THERAPEUTIC POTENTIAL AND BIOEVALUATION OF (CHRYSOPOGON ZIZANIOIDES): A NARRATIVE REVIEW

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ABSTRACT

Vetiver (*Chrysopogon zizanioides*) is a plant that has been utilized in various fields such as medicine, aroma, commerce, environmental protection, and agriculture, owing to its traditional significance and versatile properties. Vetiver has a diverse historical background in traditional medicinal practices; however, only a limited number of research articles have documented its efficacy in disease treatment. The objective of this review was to collate current data about the phytochemistry, pharmacology, and customary applications of *Chrysopogon zizanioides* (*C. zizanioides*). The primary objective of the

manuscript is to integrate pertinent, genuine, and current information. Relevant articles were also extracted from online databases, including PubMed, Scopus, and Science Direct. The findings of the compilation process indicate that the efficacy of vetiver's traditional uses has been confirmed through the testing of different extracts of this plant part against disease-based pharmacological models. Nevertheless, further comprehensive research is required to substantiate the extraction of bioactive compounds and elucidate their mode of operation. The process of extracting oil necessitates the implementation of distinctive and resilient methodologies, the advancement of which may expedite the identification of biologically advantageous utilities.

KEYWORDS: Essential oil; Vetiver; Antioxidant; Antimicrobial; Anti-inflammator.

INTRODUCTION

Since ancient times, people have turned to the healing properties of plants to treat a wide variety of ailments. Because they include chemical components of therapeutic potential, they are utilized in the medical field as treatments for a variety of conditions. Throughout history and across cultures, medicinal preparations made from plant components have been used. The information on plants that were discovered to be the most efficient against various diseases was passed down from generation to generation. Medicinal plants hold great potential in order to innovative chemotherapeutic drugs for the management of a wide range of diseases, including cancer (1).

Vetiveria zizanioides (L.) Nash (*VZ*), also known as *Chrysopogon zizanioides* (L.) (*C. zizanioides*), is an annual plant from India that belongs to the Poaceae family (subfamily Panicoideae). It is common in Asia, Africa, Oceania, Central America, and South America. The essential oil that is extracted from the vetiver root is a thick liquid that can be pale yellow or dark brown. It has a strong, smoky, earthy, and woody smell. Vetiver oil is often used as a main smell-making ingredient in perfumes and as a flavoring agent in food (2-4). Even

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though vetiver oil has a unique smell, it also has many useful biological properties, such as antioxidant (5-6), antibacterial (7-8) and anti-inflammatory (9-10) qualities.Flavonoids have been shown to have a protective effect against a variety of neurological illnesses and disorders, including disorders of anxiety and mental decline, according to current scientific studies (11-13). Many diverse maladies, including mouth ulcers, fever, boils, epilepsy, burns, snakebites, scorpion stings, rheumatism, fever, and headaches, are treated with VZ by various indigenous communities (14). There are reports of several VZ plant activities, but none of these involve the root's anxiolytic or nootropic effects in mice. The plant is beneficial in various ways: as a brain tonic, nootropic, coolant, antiemetic, diaphoretic, hemostatic, skin disease therapy, expectorant, antifungal action, and hypertension prevention recommendation. Diuretic, antiinflammatory, anti-spasmodic, renal and gallstone treatment, sleeplessness treatment, antioxidant, and many other uses (16). This article will shed light on the many Isoflavonoids, which are active chemical compounds, and the method by which they contribute to the therapeutic process in relation to the body's nervous system Found in the Center of the Body.

The purpose of this research was to shed light on the herb Vetiveria zizanioides, which has been utilized effectively in the use of conventional Medicine of Chinese to address a diverse variety of medical ailments. The publication also emphasized research into several different models of notropic and depressive drugs. Given the widespread recognition that the healing practices of the Indian medical tradition depend heavily on natural resources for the benefit of humankind, academics have begun to worry about the widespread use of these resources. Natural sources are popular since they are safer and well-tolerated. Chrysopogon zizanioides (Linn.) was the study's subject plant. Nash, a perennial grass in the family Poaceae, sometimes called the Khas-Khas grass, the Khas grass, or the Khus grass in India, is distinguished by its scented and highly prized thick fibrous adventitious roots, commonplace in alternative medical practices, especially Ayurvedic ones.



