

A Review on Korai Grass (*Cyperus pangorei*): Traditional Applications, Fiber Potential, and Emerging Opportunities in Sustainable Textiles

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Abstract

Korai grass (*Cyperus pangorei*) is an indigenous wetland plant predominantly grown along river margins and marshy tracts of South India, especially in Tamil Nadu. This review critically examines the relevance of Korai grass as an alternative natural fibre for sustainable textile and craft-based applications. Conventionally employed in handwoven mats and domestic utility products, the fibre contributes to environmentally responsible production while sustaining traditional artisan communities. Recent scientific observations on *Cyperus* species reveal the presence of biologically active constituents associated with antimicrobial, antioxidant, and health-supportive functions. These intrinsic properties provide scope for extending Korai grass usage into functional and wellness-oriented textile products, including hygienic floor coverings, therapeutic mats, and eco-conscious home textiles. Such value addition strengthens the material's relevance in modern sustainable textile systems. This paper discusses botanical characteristics, cultivation practices, traditional processing, fibre properties, functional potential, and future research requirements essential for integrating Korai grass into contemporary textile product development.

Keywords

Korai grass; *Cyperus pangorei*, bio-based fibres, sustainable textiles, functional floor coverings, antimicrobial natural materials, wellness products

1. Introduction

Sustainability has become a central focus of the textile sector due to increasing environmental pressures and the limitations of synthetic fibre production. Natural fibres derived from renewable plant resources are gaining renewed interest because of their biodegradability, low ecological impact, and compatibility with circular economy concepts. In this transition, region-specific and traditionally used plant fibres offer untapped opportunities for sustainable innovation.

Korai grass (*Cyperus pangorei*), belonging to the Cyperaceae family, is one such plant fibre resource historically utilized in South India. While its application has largely remained within traditional mat weaving and craft sectors, limited scientific attention has been given to its fibre potential in modern textile contexts. With the rising demand for eco-friendly and functional textiles, Korai grass warrants systematic evaluation. This paper compiles and analyzes prior research to understand the significance and application potential of Korai grass.

2. Botanical Characteristics and Cultivation Practices

Korai grass is a perennial sedge plant characterized by elongated stems, fibrous texture, and high pliability. It thrives in wetland ecosystems such as riverbanks and marshes, where it grows naturally without intensive agricultural inputs.

Table 1. Botanical and Sustainability Characteristics of Korai Grass

Attribute	Description
Botanical name	<i>Cyperus pangorei</i>
Plant family	Cyperaceae
Growth environment	Wetlands, riverbanks, marshy soils
Major cultivation regions	Tamil Nadu, South India
Input requirement	Minimal fertilizers and chemicals
Harvesting method	Manual
Regrowth potential	High
Environmental role	Soil stabilization, wetland conservation
Sustainability aspect	Renewable and biodegradable

Korai grass cultivation involves simple and low-input farming practices well suited to wetland environments. Field preparation is minimal and generally

limited to light ploughing or leveling to remove weeds and ensure uniform water distribution. Planting is carried out using rhizomes or root clumps with adequate spacing to promote healthy stem growth and ease of harvesting. Small earthen bunds are often formed around the fields to retain moisture and prevent soil erosion, particularly in riverbank areas. Organic inputs such as farmyard manure, compost, or decomposed plant residues are commonly applied to improve soil fertility and structure. The dense growth habit of Korai grass naturally suppresses weeds, reducing the need for frequent weeding. The crop exhibits strong resistance to pests and diseases, eliminating the requirement for chemical pesticides. Water requirements are met through natural rainfall, canal water, or seasonal flooding, making Korai grass cultivation energy-efficient, environmentally sustainable, and economically viable for rural farming communities.



P1.Harvested Korai Grass

The cultivation of Korai grass supports ecological balance by preventing soil erosion and promoting wetland stability. Its rapid regrowth after harvesting enables repeated yield cycles, making it a sustainable raw material source.

