



THE ROLE OF NATURAL DYES IN PRESERVING INDIA'S CULTURAL HERITAGE AND TRADITIONAL PRACTICES

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ABSTRACT:

India's legacy of natural dyeing is inseparable from its civilizational memory: from Ajrakh and Kalamkari to Kasuti and Kutch traditions, color is interwoven with ritual, livelihood, and identity. Yet over the past century, synthetic dyes, water-intensive industrial processes, and market standardization have displaced many community dye practices. This paper examines the role of natural dyes in safeguarding India's intangible cultural heritage by mapping how plant-, mineral-, and insect-derived colorants support living traditions, artisanal knowledge systems, and localized value chains. It outlines the cultural functions of dyeing in rites of passage, temple arts, craft guilds, and seasonal economies; documents conservation pathways such as Geographical Indications (GI), cluster programs, Khadi institutions, and design-school linkages; and synthesizes evidence on ecological and health co-benefits that strengthen the case for continuity. To bridge culture with practice, the paper integrates a practical lens—drawing on documented fastness data for commonly used dyes on cotton Khadi—to show that tradition and performance need not be in tension when recipes are optimized with appropriate mordants and bath conditions. A timeline of milestones since the 19th century and a conceptual framework for 'heritage-through-dyeing' are presented to guide future programs in education, policy, and MSME capacity-building. By placing artisan agency at the center, natural dyeing emerges not as nostalgia, but as a contemporary strategy for sustainable livelihoods, cultural continuity, and responsible consumption aligned with national and global goals.

Keywords: *Natural dyes, Cultural heritage, Khadi, Traditional crafts, Sustainable textiles.*

INTRODUCTION :

Across India's cultural landscape, color is a language. From indigo-draped ajrakh to the madder reds in kalamkari and the pomegranate-gold of festive textiles, dyeing practices encode regional ecologies, ritual calendars, and caste- and guild-based divisions of labor. Natural dyes, historically sourced from plants (e.g., indigofera, rubia cordifolia, pomegranate rind), insects (e.g., lac), and minerals (e.g., alum, iron), were part of a holistic craft system that linked farmers, herb gatherers, dyers, printers, weavers, and traders. This system has been stressed by industrial modernity: synthetic anilines, low-cost imports, and the demand for uniformity. Yet, natural dyeing persists—not only as a museum relic, but as a living heritage sustained by communities, Khadi institutions, cooperative clusters, and design school collaborations. This paper situates natural dyes within the larger discourse of intangible cultural heritage and

examines how revitalization can be aligned with contemporary concerns of environmental stewardship, public health, and rural livelihoods.

CULTURAL FUNCTIONS AND TRADITIONAL PRACTICES

Natural dyeing traditions function as repositories of tacit knowledge. Recipes transmit orally within families and guilds: how to soak myrobalan (harda) to prime cotton; how to thicken jaggery and iron to develop black; how to modulate pH and temperature to coax shades from marigold or catechu. Rituals—from weddings to harvest festivals—specify colors and motifs, making dyeing a ritual technology as much as a craft. In many regions, dye houses are embedded in temple precincts or artisanal lanes, interfacing with block printers (e.g., Bagru, Sanganer), resist-dyers (Bandhani in Kutch), and painters (Kalamkari in Andhra

Pradesh). These networks carry not just technique but also cosmology, iconography, and social organization. Preserving natural dyeing therefore preserves myriad cultural functions: dress codes, identity markers, ritual paraphernalia, and community economies.

HERITAGE CONSERVATION PATHWAYS

Multiple institutional pathways help safeguard natural-dye heritage. Geographical Indications recognize place-based craft ecologies; Khadi and Village Industries institutions nurture small-scale production; state-supported clusters and design mentorships link artisans with markets; and museums and open-air craft schools create public pedagogy. Community archives—pattern books, wooden blocks, dye-pot logs—serve as living curricula, while contemporary labels co-develop collections that keep traditional palettes relevant. Environmental certifications and health-oriented labels further differentiate naturally dyed goods. Together, these pathways align cultural continuity with dignified work and conscious consumption.

ECOLOGICAL AND HEALTH CO-BENEFITS

Natural dyes can reduce toxic effluents and worker exposure relative to certain petrochemical colorants, especially when paired with bio-mordants and optimized bath reuse. Plant-based colorants support agroforestry and value addition to farm residues (e.g., pomegranate rind, onion peel, marigold waste), and their biodegradability aligns with circularity. For consumers, reduced allergenicity and skin comfort are valued attributes. While not universally benign—improper mordanting or waste disposal can still pollute—responsible recipes and process controls offer a clear public-health benefit for dye workers and surrounding communities.

FIGURES AND DATA

Table 1-Presents a timeline of milestones that influenced natural-dye heritage, from the impact of synthetic dyes to India's craft revival, GI

recognition, laboratory standardization references, and sustainability adoption. Figure 2 - Visualizes representative fastness outcomes (wash, rub, perspiration) for dyes commonly used in Indian traditions when applied to cotton Khadi using standardized tests. Data points are derived from documented laboratory evaluations provided in the author's progress materials. These values demonstrate that natural dyes, when correctly mordanted and processed, can attain acceptable performance.

Figure 3 outlines a conceptual framework—'heritage-through-dyeing'—linking knowledge keepers, ritual-aesthetic demands, and ecological materials to processes of transmission and production, culminating in cultural continuity, livelihood security, and sustainability outcomes.