Fig. 1: (A) Whole plant of Chrysopogon Zizanioidesis, (B) Stem, (C) Root

Plant Taxonomy

Native to India, the perennial grass *Chrysopogon zizanioidesis* a plant that belongs to the grass family. Both in the north and the south of India, it is known as khas. This grass has a tall, sturdy stem with narrow, long leaves. Flowers on vetiver plants have a brownish-purple color, and the plant's roots can spread out to a depth of two to four meters. Countries like Indonesia, malesia india, pakistan, and japan are currently the world's leading producers of *Chrysopogon zizanioidesis*.

Chemical Constituents

The phytochemical compounds included in this plant Khusimone, Khusimol, Vetivene, Khositone, Terpenes, Epizizianal, vetivenylvetivenate, Vetiverol, Vetivone, isokhusimol, Vetiver oils, Benzoic acid, Tripene-4-ol, ß-Humulene vetivazulene. Zizaene, prezizaene, (17). Among these, the most important active ingredients found are called khusimol, vetivone, eudesmol, khusimone, zizaene, and prezizaene, and they are regarded to represent the oil's fingerprint. The essential oil of vetiver, also known as *Chrysopogon zizanioides* (L.) Nash, is one of the most important raw materials in the perfumery industry. Vetiver is used both as a fixative

and on its own as a component in fragrances. Vetiver oil has a sedative effect and has been used for a very long time in aromatherapy for the treatment of stress, anxiety, nervous tension, and sleeplessness. Vetiver oil is made up of a complex blend of more than 150 sesquiterpenoid constituents. Vetiver oil has a long history of usage in aromatherapy. The country of origin has a significant impact on the chemical makeup as well as the aroma quality of the oil. The sesquiterpenes alpha-vetivone, beta-vetivone and khusimol are always present in the oil, and their concentrations can reach up to 35%. These components are three of the 60 that have been found so far. As a consequence of this, even though they do not possess the traditional odor characteristics that are linked with vetiver, they are regarded to be fingerprints of the oil because they are related to it.



Fig. 2: Represent the various protective effect of Vetiver

Pharmacological activities

(A) In Traditional Medicine

Different portions of the vetiver plant are used by different people to treat a wide variety of conditions, including mouth ulcers, boils, epilepsy, burns, snake bites, scorpion stings, rheumatism, fever, headaches, and more. A decoction of the roots has been used as a tonic for weakness, while the Santhal people of Bihar and West Bengal, India, utilize the paste made from fresh roots to treat burns, snakebites, and scorpion stings. The Lodhas of the West Bengal region utilizes a paste made from the plant's roots to treat conditions like headaches, rheumatism, and sprains. A decoction made from the plant's stems is taken to treat UTIs. Leaf juice is used as an anthelmintic by the tribal people of Madhya Pradesh's Mandla and Bastar regions. It is also effective against mouth sores, snakebites, scorpion stings, fever, and epilepsy. Pain in the head and teeth can be relieved by a root extract. Tribal people in Varanasi, India, treat malaria by inhaling the vapor from the root. The Oraon people use root ash to treat acidity. In the same way, the plant has a wide variety of medical uses among India's diverse ethnic

groups. Rheumatism, lumbago, and sprains all respond well to a local application of leaf paste. Fragrant linens can be purchased by adding dried roots to the wash(18). Stimulant, diaphoretic, and refrigerant7 are just a few of the uses for vetiver oil.

(B) Anti-Oxidant Activity:

Free radicals cause lipid peroxidation and DNA damage, as reported by Kim H et al. Some plant extracts have been shown to have antioxidant capabilities, which can neutralize free radicals in living organisms. *Chrysopogon zizanioidesis* a tufted grass that is commonly used in aromatherapy to treat stress, anxiety, nervous tension, and sleeplessness. A variety of various in vitro antioxidant capacities, such as decreasing power ability, enhancing free removal activity, deoxyribose degradation assay, total antioxidant capacity, total phenolics, and total flavonoid component, were measured after ethanol extraction of *Vetivera zizanioides* roots (19).

