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Preliminary Phytochemical Study of *Usheer* (*Vetiveria zizanioides*) Extract and Its Comparison with Standard Findings

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Abstract

Usheer (*Vetiveria zizanioides* Linn.), a valuable medicinal plant in Ayurvedic pharmacopeia, is known for its aromatic and therapeutic roots. The current study aims to conduct a preliminary phytochemical screening of benzene-extracted *Usheer* using Soxhlet apparatus. Standard qualitative tests were performed to identify major phytoconstituents, and the results were compared with those reported in previous scientific studies. The findings revealed the presence of alkaloids, steroids, saponins, and reducing sugars. However, flavonoids, phenolic compounds, and anthraquinone glycosides were absent—likely due to the solvent's non-polar nature.

Keywords: *Vetiveria zizanioides*, *Usheer*, Phytochemical screening, Soxhlet extraction, Alkaloids, Saponins [5]

1. Introduction

Vetiveria zizanioides (*Usheer*) is a perennial grass whose roots possess medicinal, aromatic, and therapeutic properties. Widely used in Ayurveda, it has

applications in formulations for fever, inflammation, skin disorders, and as a coolant [1,2]. Various pharmacological studies have highlighted its antioxidant, antimicrobial, and anti-inflammatory properties [3]. Preliminary phytochemical screening is a vital step to identify the bioactive compounds in herbal medicines. The present work aims to evaluate the phytoconstituents present in *Usheer* extracted using benzene and compare the results with existing literature to assess its phytopharmacological significance. [1,2]

2. Materials and Methods

2.1 Materials Used

- **Plant Material:** 50 g of coarse powdered *Usheer* root Solvent: Benzene (150 mL)
- **Equipment:** Soxhlet apparatus, round-bottom flask, test tubes, pipettes, droppers, test tube holder, water bath
- **Chemicals and Reagents:** Dragendorff's reagent, Wagner's reagent, hydrochloric acid (HCl), magnesium turnings, ethanol,

chloroform, sulfuric acid (H₂SO₄), lead acetate, ferric chloride, Benedict's reagent, ammonia, distilled water

2.2 Preparation of *Usheer* Extract

The dried and powdered root of *Vetiveria zizanioides* (50 g) was subjected to Soxhlet extraction using 150 mL of benzene as the solvent. The extraction was carried out continuously for 12 hours. The resultant

extract was filtered and concentrated to obtain approximately 50 mL of crude extract for phytochemical analysis. [5]

2.3 Phytochemical Tests and Comparative Analysis

Standard phytochemical tests were carried out, and the observations were compared with existing phytochemical studies of *Usheer* to validate the findings.

Phytochemical Group	Test Performed	Observation (Current Study)	Literature Findings	Conclusion
Alkaloids	<i>Dragendorff's and Wagner's tests</i>	Orange/red-brown precipitate formed	Positive in ethanol/chloroform extracts [4,5]	Present
Flavonoids	Shinoda's test (ethanol + HCl + Mg)	No color change	Common in methanol/ethanol, absent in benzene [4,6]	Absent
Steroids	Salkowski's test (chloroform + H ₂ SO ₄)	Red color in chloroform layer, greenish-yellow in acid layer	Confirmed in petroleum ether and benzene extracts [4,7]	Present
Phenolic Compounds	Lead acetate and FeCl ₃ tests	No white ppt or blue-black color	Reported in methanol/aqueous extracts [6,8]	Absent
Saponins	Frothing test	Persistent foam after 15 min shaking	Detected in aqueous and benzene extracts [5,7]	Present
Reducing Sugars	Benedict's test	Yellow-green coloration	Reported in polar extracts [4,9]	Present
Anthraquinone Glycosides	Borntrager's test	No pink/red layer	Rare and inconsistently reported [6,10]	Absent

Solvent Influence:

The use of benzene, a non-polar solvent, influenced the detection profile, favoring extraction of non-polar components such as steroids and alkaloids while limiting polar components like flavonoids and phenolic acids.

3. Results

The results of phytochemical screening are summarized below:

Phytoconstituent	Result
Alkaloids	Positive
Flavonoids	Negative
Steroids	Positive
Phenolic Compounds	Negative
Saponins	Positive
Reducing Sugars	Positive
Anthraquinone Glycosides	Negative

4. Discussion

The current findings confirm the presence of alkaloids, saponins, steroids, and reducing sugars in benzene-extracted *Usheer*, aligning with several earlier reports. The absence of phenolics and flavonoids can be attributed to the non-polar nature of the solvent, highlighting the need for using multiple solvents in successive extraction procedures for a comprehensive phytochemical profile. Prior studies utilizing ethanol or methanol have reported flavonoids and phenolic compounds, which supports the solubility-dependent nature of phytochemical extraction [3,6]. [6]

5. Conclusion

The benzene extract of *Vetiveria zizanioides* demonstrated the presence of key bioactive compounds such as alkaloids, steroids, saponins, and reducing sugars, all of which contribute to the therapeutic potential of *Usheer*. Phenolic compounds, flavonoids, and anthraquinone glycosides were not detected, likely due to solvent limitations. Future studies should explore multi-solvent extraction to capture the full spectrum of *Usheer*'s phytoconstituents and validate its traditional uses with advanced pharmacological assays. [9,10]

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