3. Traditional Uses and Socio-Cultural Importance

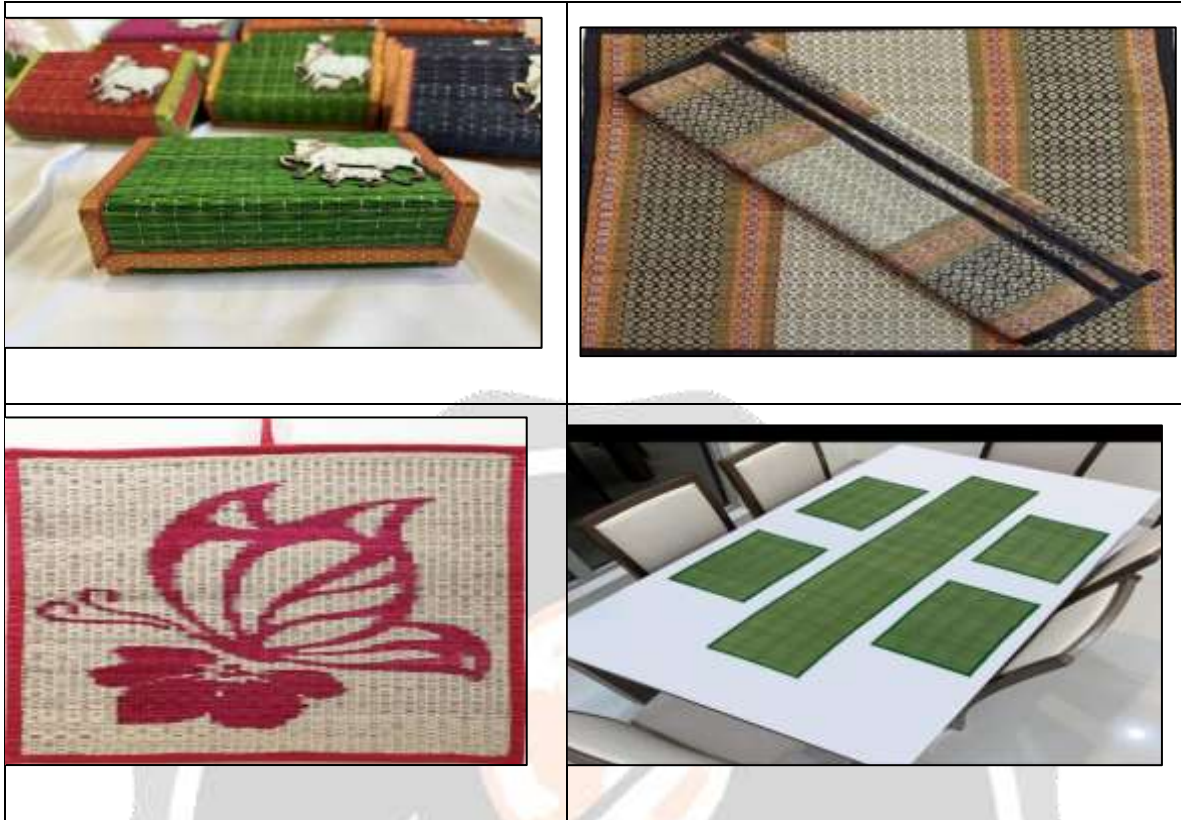
Korai grass has long been embedded in the material culture of South Indian communities. Artisans traditionally process the dried stems into mats, baskets, and functional household articles.

Table 2. Traditional and Contemporary Applications of Korai Grass

Application Type	Products	Functional Benefits
Traditional crafts	Floor mats, prayer mats	Breathability, cooling comfort
Domestic use	Sleeping mats, storage items	Durability, moisture handling
Wellness products	Yoga and meditation mats	Comfort, natural hygiene
Interior textiles	Decorative panels, partitions	Sustainability, aesthetics
Lifestyle products	Eco-friendly furnishings	Low environmental impact

These products are valued for their comfort in warm climates and are commonly used in domestic, religious, and ceremonial contexts. The craft tradition also provides livelihood security to rural artisan communities.

Korai grass mats are traditionally woven to serve as durable floor mats, door mats, and welcome mats. Their natural rough texture and moisture resistance make them ideal for entrances, offering a rustic aesthetic alongside eco-friendliness.



P2.Korai grass Products

Beyond mats, korai grass is crafted into various household and decorative items, including coasters, baskets, thamboolam bags, and wall hangings. These craft items leverage the lightweight, flexible nature of korai fibers and are often handmade by traditional artisans. Korai grass craft products are gaining popularity as eco-friendly alternatives in gifting and home décor sectors.

4. Fibre Properties and Processing Methods

Korai grass fibres possess moderate strength combined with flexibility, making them suitable for rigid and semi-rigid textile products. The fibre exhibits good moisture absorption and surface texture appropriate for floor and interior applications.

Traditional processing includes harvesting, sun drying, stem splitting, and manual weaving. Although environmentally benign, these methods still lack standardization. Advancements in fibre extraction, softening techniques, and controlled drying could significantly improve material consistency and performance.

5. Bioactive Properties and Functional Relevance

Phytochemical investigations on *Cyperus* species indicate the presence of compounds such as phenolics and flavonoids, which are associated with antimicrobial and antioxidant activity. These properties are particularly relevant for textile products intended for prolonged human contact.

Table 3. Fibre Properties and Corresponding Textile Applications

Fibre Characteristic	Functional Attribute	Potential Application
Moderate tensile strength	Structural stability	Floor coverings
High flexibility	Ease of weaving	Handcrafted textiles
Moisture absorption	Comfort enhancement	Home textiles
Bioactive constituents	Antimicrobial action	Wellness and hygiene products
Natural texture	Aesthetic appeal	Interior décor items

The utilization of inherent bioactivity reduces dependence on synthetic chemical finishes, contributing to environmentally safer textile processing.

6. Opportunities in Sustainable and Functional Textiles

The shift toward wellness-oriented and eco-conscious products has created demand for natural materials with functional benefits. Korai grass offers scope for product diversification into antimicrobial mats, therapeutic floor textiles, eco-friendly furnishings, and sustainable interior applications.

Incorporating Korai grass into contemporary textile design also supports ethical production, promotes regional materials, and enhances value addition through functional differentiation.

7. Limitations and Research Challenges

Despite its advantages, Korai grass faces barriers to large-scale textile integration. Scientific data on mechanical performance, durability, ageing behaviour, and standardized processing remain limited. Additionally, claims related to therapeutic performance require experimental validation through controlled studies.

8. Future Research Scope

Future investigations shall include fibre characterization, blending studies with other natural fibres, eco-friendly finishing methods, and life cycle assessment. This review highlights the need for continued research to explore its full potential in industrial applications.

9. Conclusion

Korai grass is an environmentally sustainable and culturally significant natural fibre with strong potential for functional textile applications. Its traditional relevance, minimal ecological footprint, and emerging bioactive properties position it as a promising candidate for sustainable textile innovation. Systematic research, process optimization, and product development can facilitate its transition from traditional crafts to modern sustainable textile systems.

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