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Herbal Formulations and their Anticancer Potential- A Review

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Abstract: India is the world's top producer of medicinal plants and is aptly referred to as the "Botanical Garden of the World." Medical plants not only offer natural remedies for a variety of illnesses, but also premium food and raw resources for survival. Significant study has been conducted on these plants to treat cancer based on their traditional uses and scientific investigations, and specific plant components have been marketed as anticancer drugs. These plants may assist the host in acquiring an immunity to infection by restoring the body's equilibrium and retraining the biological tissue. Different cancers can develop as a result of lifestyle modifications, drug and alcohol misuse, hormone treatment, and other causes. The use of herbal medicine to treat people with harmful illnesses like cancer is universally acknowledged. Therefore, to treat these numerous forms of malignancies, radiation and chemotherapy are routinely employed to destroy the cancer-causing cells. A number of adverse effects are brought on by the length and dose of these therapies, which are then followed by a number of ailments.

Keywords: Anticancer, Chemotherapy, Herbal Medicine, Malignancies, Ailments

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INTRODUCTION

Malnutrition, a shortage of food and medication, as well as an increase in industrialisation and environmental risks are all caused by the rising population pressure. Nutritional deficiencies and pesticide residues on fruits, vegetables, and food items cause the local populations to acquire cancerous consequences. The use of excessive amounts of non-prescription medications also contributes to the production of many carcinogenic metabolites. Changes in lifestyle, combined with drug and alcohol abuse, hormone therapy, and other factors, all contribute to the emergence of different malignancies. Radiation and chemotherapy are frequently used to eradicate the cancer-causing cells in order to treat these various types of cancers. The duration and dosage of these treatments cause a variety of side effects to emerge, which are then followed by a number of illnesses. So now is the perfect opportunity to research novel herbal combinations to test against various malignancies. Compared to radiation and chemotherapy, herbal formulations are safer, more environmentally friendly, and side effect free.

The vast majority of people worldwide rely on conventional medications. Due to the presence of different alkaloids, flavonoids, steroids, and polyphenols in medicinal herbs, the World Health Organization estimates that 80% of people living in rural areas rely on them as their major source of healthcare (Dhru et.al., 2016 and Loc and Kiet, 2011). More than 60% of bioactive compounds that fight cancer come from natural sources. In India, 3000 traditional users employ the 45,000 different types of medicinal plants. India is therefore the world's greatest producer of medicinal plants and is referred to as the "botanical garden of the world" (Medical Plants India, 2010). Due to a rising awareness of the negative consequences of both

designer drugs and medications, significant advancements are being made in the fields of pharmaceutical drug production and medicines. Plants also play a significant role in modern society and traditional medical systems (Kayastha, 2014). Products made from plants have gained major importance, not just in underdeveloped countries but also in Western Europe and the United States. Plant products are anticipated to play a significant part in healthcare programmes across all countries in the globe for a very long time (Nyeem et.al., 2017). There is little doubt that a thorough examination of native medicinal plants and their therapeutic potential would uncover a wide range of additional efficient remedies and broaden the scope of India's ancient methods (Umadevi et.al., 2013).

According to Motais et.al., 2020 most cancer treatments that have a multitude of side effects are treated using surgery, radiation, chemotherapy, immune, targeted hormone, and stem cell transplants. Both the percentage of deaths during recovery and those brought on by such therapy are rising daily. Thus, using a natural herbal composite product to treat patients is crucial. Thus, using a natural herbal composite product to treat patients is crucial. There has been a lot of interest in using conventional medicine to treat cancer. Therefore, scientific research into such composite herbal products is necessary to create natural cancer treatments.

The use of herbal medicine to treat people with harmful illnesses like cancer is universally acknowledged. Traditional Ayurvedic treatments have long included Triphala and other herbal concoctions as a healing tonic. In addition, it's possible that the number of active ingredients in the recipe, particularly tannins, are the primary causes reducing cell death via the production of free radicals in malignant cells. On the other hand, the three fruits of these plants are even rich in antioxidants that may effectively protect healthy cells from free radical damage (Wongnoppavich et.al., 2009).

About *Opuntia elatior*

Opuntia is a large genus of succulent plants native to the New World that are now widely grown in hotter climates due to their distinct personalities and alluring blossoms. Thorny pears were unintentionally brought into India and other eastern nations by early Western explorers who brought these crops to use as vegetables to prevent scurvy during their protracted voyages. They swiftly spread over neighbouring countries as well as India, becoming noxious weeds that dominated vast desert and developed areas (The Wealth of India, 2001).

Most of the 194 species that make up the *Opuntia* genus are found in dry and semi-arid regions. This shrub is native to many regions of the world, including the Mediterranean, Australia, Africa, and India. It is also native to the Caribbean, Central and South America, as well as the northern section of South America. West India is where one may find *Opuntia elatior* Mill. (The Wealth of India, 2001). Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Andhra Pradesh, Tamil Nadu, as well as a few other sparsely populated dry and semiarid areas around the nation.

Shrubby or subarborescent Subulate, recurved, reddish-tipped leaves with variable-sized joints that are obovate or elliptic in shape, rather thin, undulate-free, and dull bluish green in colour. Areoles with rust-brown, discrete glochidia that are nearly obscured by fuzzy hairs. 5 cm wide, yellow or orange flowers. The perianth rotates, with the inner spathulate segments being acutely spathulate, and the outer segments

being short, oval, and crimson in the middle. A tiny bit shorter stamens than the perianth. Stigmas are six, and the style is larger than the stamens. When mature, the pyriform, angular, or rather warty berry becomes reddish purple and is covered in tufts of glochidia (Kirtikar and Basu, 1999).

