

The Revival of Walnut Husk Dye Traditions in Northern Pakistan and Azad Jammu and Kashmir Heritage, Decline, and Prospects for Sustainable Craft Regeneration

Ijaz Hussain

indigooriginal@yahoo.com

Assistant Professor, SABS Uni of Art, Design and Heritage, Jamshoro, Pakistan

Syeda Rabiya Fatima Zaidi

syedzadi88@yahoo.com

Textile Design Graduate, SABS Uni of Art, Design and Heritage, Jamshoro, Pakistan

Muhammad Abdullah Mushtaq

neeroti@yahoo.com

Textile Design Graduate, SABS Uni of Art, Design and Heritage, Jamshoro, Pakistan

Corresponding Author: * Ijaz Hussain indigooriginal@yahoo.com

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ABSTRACT

Walnut (Juglans regia) grows abundantly across the Karakoram, Hindukush, and western Himalayan belt that spans Gilgit-Baltistan, Chitral, and Azad Jammu and Kashmir (AJK), and the tannin- and juglone-rich husk of its fruit has long served regional communities as a source of brown and rust-brown dye for wool, leather, and wood. This paper examines the cultural history, decline, and contemporary revival potential of walnut husk dyeing in these northern territories of Pakistan. Drawing on documented craft practices from neighboring and closely related textile cultures Hunza, the Kashmir Valley, and Ladakh alongside the chemistry of walnut-based colorants, the paper argues that walnut husk dye survives today mainly as fragmentary, undocumented household knowledge rather than as an organized craft sector, in contrast to walnut wood carving and embroidery, which have attracted more sustained institutional and commercial revival efforts in the same region. The paper identifies the mechanisms of decline common to natural dye traditions worldwide synthetic dye substitution, deforestation and restricted access to raw material, and the erosion of intergenerational transmission — and situates walnut husk dye within the broader wave of sustainable and slow-fashion interest that has already revived indigo, madder, and other natural dyes elsewhere in South Asia. It closes by proposing a practice-based research methodology, grounded in the work of Schön, Haseman, Candy, and Barrett and Bolt, for documenting and reviving walnut husk dye specifically within AJK and northern Pakistan, an area that remains significantly under-researched in the natural dye literature compared with Indian-administered Kashmir and Ladakh.

Keywords: Walnut husk dye, *Juglans regia*, natural dyeing, Azad Jammu and Kashmir, Gilgit-Baltistan, Chitral, sustainable textiles, craft revival, practice-based research

INTRODUCTION

Across the mountain valleys of northern Pakistan and Azad Jammu and Kashmir, the walnut tree occupies a place in daily life far beyond its fruit. Its timber furnishes furniture, doors, and the carved utensils for which Hunza and the wider Gilgit-Baltistan region are internationally known; its green husk, encasing the hard shell before the nut ripens, yields one of the most reliable and long-used brown dyes available to mountain communities with limited access to imported colorants. Unlike indigo, madder, or lac, which required cultivation, trade networks, or specific ecological conditions, walnut husk dye was available wherever walnut trees grew which is to say, throughout most inhabited valleys of this Himalayan-Karakoram-Hindukush zone. It colored wool for caps and blankets, leather, and, on occasion, cotton and silk once mordanted.

This paper asks what has happened to that tradition, and what a genuine revival would require. It situates walnut husk dye within the broader regional picture of natural dyeing a field in which indigo revival (in Sindh and Punjab) and Pashmina and Kashmiri shawl dyeing (in the Kashmir Valley and Ladakh) have received considerably more scholarly and institutional attention than the walnut-based dye traditions of Chitral, Gilgit-Baltistan, and AJK. The paper is structured as a literature-grounded review rather than a report of new empirical fieldwork: it draws together the chemistry of walnut dye, the documented material culture of the region, the well-established narrative of craft decline and revival in neighboring Kashmiri crafts, and a proposed methodology for future practice-based research specific to AJK and northern Pakistan.

BOTANICAL AND CHEMICAL BASIS OF WALNUT HUSK DYE

Juglans regia, the common or Persian walnut, is native across a wide arc from the Balkans through Central and South Asia to western China, and is extensively cultivated in the temperate valleys of Gilgit-Baltistan, Chitral, and AJK, where its fruit is both a food crop and, historically, a dye source. The green husk (pericarp) surrounding the shell contains high concentrations of tannins and juglone (5-hydroxy-1,4-naphthoquinone), a naphthoquinone pigment responsible for the dye's characteristic brown coloration.

