinal plants: A review. *Asian Pacific Journal of Tropical Disease*. 7. 57-64. 10.12980/apjtd.7.2017D6-294.