

# Chapter 1

## Ecological fodder role and phytotherapeutic potential of *Sporobolus diandrus* (Retz.) P. Beauv.

Vikas Tailor<sup>1</sup>, Sanjeet Kumar<sup>2</sup> and Ghodke Anita Sureshrao<sup>3\*</sup>

<sup>1</sup>Department of Biology; Swami Vivekanand Government Model School, Block Asind, Bhilwara, Rajasthan, India

<sup>2</sup>Biodiversity and Conservation Lab., Ambika Prasad Research Foundation, Odisha, India

<sup>3</sup>Amaltas Institute of Ayurveda and, Amaltas Ayurved Hospital and Research Center. Dewas Madhya Pradesh, India

\*Email-Id: anitaghodke24@gmail.com;

**Abstract:** This study highlights the ecological fodder significance and preliminary phytotherapeutic potential of *Sporobolus diandrus* (Retz.) P. Beauv., integrating its role in wildlife nutrition with qualitative phytochemical and antimicrobial findings.

**Keywords:** Fodder plants, medicinal uses, wildlife

### Introduction

Grasses play a pivotal role in maintaining ecosystem productivity, supporting wildlife populations, and stabilizing soil in fragile landscapes (Sethi et al., 2024). Among them, *Sporobolus diandrus* (Retz.) P. Beauv., of the family Poaceae, occupies sandy and open habitats where it provides seasonally palatable herbage for wild grazers (Figure 1). Its adaptive traits tolerance to drought, fire, and nutrient-poor soils enable it to persist in disturbed ecosystems and contribute to vegetation cover continuity (Behera et al., 2025). Systematic documentation of such grasses is vital, not only for taxonomic clarity but also to understand their role in rangeland ecology, succession dynamics, and wildlife nutrition (Álvarez-Holguín et al., 2024). Unfortunately, many native grasses remain underreported in terms of their phytochemistry and bioactivity, leaving a gap in knowledge that limits their inclusion in both habitat management and pharmacological exploration. They have food and medicinal properties (Satapathy et al., 2019; Mishra et al., 2022; Sinha et al., 2023; Dimri et al., 2024). Fodder plants of wildlife are critical components of ecological food webs, influencing the distribution, migration, and reproductive success of herbivorous fauna (Birnie-Gauvin et al., 2017). Seasonal availability of nutritious grasses such as *S. diandrus* can shape grazing pressure and indirectly regulate predator–prey interactions. Keeping this in view, an

attempt has been made to document its fodder values, available secondary metabolites and antimicrobial activity.



Figure 1: Inflorescence of *Sporobolus diandrus*



Figure 2: Collected sample of *S. diandrus*

**Methodology**

Whole plant of *Sporobolus diandrus* were collected from nearby Mahanadi areas of Cuttack district, Odisha, India (Figure 2). The grass species was identified by Dr. Sanjeet Kumar followed by published literature (Behera et al., 2025). Whole plant was thoroughly washed under running tap water to remove dust. Further, they were cut into small pieces and air dried. Extraction was made using Soxhlet extraction (Jena et al., 2025). Phytochemical screening was carried out using standard method (Jena et al., 2025). Antibacterial activity was done against *Escherichia coli* (Jena et al., 2025).

**Results and discussion**

Published literature identifies *Sporobolus diandrus* as a wildlife fodder grass with generally moderate palatability, yet it is reported to be highly preferred by herbivores within Chandaka Wildlife Sanctuary (Behera et al., 2025). Qualitative phytochemical analysis of *S. diandrus* revealed the presence of tannins, saponins, and reducing sugars across different solvent systems, while flavonoids, phenolics, steroids, alkaloids, and carbonyl compounds were absent (Table 1; Figure 3-5). The consistent presence of tannins and reducing sugars across all extracts suggests a potential role in defense mechanisms and nutritive contributions to wildlife fodder, as tannins can influence protein digestibility and palatability at moderate levels. The detection of terpenoids in n-hexane showed pharmacological potential. These findings indicate that although *S. diandrus* may lack diverse secondary metabolites compared to medicinal dicots, it still contains bioactive components that justify its preliminary pharmacological screening. Antimicrobial evaluation showed that the hydroethanolic extract inhibited the growth of *Escherichia coli* at a minimum inhibitory concentration (MIC) of 50 mg/mL, with no growth observed at 100 mg/mL (Table 2; Figure 6). This moderate antibacterial activity suggests that the species could be explored as a potential source of natural antibacterial agents. The combined results reinforce the dual value of *S. diandrus* as a forage species sustaining wildlife populations and as a plant with promising but underexplored phytotherapeutic potential emphasizing the need for advanced phytochemical profiling, bioassay-guided fractionation, and *in-vivo* validation.

