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A Review on Therapeutic Uses of Vetiveria Zizanioides

*Yogesh Manikrao Kumare[1], Mangesh M. Kumare[2]
[1]Shri Ayurveda College & Pakwsa Samanvay Hospital, Hanuman Nagar, Nagpur, Maharashtra. 440024
[2]Smt. Kusumtai Wankhede Institute of Pharmacy, Dhantoli, Katol, Nagpur, Maharashtra. 441302

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ABSTRACT
A perennial plant of the subfamily Panicoideae of the Poaceae family is called Vetiveria zizanioides (L.) Nash. The vetiver grass is widely found throughout Asia, Africa, Central America, and South America despite its Indian origins. Due to its extensive system of fibrous roots, vetiver grass is helpful in reducing soil erosion. Additionally, vetiver essential oil exhibits a range of colors from light yellow to dark brown and is distinguished by its low volatility and viscosity. Due to its distinctive and powerful woody scent, it is a popular ingredient in perfume and cosmetic products as well as a promising flavoring element in the food industry. Particularly noteworthy are the functional qualities that vetiver essential oil and extracts have, such as antioxidant, antibacterial, antifungal, and anticancer actions. Sesquiterpenes (3-4%), sesquiterpenols (18-25%), sesquiterpenones (7-8%), Vetivene, Vetivenyl vetivenate, Khusimene, and Khusimone are the primary sesquiterpenes found in the essential oil produced by steam distilling the roots of this grass. Khusimol, -vetivone, and -vetivone, which make up around 35% of oil, are among the most economically significant active chemicals. For commercial cultivation, the commercial grades Dharini, Gulabi, Kesari, and Pusa Hybrid-7, Hybrid-8, Sugandha, KH-8, and KH-40 are available in North India and South India, respectively. This review aims to compile all available data on the chemical make-up and medical applications of vetiver oil.

Keywords :- Vetiveria zizanioides, Vetivene, Vetivenyl vetivenate, Khusimene, Khusimone, Antioxidant, Antibacterial, Antifungal, and Anticancer.

I. INTRODUCTION

The demand for herbal medications is currently high, and their acceptance is growing daily. In ancient literature, some 500 plants are listed as having therapeutic properties, and about 800 plants have been utilized in traditional medicine. India is home to a sizable collection of medicinal plants that are employed in conventional medicine. Even though nearly 80% of the world's population uses traditional medicines for primary healthcare, the WHO has not comprehensively reviewed them. However, WHO created criteria for the evaluation of herbal medicine in 1991. There are recommendations for standardizing herbal medicine. Some herbal constituents' safety has recently come under scrutiny, in part due to the discovery of adverse reactions connected to their usage and, more and more, due to the revelation of clinically significant interactions between herbs and prescription medications. But the use of herbal medicine has increased dramatically during the last few decades. Due to its natural origins and minimal negative effects, it is becoming more and more popular in both developing and developed nations. In India, Vetiveria zizanioides(Linn.) Nash, a perennial grass with thick fibrous adventitious roots that are scented and highly appreciated, is known as the Khas-Khas, Khas, or Khus grass. A commercially significant essential oil used in fragrance and aromatherapy is also produced from vetiver grass.

The perennial bunchgrass Chrysopogon zizanioides, sometimes called vetiver and khus, belongs to the Poaceae family. While sorghum and vetiver are its closest relatives, other aromatic grasses including citronella, lemongrass, and palmarosa (all Cymbopogon species) and palmarosa (Cymbopogon martinii) also exhibit many of the same morphological traits. Through the French term vétyver, the word vetiver is derived from the Tamil word "veivr," which means "root that is dug up." Khus is another name for it in northern India.

II. LITERATURE REVIEW

In one database, Scopus, a review of the literature was done using data available on October 25, 2022. Results were searched for using the keywords "vetiver," "bioactivity," and "chemical composition" between 2003 and 2022.

The potential of aromatic roots to accumulate lead via plant properties, additive

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addition, as well as a symbiosis with microorganisms (bacteria, algae, and fungi), has been shown in literature.2002's (Roongtanakiat & Chairoj) It has been proposed that heavy metal removal and land reclamation in former landfills could both benefit from the application of fragrant root technology.

The complex formation involving phytochelatinin-fragrant roots, Pb, and ethylenediaminetetraacetic acid (EDTA) was discovered through research (Andra, Datta, Reddy, Saminathan, & Sarkar, 2011). It is thought that the development of this complex results in fragrant roots that can tolerate lead. Additionally, studies have shown that the chelant-bound lead form is less dangerous and readily assimilated by plants. Although fragrance roots are not as effective as some other species in absorbing significant amounts of metal, Danh et al. (2009) argue that their high resistance to harsh weather and soil conditions make them a viable option for planting in contaminated areas.These distinctive qualities make fragrant roots a good plant for phytoremediation.

