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Anticancer Properties and Cytotoxic Effects of Agasthiyar Hills Medicinal Herb Vernonia cinerea

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A B S T R A C T

Vernonia cinerea, an indigenous medicinal plant in Agasthiyar Hills, exhibits potent anticancer properties and cytotoxic effects. Research has revealed its ability to prevent the proliferation of cancer cells through several mechanisms, including the induction of apoptosis and cell cycle arrest. Bioactive compounds from Vernonia cinerea have shown inhibitory effects on key pathways involved in the development of many cancers. Furthermore, the plant's cytotoxicity against many cancer cells shows its potential as a therapeutic agent. Studies have elucidated the effects of Vernonia cinerea on the viability of cancer cells and have highlighted its ability to selectively target malignant cells. In addition to everyday cells. The phytochemical composition of this medicinal plant, rich in secondary metabolites, is reported to contribute to its anticancer activity.

INTRODUCTION

Behind heart disease, cancer is the second most common cause of mortality . Cancer causes one in eight deaths worldwide, including malaria, tuberculosis, and AIDS. It is projected that the global death toll from cancer will rise from 7.1 million in 2002 to 11.5 million in 2030. A vast range of illnesses known as cancer can begin in any organ or tissue when aberrant cells proliferate uncontrollably, and keep expanding worldwide, placing a great deal of financial, emotional, and physical strain on health systems, communities, families, and individuals. Even though ovarian cancer treatment and control have advanced significantly, there are still many unaddressed issues and opportunities for development. Chemotherapy can have several unintended side effects. Side effects can be minimized by natural treatments, such as the use of herbal products in cancer treatment. Certain natural products are being employed in the treatment of cancer. This review will highlight many chemical compounds derived from plants that have recently demonstrated potential as anticancer medicines and will also illustrate possible modes of action. Ayurvedic medicine, or traditional medicine, has been utilized to treat several illnesses, including cancer.

MORPHOLOGY

Vernonia Cinerea is a medicinal plant, distributed in India and easily seen on roadsides, open waste areas, perennial plants and dry grassy sites and perennial crops during planting. It is branching, upright, and grows to a height of 12 to 75 cm. The leaves are alternating, the lower one is petiolated, and the upper one is stalkless 2–6 centimeters in length; hair is roughly fine and dense. The heads have a diameter of 2.5 mm and a length of 7 mm about twenty tubular blooms are produced per head; they are all light purple, pink, or white. Sheath of pappus, 3–5 mm long. Achenes are 1.5 mm long, ribless and puffy.

BIOLOGICAL ACTIVITY OF VERNONIA CINEREA

In Hindi, Veronia cinerea is referred to as Sahdebi or Sahadevi. It's known as little ironweed plant or purple fleabane in English. Skin ailments, stomach issues, and respiratory infections have all been treated with it. According to scientific research, Vernonia cinerea possesses antioxidant, antibacterial, and anti-inflammatory qualities, making it a viable option for the creation of novel medications or home cures. Over the past few years, the Vernonia Cinerea has demonstrated

significant potential in the medical domain. It is a potential treatment for several infections and inflammations due to its antibacterial and anti-inflammatory qualities. Furthermore, its antioxidant qualities imply that it might be involved in avoiding oxidative stress-related illnesses. The more this plant is studied, the more chances it may have for therapeutic development. Sahadevi is used to treat vaginal discharges, boils, intermittent fever, and filariasis. The entire plant is prepared for the treatment of cough, colic, abdominal pain and diarrhea. It has anti-tumor and anti-cancer properties.

SCIENTIFIC CLASSIFICATION

Kingdom: Plantae

Order: Asterales

Family: Asteraceae

Tribe: Vernonieae

Genus: Vernonia

CHEMICALS CONSTITUENTS

The plant has triterpene chemicals such lupol acetate and beta-amyrin acetate as well as luteolin-7 mono-beta-D-glucopyranoside. The sterols beta-sitosterol, stigmasterol, and alpha-spinasterol are present in the plant. This plant's primary chemical constituent is beta-amyrin acetate, also known as lupeol acetate. Moreover, it contains sterol-beta-sitosterol, alpha-spinasterol, and stigmasterol. Because of its anti-inflammatory, anti-bacterial, anti-fungal, digestive, and calming qualities, this herb is highly valued in Ayurveda.