Table 1: Qualitative phytochemical analysis of *Sporobolus diandrus* using different extracts

| Bioactive compounds | n-Hexane | Ethanol | Aqueous |
|---------------------|----------|---------|---------|
| Tannin              | Absent   | Present | Present |
| Saponin             | Absent   | Absent  | Present |

|                    |         |         |         |
|--------------------|---------|---------|---------|
| Flavonoids         | Absent  | Absent  | Absent  |
| Terpenoids         | Present | Absent  | Absent  |
| Phenolic compounds | Absent  | Absent  | Absent  |
| Reducing sugars    | Absent  | Present | Present |
| Steroids           | Absent  | Absent  | Absent  |
| Alkaloids          | Absent  | Absent  | Absent  |
| Carbonyl compounds | Absent  | Absent  | Absent  |

Table 2: Estimation of MIC of hydroethanolic extract against *E. coli*

| Extract            | Concentration (mg/mL) |    |    |      | MIC (mg/mL) |
|--------------------|-----------------------|----|----|------|-------------|
|                    | 100                   | 50 | 25 | 12.5 |             |
| <i>S. diandrus</i> | NG                    | NG | G  | G    | 50          |
| Nutrient broth     | NG                    | NG | NG | NG   | ~           |
| Microbial broth    | G                     | G  | G  | G    | ~           |

(NG = No Growth; G = Growth observed)

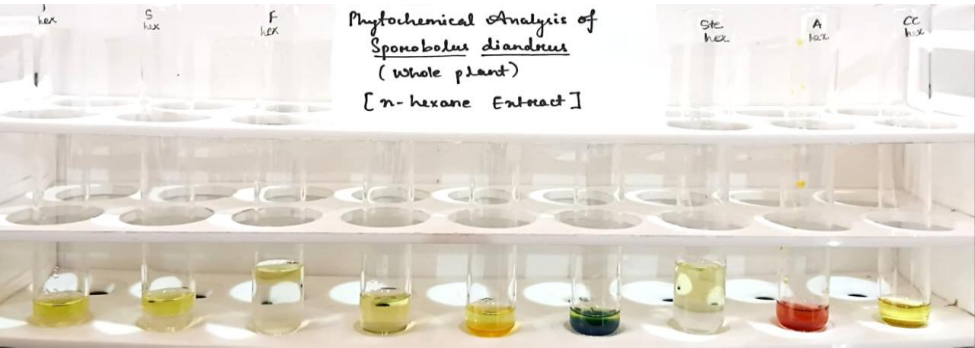


Figure 3: Phytochemical analysis of *S. diandrus* (whole plant) using n-Hexane extract



Figure 4: Phytochemical analysis of *S. diandrus* (whole plant) using ethanolic extract



Figure 5: Phytochemical analysis of *S. diandrus* using aqueous extract

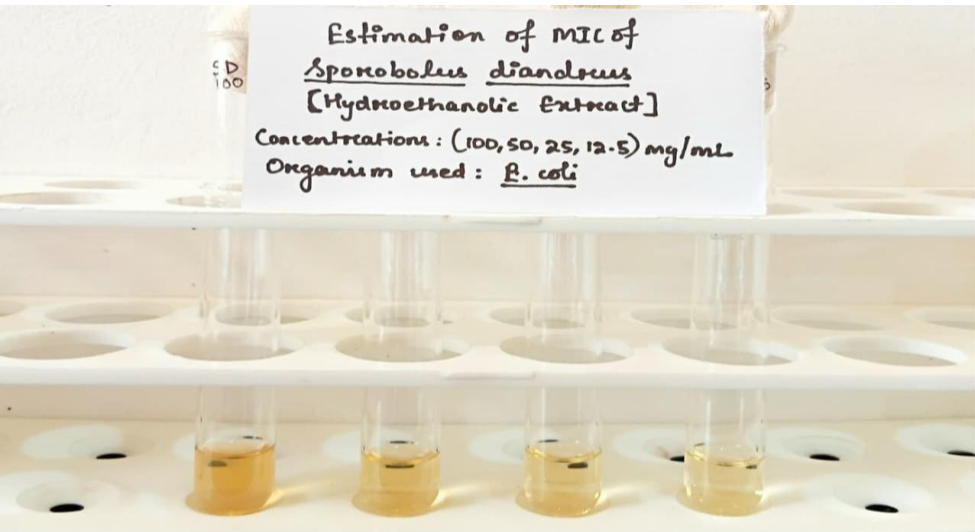


Figure 6: Estimation of Minimum Inhibition Concentration (MIC) against *E. coli*

### Conclusion

The present study concludes that *Sporobolus diandrus* is a fodder grass having medicinal potentials. Future research should focus on detailed phytochemical profiling, bioassay-guided isolation of active constituents, and *in-vivo* validation of pharmacological effects, alongside field studies on seasonal forage quality, to integrate *S. diandrus* into both rangeland wildlife management strategies and sustainable natural product discovery programs.

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