The tops of the aromatic roots can be periodically picked without replanting in order to restore contaminated soil. The advantage of aromatic roots is that they are not viewed as harmful waste once they have been harvested.

Fragrant roots can be safely used to produce bioenergy, compost, or even as a source of materials for crafts (Roongtanakiat 2009). According to Rotkittikhun et al. (2010), Pb can increase the amount of fragrant root oil.

Planting aromatic roots in tin mining areas might be the best option for recovering lead. Pb buildup in fragrant roots can be caused by EDTA contamination of the soil.Abiotic strangulation is the main factor affecting plant effectiveness in soil healing via scented roots. Abiotic stress is something that plants always have to cope with, thus they have evolved defense mechanisms. Plants must be able to modify their physiology, growth, and development in order to survive.

PLANT PROFILE

Some Common Name:-

Hindi and Bengali:- Khas, Khas-Khas, Khus-Khus, Khus

Gujarati:- Valo

Marathi:- Vala

Telugu:- Kuruveeru, Vettiveellu, Vettiveerum

Tamil:- Vattiver Kannad Vattiveeru, Laamancha, Kaddu,

Malyalam:- Ramaccham, Vettiveru

Ayurvedic name:- Ushira

Classification:-

Kingdom	Plantae,
Subkingdom	Tracheobionta
Superdivision	Spermatophyte
Division	Magnoliophyta
Class	Liliopsida
Subclass	Commelinidae
Order	Cyperales
Family	Poaceae
Genus	Vetiveria bory
Species	Vetiveria Zizanoides

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Habitat: River Banks and in rich marshy soil.
Distribution: India, Myanmar, Sri Lanka, Bangladesh;from Southwest Asia to tropical Africa.
The Dose of roots as per Ayurvedic Pharmacopeia of India: 3-6 g. of the drug in powder form for infusion.

Plant description

Dense perennial grass up to 2 meter tall

Roots-

Color - Cream, Grey or Light Yellow to Brown
Fracture- Short and Splintery
Odour - Strong Aromatic
Taste - Slightly Bitter

Leaves-

- Narrow, erect, keeled, and edges covered in scabs
- A panicle of several slender racemes arranged in whorls around a central axis, measuring up to 15–45 cm long, serves as the inflorescence.
- Spikelets are paired, 4-6 mm long, and grey to purple.

Chemical Constituents

Vetiver oil, or khus oil, is a complex oil, containing over 150 identified components, typically:

Benzoic Acid,	Vetivene
Vetivenyl vetivenate,	Khusimene
Khusimone,	Calacorene
Ferfurol,	Terpenol
Valencene	

Properties of Vetiver:-

Blood purifying agents,	Digestive agents
Carminative,	Stomachic
Constipating agents,	Haematinic
Expectorant,	Anti-Ispasmodic
Anti-Asthmatic,	Anti-Gout
Anthelmentic,	Anti-Microbial
Diuretic	

Medicinal Uses of Vetiver:-

- On venomous stings, such as scorpion and snakebite, paste made from the grass roots of the Khus plant is applied externally.
- The topical use of paste is also beneficial for headaches, gout, and joint pain.
- The root decoction is used to treat weakness since it has tonic characteristics.
- Due to the cooling properties of roots, root decoction is administered to patients with high fevers to lower fever.
- Infections of the urinary tract are treated using stem decoction.
- When taken orally, the leaf juice provides relief from parasite illness.

Contraindications, Interactions, and Side Effects of Vetiver

- Vetiver possesses uterotoxic, emmenagogue, and abortifacient properties.
- Uterotonics are used to stop postpartum hemorrhage and to start labor.
- Therefore, it should not be used during pregnancy.
- It is not appropriate for infants or kids younger than twelve.

PHARMACOLOGICAL ACTIVITIES

1. Antioxidant Activity

By causing DNA damage and lipid peroxidation, free radicals cause a wide range of disorders. According to reports, several plant

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extracts have antioxidant characteristics that can scavenge free radicals in living tissue.
The densely tufted grass Vetiveria zizanioides is frequently used in aromatherapy to reduce stress, anxiety, nervous tension, and insomnia.

2. Fungicide Activity

Vetiveria zizanioides aqueous extracts and ethanol both have antifungal properties. Vetiveria Zizanioides extracts in ethanol and water were made. Nystatin and Griseofulvin were utilized as the industry standard in the antifungal tests, which were carried out using the agar well plate method.

3. **Antibacterial Activity**

The zone of inhibition (mm) is used to gauge the antibacterial activity. Ethanolic extract of Vetiveria Zizanioides is known to contain flavonoids, alkaloids, terpenoids, saponins, tannins, and phenols that either individually or in combination exert antimicrobial activity against a total of four bacterial strains (two gram positive bacteria, S. aureus, B. subtilis, and two gram negative bacteria, P. aeurogenosa, E. coli).