CYTOTOXICITY

Cytotoxic activity is one of the remarkable properties of quassinoids and has been studied. The veronica plant variety, V. cinetothera, is the only one that shows antiproliferative activity on cancer cells. Unfortunately, there is little scientific data to detail these effects. According to a tumor assay, WC's primary mechanism of cytotoxicity against cancer cells is through inducing apoptosis. Inhibition of multidrug resistance transporters or drug effector pumps and STAT3-STAT2 phosphorylation. Cytotoxic activity is one of the remarkable properties of quassinoids and has been studied. The veronica plant variety, V. cinetothera, is the only one that shows antiproliferative activity on cancer cells. Unfortunately, there is little scientific data to detail these effects. A tumor assay showed that WC was cytotoxic to cancer cells mainly due to its effect on apoptosis. Inhibition of multidrug resistance transporters or drug effector pumps and STAT3-STAT2 phosphorylation.

ANTIOXIDANTS FOUND IN VERNONIA CINEREA FOR CANCER TREATMENT

Vernonia cinerea contains various antioxidants that contribute to its potency against most cancers. Alkaloids have antioxidant activity and immunomodulatory effects. Along with flavonoids, quercetin and kaempferol, the plant exhibits antioxidant properties. These compounds help neutralize free radicals, which can be present in oxidative stress and contribute to many cancers. The antioxidant activity of Veronia cinerea is thought to play a role in inhibiting the growth of cancer cells.

In addition, the ability of plants to combat oxidative stress. Consistent with its ability to prevent DNA damage as needed. Components in cancer initiation and progression. As research continues, the antioxidant properties show the importance of Veronika Cinema in exploring various natural therapies for the prevention and treatment of cancer.

PHYTOCHEMICAL PROPERTIES OF VERNONIA CINEREA HERB

This herb contains flavonoids, alkaloids, saponins and tannins. These phytochemicals provide antioxidant capabilities, helping to neutralize harmful free radicals. In addition, this herb has anti-inflammatory properties, offering therapeutic benefits. The presence of anti-microbial compounds indicates the normal healing ability of vernonia cinnabar. Its rich phytochemical profile contributes to ongoing research.

ANTITUMOUR ACTIVITY

Significant antifungal activity against Dalton's ascitic lymphoma in ethanolic and chloroform extracts of the aerial part of Vernonia Cinerea. Following the injection of extracts, in vivo investigations on mice demonstrated a decrease in the number of cancer cells, and this protective effect was reinforced by hematological measures.

USE IN CARCINOMA

■ It has been observed that the plant exhibits anticancer efficacy against mice with sarcoma 180.

■ C57BL/6 mice were used to investigate the impact of Vernonia Cineria (Sahadevi) Less. extract on the suppression of lung metastasis produced by B16F-10 melanoma cells.

■ Human adenocarcinoma cells experienced dose-dependent cytotoxicity from the dichloromethane portion of (VC-DM), whereas human normal epithelium cells were less affected. In human adenocarcinoma cells, these "sesquiterpenoids" enriched fraction (VC-DM) caused apoptosis, DNA damage, genotoxicity, and G2/M phase arrest. It's interesting to note that in human adenocarcinoma cells, VC-DM produced "synergist cytotoxic effects" with anticancer medications and markedly reduced the functional activity of MDR transporters (ABCB1 and ABCG2).

CONCLUSION

Vernonia cinerea is (sahadevi) widespread in East Africa, West-africa, Asia (India,Bangladesh and Nepal). It took a scientific approach to its use as a medicinal plant in chemotherapy, antitumor and various other ailments. Vernonia cinerea (Sahadevi) is a plant that has medicinal value in all its parts. Medicinal investigations demonstrate that in human adenocarcinoma cells, VC-DM induces a "synergistic cytotoxic effect" (combination therapy with

anticancer agent) and inhibits apoptosis, DNA damage, genotoxicity, cell cycle arrest (G2/M), and MDR transporters (ABCB1 and ABCG2). The study's findings justify and corroborate VC-DM's potential as a "anticancer agent" for treating human adenocarcinomas, particularly those that exhibit multidrug resistance.

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