Juglone functions as a substantive or direct dye on protein fibers such as wool and silk, meaning it can bind to these fibers without a mordant, while the accompanying tannins independently improve colorfastness. Cellulose fibers such as cotton and linen, lacking the same affinity, generally require pre-mordanting — commonly with alum — to achieve comparable depth and durability of color. Color outcomes range from pale tan through warm chestnut to near-black, depending on the concentration of husk material relative to the weight of fiber, the freshness of the husks (fresh, green husks yield substantially more dye than dried ones), extraction time and temperature, and post-dye modification with an iron-based afterbath, which shifts the tone toward grey-brown and black. Because juglone oxidizes on exposure to air, the depth of brown continues to develop for some time after the fiber leaves the dye bath, a property regional dyer historically managed through extended, patient simmering and overnight steeping rather than rapid, high-heat processing.

HISTORICAL AND CULTURAL CONTEXT

Walnut dye in the material culture of Gilgit-Baltistan, Chitral, and AJK

The clearest surviving trace of walnut husk dye in the region's textile culture is the pakol, the rolled woollen cap associated with Chitral, Gilgit, and the wider Hindukush-Karakoram zone, and worn today across Pakistan and Afghanistan. While the pakol is most often seen in undyed natural shades of brown, grey, and ivory, it has historically also been produced in a red-brown obtained by dyeing the wool with walnut, alongside other earthy natural colourways. This single, well-attested example indicates that walnut was one of the standard colourants available to the hand-spinners and cap-makers of the region, used interchangeably with, or as an alternative to, the wool's natural undyed shades.

Walnut wood itself is far more extensively documented as a regional craft material than walnut dye. Gilgit-Baltistan's handicraft economy is built substantially around walnut-wood utensils, carved spoons, boxes, and furniture, and a wave of artisan-led revival — for example, the Hunza woodcraft initiative Hunzo-e-Hayat, founded by a self-taught local carver after the woodcraft sector declined following the construction of the Karakoram Highway — has been documented as an effort to keep walnut and other local hardwoods in active craft use. This asymmetry is itself instructive: the wood of the walnut tree has attracted dedicated revival narratives, tourism marketing, and export promotion, while its husk — a by-product generated in quantity every autumn wherever the wood is harvested or the nuts are processed — has not received comparable attention as a dye resource in Pakistan's northern areas, despite requiring no dedicated cultivation and imposing no additional pressure on walnut tree populations.

Comparative context: the Kashmir Valley, Ladakh, and Kumaon

Walnut husk dye is considerably better documented in neighbouring Himalayan textile cultures than in Pakistan's northern areas specifically. In Ladakh, communities have long used a range of locally available materials — plant roots, bark, wild herbs, flowers, onion peel, and walnut shells and husks — to colour wool and Pashmina, a body of practical knowledge recently the subject of a formal transfer workshop organised for weavers of the wider Jammu region under India's Integrated Wool Development Programme. In the Kashmir Valley, walnut hull is one of several traditional plant dyes historically used by hereditary dyers (rangrez) alongside herbs known locally as Veer Moul, Doun Gular, and Doun Kange, a craft now sustained by only a handful of practitioners as synthetic dyes have taken over commercial thread-dyeing. Further east, in the Kumaon Himalaya of Uttarakhand, the Bhotiya community's use of walnut for dyeing is cited as one of the longer-standing Himalayan walnut dye traditions in the broader natural-dye literature.

These parallel traditions matter for a study of AJK and northern Pakistan for two reasons. First, they demonstrate that walnut husk dyeing was never a localised curiosity but part of a shared body of Himalayan and Karakoram ecological knowledge, likely once practised with only minor variation from Ladakh and the Kashmir Valley through to Chitral and the valleys of AJK, given the shared availability of *Juglans regia* and comparable wool-based craft economies. Second, they highlight a documentation gap: the workshops, artisan profiles, and academic and industry interest visible in Ladakh and the Kashmir Valley have no clear counterpart, in the available literature, on the Pakistani and AJK side of the same mountain system, even though the underlying raw material and much of the wool-craft context is comparable.