(C) Antitubercular Activity

Chaudhary GD et al. tested *Chrysopogon zizanioides L*. Nash (Family: Poaceae) root extracts and fractions were tested using the radiometric BACTEC 460 TB system for their antimicrobial effect against the H(37)Rv and H(37)Ra strains of Mycobacterium tuberculosis. At a concentration of 500 micrograms per milliliter, the ethanolic extract of both intact and spent root exhibited significant antituberculosis action. At a concentration of 50 g/ml, the hexane fraction caused a reduction in the growth index of Mycobacterium TB (20).

(D) Hepatoprotective Activity

Chrysopogon zizanioides extracts in both methanol and ethanol have demonstrated hepatoprotective effects. An extract derived from this grass prepared with methanol has shown efficacy at doses of 300–500mg/kg. At 3.7 mg/kg, ethanol extract caused 20% toxicity (21).

(E)Antibacterial Activity

Razvy et al. examined zone of inhibition (mm) antibacterial activity. both gram-negative P. aeurogenosa and E. coli and Both gram-positive S. aureus and B. subtilis bacteria, were isolated. Extract of ethanolic from the *Chrysopogon zizanioides* contains flavonoids, alkaloids, terpenoids, saponins, tannins, and phenols that are antibacterial. *EEVZ* inhibited gram-negative bacteria more than grampositive bacteria. phtochemical are excellent antimicrobials aligned with a broad spectrum of microbes owed to their capacity to combine with extracellular as well as soluble proteins and bacterial cell walls. More lipophilic flavonoids may rupture microbial membranes. Tannins bind with polysaccharides and destroy the enzymes that bacteria use to stick together and the transport proteins in the cell membrane, making them antibacterial. This study's in vitro antibacterial activity may be due to tannins in *Vetiveria zizanioides'* roots. Plant extract tannin has antimicrobial properties (22).

(F) Antifungal Activity

Fungus-related infections are typically treated with antifungal medication. While a skin fungal infection typically isn't life-threatening, some types of fungal infections can dangerous when it spreads within and threatens vital organs. The normal cultures of Aspergillusnigra, *Aspergillus clavatus*, and *Candida albicans* were all killed by extracts of *Vetiveria zizanioides*, both aqueous and ethanolic. Standardization was performed using the nystatin and griseofulvin agar plate method (23)

(G) Antihyperglycaemic Activity

Antihyperglycemic action has been observed in an ethanolic root extract of *Vetiveria zizanioides*. Under normal laboratory conditions, this extract had a beneficial effect on rats (24).

(H) Antileishmanial activity

These findings imply that the bioactive chemical of this plant might be employed as an ingredient in novel oral care products as well as may be subsequently browbeaten intended for the research and the creation of new medications for treating leishmaniasis. The aromatic component that is extracted from the roots of *C. zizanioides*. is effective against *Leishmaniaama zonensis* (25).

CONCLUSION

The present review, which was gathered about the applications and pharmacological properties of Vetiveria zizanioides, has been compared with the relevant published text. In the current environment, applications of natural resources that are rooted in ethnobotany and tradition chemicals, particularly those derived from plants, have gotten a lot of attention. This is because these uses have been thoroughly studied for their effectiveness, and they are usually thought to be safe for human consumption. The classical strategy is the ideal one to take while looking for novel compounds for the relief of a wide range of symptoms and conditions. A comprehensive review of the material that is currently accessible on Chrysopogon zizanioi desrevealed that the plant has a lot of applications as a cure for a variety of diseases by Ayurvedic practitioners as well as practitioners of traditional medicine and other ethnic traditions. Researchers are investigating the plant's therapeutic potential because they believe it possesses other therapeutic characteristics about which little is known.

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