CASE VIGNETTES: TRADITIONS AND DYE ECOLOGIES

Ajrakh (Kutch and Sindh): A multi-stage resist-printing and dyeing tradition where indigo and madder dominate the palette, with myrobalan pre-mordanting and iron-jaggery black. Ritual calendars dictate motif circulation. Kalamkari (Andhra Pradesh): Hand-painted cotton using myrobalan priming, alum mordanting, and madder-lac palettes; temple narratives and flora-fauna themes keep iconography alive.

Bagru/Sanganer (Rajasthan): Block-printed cotton with natural black (iron), red (madder), and yellow/buff (pomegranate), supported by river-water traditions and community organization among chhipa printers.

Bandhani (Kutch): Tie-resist dyeing with natural indigo and madder historically; caste- and ritual-coded color combinations articulate social meaning during weddings and festivals. Khadi Dyeing Clusters (Maharashtra/Gujarat): Small dye houses associated with spinning-weaving societies; process logs, myrobalan-alum

recipes, and standardized fastness tests enable quality improvements relevant to today's markets.

CHALLENGES AND RESPONSES

Challenges include: price competition with synthetics; uneven water quality; fragmented supply of dye plants; skill attrition; and compliance burdens for export markets. Responses involve: localized dye-plant cultivation; cluster water treatment and bath reuse; GI and brand storytelling; school-artisan internships; and fair-trade mechanisms that internalize environmental and social value. Targeted training in mordant control and pH-temperature management helps align natural-dye performance with contemporary expectations.

POLICY AND EDUCATION RECOMMENDATIONS

Policy can reinforce heritage by financing dye-plant nurseries, community water systems, and shared testing labs; simplifying certification pathways for small units; and integrating natural-dye modules in vocational curricula. Universities and design schools can adopt 'craft studios' that pair ethnography with lab practice, creating interdisciplinary cohorts who document, digitize, and co-create with artisans. Public procurement—school uniforms, institutional gifts—can anchor demand for naturally dyed Khadi and handloom goods.

CONCLUSION:

Natural dyeing in India is a living archive of ecological know-how, social coordination, and aesthetic philosophy. Preserving it is not merely backward-looking; it is a forward-looking strategy to sustain livelihoods, conserve biodiversity, and diversify markets within a

responsible consumption paradigm. By connecting heritage pathways—GI, Khadi, clusters, museums—with performance-aware practice—standardized mordanting, controlled recipes—natural dyes can retain cultural meaning while meeting contemporary quality expectations. The figures presented here—timeline, fastness metrics derived from lab evaluations on Khadi, and a conceptual framework—offer practical anchors for policy design, educational programming, and MSME capacity-building. In safeguarding natural-dye traditions, India safeguards an ethic of balance between people, place, and color.

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Table 1 :

Year	Event / Milestone	Description / Context
1856	Synthetic aniline dyes (global context)	The industrial discovery of synthetic aniline dyes in Europe marked a turning point, gradually replacing traditional natural dyes in global trade.
1905	Swadeshi movement promotes indigenous cloth	The Swadeshi movement encouraged Indians to boycott British goods and revive indigenous spinning, weaving, and dyeing traditions using natural colors.
1920	Khadi movement consolidates artisanal production	Under Mahatma Gandhi's leadership, the Khadi movement reinforced hand-spun, naturally dyed cotton as a symbol of self-reliance and cultural identity.
1956	KVIC era – Khadi & Village Industries Commission	The Indian government formalized support for rural industries through KVIC, sustaining dyeing, weaving, and handloom clusters across the country.
1987	Craft revival programs gain momentum	NGOs and design institutions began documenting and reviving traditional dyeing methods, linking craft heritage with livelihood initiatives.
2005	GI Act – place-based craft recognition	The Geographical Indications Act recognized crafts and dyeing clusters (e.g., Kutch Ajrakh, Kalamkari) for their regional identity and authenticity.
2013	ISO 105-E04 colour fastness to perspiration reference	International standards for color fastness testing reinforced quality benchmarking for naturally dyed fabrics entering export markets.
2020	Sustainability & ethical fashion mainstream adoption	Global fashion brands embraced sustainable sourcing, increasing demand for natural-dye textiles and eco-certified Indian clusters.

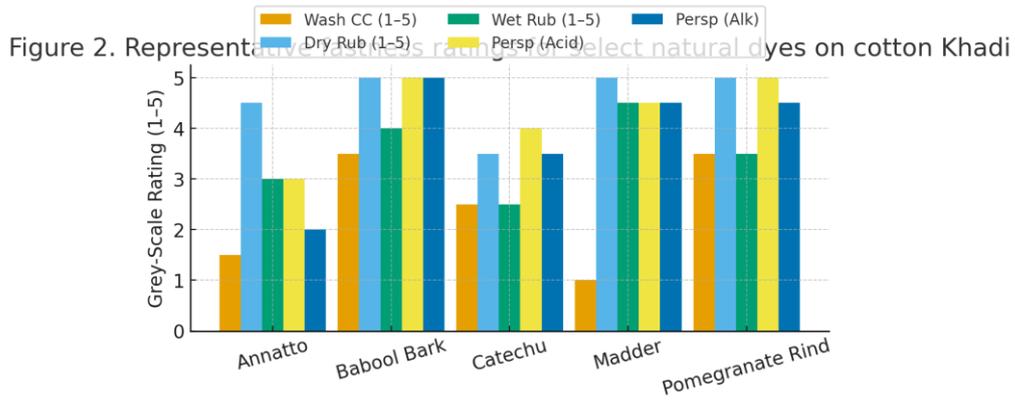


Figure 3