DECLINE OF THE TRADITION

The decline of walnut husk dye in northern Pakistan and AJK appears to follow the same general pattern documented for other regional natural dye and craft traditions, rather than resulting from any single cause specific to walnut dye itself:

- Substitution by synthetic dyes: the arrival of inexpensive, colour-consistent synthetic dyes displaced slower, more variable natural processes across the wider Kashmir and Himalayan dye economy, a shift specifically noted among Kashmir Valley thread-dyers, where synthetic colourants have largely replaced herb-based dyes such as walnut hull in commercial production.
- Improved road access and market integration: the construction of the Karakoram Highway is explicitly credited with beginning the decline of Hunza's walnut woodcraft sector by exposing it to cheaper factory-made alternatives; a comparable exposure to manufactured textiles and dyed yarn plausibly affected household-level dyeing practices across the wider region on a similar timeline.
- Erosion of oral transmission: regional handicraft knowledge, including natural dyeing, has historically been transmitted through apprenticeship and household practice rather than written documentation, making it especially vulnerable to interruption when younger generations move away from traditional livelihoods or when master practitioners are not replaced.
- Resource and environmental pressure: walnut wood carving in the wider Kashmir and Himalayan region is now constrained by the availability of mature walnut trees, a pressure connected to deforestation and changing land use; while the husk itself is a food-processing by-product rather than a driver of tree-felling, the general contraction of walnut-based craft economies reduces the routine, everyday availability of husk material to dyers.
- Economic marginality of natural dyeing as a livelihood: even where natural dyeing persists, as with the last hereditary thread-dyers of Srinagar's Downtown quarter, practitioners describe declining

income relative to the physical demands of the work, discouraging younger family members from continuing the craft.

DRIVERS OF CONTEMPORARY REVIVAL

Several converging trends support the case for a deliberate revival of walnut husk dye in AJK and northern Pakistan, even in the near-absence of documented local case studies to date:

- Global and regional interest in sustainable and slow-fashion textiles has already driven successful revivals of other South Asian natural dyes, including indigo-based resist printing (dhabu) in Rajasthan and natural indigo cultivation and dyeing in Sindh and Punjab, establishing both a market and a template for craft-sector revival that walnut husk dye could plausibly follow.
- Scientific validation of walnut husk as a dye source has grown in the recent materials-science literature, which characterises its dyeing constituents, evaluates its antimicrobial properties for cosmetic and textile use, and frames it explicitly as a way of converting an agricultural by-product and a source of environmental pollution when discarded untreated into a value-added, eco-friendly colourant.
- Institutional interest in natural wool dyeing has been formally renewed in the immediately neighbouring Jammu and Kashmir handloom sector through government-organised training that explicitly includes walnut shells as a dye source, suggesting a readily transferable body of technical knowledge and a potential template for parallel programming on the Pakistani side of the region.
- commerce and digital marketing have already been used successfully by Hunza and wider Gilgit-Baltistan artisans, particularly women, to extend traditional handicrafts embroidery, caps, and woodcraft to national and international buyers beyond the seasonal tourist market, a distribution channel equally available to a revived walnut dye product line.
- Zero-cost, locally abundant raw material: because walnut husks are a by-product of an existing food and timber economy in the region, reviving husk-based dyeing carries none of the land-use or cultivation burden associated with reviving, for instance, indigo, and can be positioned as a low-input, circular-economy craft practice.

TRADITIONAL AND REVIVED DYEING METHODOLOGY

A dyeing process consistent with both historical practice and current natural-dye literature can be outlined for wool, the fibre most closely associated with regional walnut dyeing:

- **Collection:** green husks are gathered as the walnut approaches maturity, ideally while still moist, since fresh husk yields substantially more dye than husk that has dried or begun to blacken and rot on the ground.
- **Preparation:** husks are used whole or coarsely crushed, and may be used fresh or preserved by drying or freezing for use outside the autumn harvest season, though dried material requires a larger quantity to achieve equivalent depth of colour.
- **Extraction:** husks are simmered in water — traditionally for an extended period, often with an overnight rest — to draw out the tannins and juglone into the dye bath; boiling too briefly or at excessive heat reduces colour yield and can damage the tannin content.
- **Mordanting:** wool and silk generally require no mordant, since juglone acts as a substantive dye on protein fibres; cotton and other cellulose fibres benefit from alum pre-mordanting to improve dye uptake and fastness.

- **Dyeing:** pre-wetted fibre is introduced into the strained dye bath and held at a gentle simmer before being allowed to cool slowly in the bath, a slow approach that regional and international dyers alike identify as essential to achieving a deep, even brown.
- **Modification:** an iron (ferrous sulphate) afterbath can shift the resulting warm brown toward a cooler grey-brown or near-black, extending the tonal range available from a single dye source.