Plate 1: *Opuntia elatior* Mill. A. Habit, **B.** Initiation of fruit, **C.** Green fruit, **D.** Fruit with flower, **E- F.** Red fruit

About *Mornida citrifolia*

Mornida L. belongs to the Rubaiceae family. Due to the fruit's resemblance to the *Mulberry indica*, the term *Morinda*, which is often referred to as the Indian Mulberry, is derived from the Latin word Morus, which means mulberry. In several nations, the genus *Morinda* is recognised by various local names.

It is abundantly produced in India's Andaman and Nicobar Islands and in the coastal regions of Kerala, Karanataka, and Tamil Nadu under natural conditions. It is discovered to be cultivated beside roads and fences in the coastal region, demonstrating its broad resilience to harsh environments (Rethinam and Sivaraman, 2007). Cooke (1903) noted the presence of noni in the coasts of Vengurla, Marmagoa and Malvan, Latur, Osmanabad, Nanded, and draught-prone Marathwada area districts in his Flora of Bombay Presidency (Naik, 1998). In Akola, Bombay, Jalgaon, Nagpur, Pune, Ratnagiri, the sea coast of Mumbai, and Thane, *Mornida citrifolia* is often farmed and also grows as an escape (Singh et.al. 2000). In Kolhapur district *Morinda* discovered in Panhala woodland, Kerala and Tamdalge (Yadav and Sardesai, 2002).

Small evergreen shrub or tree, ovate, wide elliptic, or oblong leaves, three long nodes per leaf, A terminal or axillary inflorescence Bisexual and protoandrous. The flower head that matured into a fruit, the calyx is tubular, drastically reduced, and has few lobes. Corolla: Tube-shaped, actinomorphic, rather funnel-shaped. Stamens: Capitate, glabrous, and extended slightly beyond the corolla. Ovary: inferior, two or four locular, oblong, Fruit: globose syncarp that is densely clustered, initially green in colour, becoming white yellow when ripe; seed: vertical, ovoid to obovoid.

Plate 2: *Morinda citrifolia* L. A. Habit, **B.** Fruit with flowers, **C.** Healthy green fruit, **D.** Mature yellow fruit.

About *Simarouba glauca*

Simarouba glauca, a rainfed wasteland evergreen oil tree sometimes called "Laxmitaru" or "paradise tree," is a member of the Simaroubaceae family. The scientific name glauca, which alludes to the bluish-green leaves, literally means "covered with bloom" (Patil and Gaikwad, 2011).

The National Bureau of Plant Genetic Resources originally introduced it in 1966 at the research facility in Amravati, Maharashtra, then in 1986 at the University of Agricultural Sciences in Bangalore. It is grown in Orissa and Maharashtra in India, as well as at the beginning stages of planting in other states like Anand in Gujarat, Jodhpur in Rajasthan, Andhra Pradesh, Karnataka, Tamil Nadu, West Bengal, and Bhubaneswar (Orissa). The leaves are alternating, even, bluish oily green pinnately compound, with 3–21 oblong leaflets that are frequently notched or smooth at the apex. The terminal panicle's final branches produce a dichasial cyme in the inflorescence. Inconspicuous bisexual flowers have a green calyx that is formed like a dome and has a varied number of sepals. Single whorls of white, greenish or yellowish, creamy petals are present. The staminate blooms have a single ovule and gynophores but no carpel.

Plate 3: ***Simarouba glauca*** **DC. A.** Habit, **B.** Inflorescence, **C,D.** Single Flower

Plants Used Cancer

India, which is rightfully referred to as the "Botanical Garden of the World," is the world's leading producer of medicinal herbs. In addition to providing natural therapeutic benefits against many ailments, medicinal plants also offer high-quality food and raw materials for subsistence. On the basis of their traditional applications and scientific studies, significant research has been done on these plants to cure cancer, and certain plant components have been sold as anticancer medications. By restoring the body's homeostasis and training the bodily tissue, these plants may help the host develop resistance to infection (Umadevi 2013).

At a dosage of 0.4 mg/ml, turmeric extract inhibited the development of Chinese Hamster Ovary (CHO) cells while also being cytotoxic to lymphocytes and Dalton's lymphoma cells. At 30°C, the cytotoxic consequence was discovered in 30 minutes. The remaining active ingredient was identified as "Curcumin," which, at a dosage of 4 g/ml, showed cytotoxicity to lymphocytes and Dalton's lymphoma cells. Early studies demonstrated that curcumin and turmeric extract slowed the development of animal cancers (Kuttan, 1985). The traditional medicine acorus calamus has been used to treat both infectious and noninfectious disorders. Acetone and ethyl acetate, which are dissimilar solvents, were used to extract dried Acorus, and their phytochemical analysis, antioxidant, antimicrobial, antioxidant, anticancer, and DNA polymerase inhibitory properties were all validated (Funde, 2015). The different Sida acuta extracts

were examined by Thondawada et.al. (2016) in vitro for their capacity to scavenge free radicals, their cytotoxicity, and their short- and long-term in vivo anticancer activities. The DPPH assay, Cytotoxicity by MTT and SRB assays in Vero, HEP-2, A-549 and HeLa cell lines, as well as short-term toxicity studies on Dalton's Lymphoma Ascites (DLA) and Ehrlich's Ascites Carcinoma (EAC) cells, were used to assess the extracts' anti-cancer activities.

CONCLUSION

It can be concluded that medicinal plants not only provide natural treatments for a number of diseases but also supply food and essential basic materials for survival. It is generally accepted that herbal therapy may be used to treat patients with dangerous diseases like cancer. Because of this, radiation and chemotherapy are frequently used to treat these many types of cancer by killing the cancer-causing cells. The duration and dosage of these therapies result in a number of undesirable consequences, which are then followed by a variety of illnesses.

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