EEVZ suppressed gram negative bacteria more effectively than gram positive bacteria, according to the study.

Due to their capacity to interact with extracellular and soluble proteins as well as the bacterial cell wall, flavonoids are shown to be effective antibacterial agents against a variety of microorganisms. More lipophilic flavonoids have the potential to disrupt microbial membrane.

The fact that tannins can inactivate microbial adhesion enzymes and cell membrane transport proteins, as well as the fact that they can bind with polysaccharides, may explain why tannins have antibacterial properties. Vetiveria zizanioides roots contain tannins, which suggests that tannin may be the substance that gives rise to the in vitro antibacterial activity seen in this study.

4. Hepatoprotective activity

Vetiveria Zizanioides Linn's methanolic extract has hepatoprotective effects at doses of 300-500mg/kg p.o. damage caused by ethanol 20% at doses of 3.76gm/kg p.o.

5. Tuberculostic Activity

The radiometric BACTEC 460 TB system was used to test the antitubercular activity of root extracts and fractions from Vetiveria zizanioides L. Nash (Family: Poaceae) against Mycobacterium tuberculosis strains. At a minimum concentration of 500g/mL, the ethanolic extract of the intact as well as the spent root exhibited strong antitubercular action.

6. Blood Sugar-Lowering Activity (Antihyperglycaemic)

After numerous doses, the root extract of Vetiveria Zizanioides significantly reduced blood sugar levels in healthy fasting rats when compared to diabetic control, with results that were comparable to those of glibenclamide.
The research shows that in both normal and allaxon-induced diabetic rats, the ethanolic extract of Vetiveria Zizanioides roots has superior antihyperglycemic efficacy to any other extract.

7. Antidepressive Effects

In the tail suspension test and force swim test produced depressive behavior, the ethanolic extract of Vetiveria Zizanioides has antidepressant efficacy, and Fluxetine combined with the ethanolic extract of Vetiveria Zizanioides is effective.

8. Pain reliever

This essential oil has a highly calming and cooling impact that soothes and reduces inflammation of all kinds. But it works particularly well to relieve nervous system and circulatory system inflammations. It has been discovered to be an effective treatment for inflammations brought on by sunburn, dehydration, and bathroom use.

OTHER USES

1. Mosquito-repelling properties

The preparation and in vivo testing of the nanoemulsions of vetiver oil, hairy basil oil, and citronella oil with mean droplet sizes ranging from 150 to 220 nm.

2. Neurotonic

A nervine, like our Essential Oil of Vetiver, is a tonic for the nervous system. It looks after the nerves and keeps them in good condition.

3. Skin care

There have been soaps, creams, and perfumes made from vetiver. Because of its antibacterial qualities, it is used to treat wounds and acne.

4. Water management

The close-growing culms aid in preventing runoff from surface water. The amount of water that is absorbed by the soil (infiltration) rises when the water flow is slowed. It can handle water flow rates of up to 5 m/s (16 ft/s).

5. Pesticides and crop protection

Crop protection can be accomplished with vetiver. It draws the Chilo partellus, or stem borer, which prefers to deposit its eggs on vetiver but whose larvae cannot survive there because the

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plant's hairiness prevents them from migrating onto the leaves, so they instead fall to the ground and perish.

Vegetables like vetiver are used as mulch to keep weeds at bay on coffee, cocoa, and tea plantations. It creates a thick mat-like barrier as a defense. Mulch decomposition increases soil organic matter and makes more crop nutrients available.

6. Animal feed

Vetiveria leaves are a helpful leftover for feeding horses, cattle, goats, and sheep. The nutritional value changes with the season, stage of growth, and fertility of the soil.Vegetables should be trimmed every one to three months in most regions for the best nutritional qualities and yields.

7. Aromatherapy and perfumery

The aromatic essential oil extracted from vetiver's roots is the major reason it is grown. The older French spelling, vetyver, is frequently employed in the perfume industry. Due of its outstanding fixative qualities, vetiver is frequently utilized in perfumes. 90% of western perfumes include it. The component vetiver is more frequently found in male scents.

III. CONCLUSION

The most adaptable, diverse grass with the most promise is vetiver. This particular plant is well-known for its capacity to generate essential oil from the roots, which is used primarily in the perfume sector. Several issues, including mouth ulcers, boils, epilepsy, burns, snakebite, fever, rheumatism, headaches, etc., are treated by various tribes using various sections of this grass. Khas has a wide range of uses as a result of these activities, making it a green treasure. Herbs and botanicals are gaining popularity due to their potential as a natural preventative measure against the onset of certain ailments and as a potential therapy for certain diseases. This increased interest in their health and wellness benefits is well-founded.

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