RESEARCH GAP AND RECOMMENDATIONS FOR AJK AND NORTHERN PAKISTAN

The available literature yields a clear asymmetry. Walnut wood carving in Hunza and wider Gilgit-Baltistan has an identifiable revival narrative, complete with named artisans, founding dates, and documented causes of decline. Walnut husk dyeing in the Kashmir Valley and Ladakh likewise has documented practitioners, government-sponsored training, and an articulated craft-preservation discourse. By contrast, no comparably specific, documented case of walnut husk dye practice, decline, or revival was located for Azad Jammu and Kashmir or for Chitral and Gilgit-Baltistan on the Pakistani side of the border. This absence should be read cautiously: it is far more likely to reflect a gap in documentation and academic attention than the genuine non-existence of the practice, given the shared botanical resource, the shared wool-craft economy evidenced by the pakol tradition, and the well-documented Ladakhi and Kashmiri parallels immediately across the Line of Control.

This gap constitutes the central practical finding of the present review: AJK and northern Pakistan represent an under-documented site for walnut husk dye research relative to their immediate neighbours, and a genuine revival effort should begin with primary fieldwork rather than further literature synthesis. Specific recommendations include:

Household-level ethnographic survey across representative valleys of AJK (Muzaffarabad, Neelum, Bagh, Poonch/Rawalakot districts) and northern Pakistan (Chitral, Hunza, Nagar, Skardu, Ghizer) to establish whether, and in what form, walnut husk dyeing survives as living household or artisan knowledge, distinct from wood carving and embroidery, which are already comparatively well documented.

Systematic recording of colour recipes, mordant practices, and any distinct regional or dialect terminology for the dye and process, before the remaining generation of practitioners with direct oral knowledge is lost.

Laboratory-supported colourfastness and shade-standardisation testing, following the model already established for walnut husk in the wider materials-science literature, to give any revived product commercial credibility.

Pairing of walnut husk dye revival with existing regional craft-marketing infrastructure e-commerce initiatives already used for Hunza embroidery and woodcraft rather than treating it as an isolated intervention.

Positioning walnut husk dye as a genuinely local, zero-cultivation-cost complement to the natural indigo and resist-dyeing revival already under way elsewhere in Pakistan, offering northern producers a natural-dye product distinct from, rather than competing with, indigo-based work.

A PRACTICE-BASED RESEARCH FRAMEWORK FOR FUTURE STUDY

Given the scarcity of documented sources specific to AJK and northern Pakistan, further work on walnut husk dye in this region is better approached as practice-based research than as a purely literature-based or laboratory-only study. Donald Schön's model of the reflective practitioner, in which knowledge is generated through iterative cycles of action and reflection-in-action, offers a suitable frame for documenting how a small number of remaining dyers or revivalist practitioners refine husk-to-fibre

ratios, extraction times, and mordant choices through trial rather than formula. Brad Haseman's account of a distinct performative research paradigm, and Linda Candy's related methodological writing on practice-based versus practice-led research, support treating the physical act of dyeing — sample-making, colour trials, iterative recipe development — as a legitimate research output in its own right, alongside conventional written findings. Estelle Barrett and Barbara Bolt's framing of practice as a form of critical enquiry further supports positioning any revived studio dye practice not merely as craft reproduction but as a mode of generating new, regionally specific knowledge about the material.

Applied to walnut husk dye, this framework would treat a structured programme of dye trials varying husk freshness, concentration, extraction time, fibre type, and mordant as the primary research method, with systematic sample documentation (physical swatches, photographic records under standardised lighting, and colourfastness notes) functioning as the research record, supplemented by interviews with any surviving practitioners to capture the tacit, experience-based knowledge that written recipes alone cannot convey.

CONCLUSION

Walnut husk dye occupies an unusual position in the craft geography of northern Pakistan and Azad Jammu and Kashmir: botanically abundant, chemically well understood, historically attested through the pakol and through closely related Ladakhi and Kashmiri wool-dyeing traditions, and yet almost entirely absent from the documented craft-revival literature that has already reclaimed walnut wood carving, embroidery, and indigo dyeing elsewhere in the same broader region. Its revival does not depend on reviving a lost plant or a difficult cultivation process, as with indigo, but on recovering and re-documenting a body of household knowledge that most likely still exists, at least in fragments, among older dyers, weavers, and wool-workers across Chitral, Gilgit-Baltistan, and AJK. The task ahead is therefore primarily one of fieldwork, documentation, and reconnection pairing a genuinely local, low-cost, and environmentally benign dye material with the market infrastructure, sustainability narrative, and institutional interest that have already proven capable of reviving comparable natural dye crafts elsewhere in South Asia.

REFERENCES

- Barrett, E., & Bolt, B. (Eds.). (2010). *Practice as research: Approaches to creative arts enquiry*. I.B. Tauris.
- Candy, L. (2006). *Practice based research: A guide*. CCS Report, University of Technology Sydney.
- Evendo. (n.d.). Gilgit Hunza Arts & Crafts International: Craftsmanship in Gilgit-Baltistan. <https://evendo.com/locations/pakistan/gilgit-baltistan/shop/gilgit-hunza-arts-crafts-international>
- Farm & Folk. (2025). Natural dyeing with black walnut husks. <https://www.farmandfolk.com/blog/2025/5/24/natural-dyeing-with-black-walnut-husks>
- Fiber Artsy. (2024). Making black walnut dye for yarn and fabric (update). <https://www.fiberartsy.com/how-to-naturally-dye-yarn-with-black-walnuts-update/>
- Fox and the Knight. (2021). Walnut tree dyeing: Medicinal, history and folklore facts + a dye recipe. <https://thefoxandtheknight.com/walnut-tree-dyeing/>
- Greater Kashmir. (2024, February 22). Glorious Shaher-e-Khaas: Rangrez brings life to colourless threads in Downtown. <https://www.greaterkashmir.com/city/glorious-shaher-e-khaas-rangrez-brings-life-to-colourless-threads-in-downtown/>

- Gwadar Pro. (2020, November 29). Handicrafts of Gilgit Baltistan fetch foreign exchange to national kitty through exports. <https://gwadarpro.pk/1333003214815604737/handicrafts-of-gilgit-baltistan-fetch-foreign-exchange-to-national-kitty-through-exports>
- Haseman, B. (2006). A manifesto for performative research. Media International Australia, incorporating Culture and Policy, 118(1), 98–106.
- Hunza.co. (2020). Reviving the art of wood carving in Hunza Valley. <https://hunza.co/blogs/from-hunza-with-love/reviving-the-art-of-wood-carving-in-hunza-valley/>
- JK Arts Foundation. (2026). Preserving Kashmiri handicrafts: Challenges, sustainability, and revival strategies. <https://www.jkartsfoundation.in/post/preserving-kashmiri-handicrafts-challenges-sustainability-and-revival-strategies>
- Kasherbs / Agro Food Processing Emporium. (n.d.). Natural dye: Black walnut powder hair dye manufacturer from Srinagar. <https://www.kasherbs.com/natural-dye.html>
- Mongabay India. (2026, April 21). Experiments with natural dyes and coloured cocoons for Pashmina and silk. <https://india.mongabay.com/2026/04/researchers-experiment-with-natural-dyes-and-coloured-cocoons-for-pashmina-wool-and-silk-fabrics/>
- Natural Dyes (Maiwa). (n.d.). Walnut. <https://naturaldyes.ca/walnut>
- Rising Kashmir. (2025, December 7). H&H hosts workshop on natural dyeing of wool, allied products. <https://risingkashmir.com/hh-hosts-workshop-on-natural-dyeing-of-wool-allied-products/>
- Schön, D. A. (1983). The reflective practitioner: How professionals think in action. Basic Books.
- ScienceDirect / Y. et al. (2024). Characterizing dyeing constituents from walnut green husks: Utilization of a harmful agricultural by-product as natural dye to alleviate its environmental pollution. <https://www.sciencedirect.com/science/article/pii/S0926669024021496>
- Seasonal Sights. (2026). Culture of Gilgit-Baltistan: Festivals, traditional dress, music. <https://seasonalsights.com/culture-gilgit-baltistan-festivals-traditions/>
- Smarthistory / MAP Academy. (2022). Mastering color: Natural dyes of the Indian subcontinent. <https://smarthistory.org/mastering-color-natural-dyes-of-the-indian-subcontinent/>
- Take One. (2025, December 6). H&H Directorate hosts 1-day workshop on natural dyeing of wool, allied products. <https://www.takeonedigitalnetwork.com/hh-directorate-hosts-1-day-workshop-on-natural-dyeing-of-wool-allied-products/>
- The Express Tribune. (2023, November 5). From threads to clicks: Tech transforms Hunza's handicrafts. <https://tribune.com.pk/story/2444853/from-threads-to-clicks-tech-transforms-hunzas-handicrafts>
- Wikipedia contributors. (2026). Pakol. Wikipedia. <https://en.wikipedia.org/wiki/Pakol>