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# Ethnomedicinal Uses and Preliminary Phytochemical Validation of *Iris decora* Wall.: Bridging Indigenous Knowledge and Scientific Evidence

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## Abstract

*Iris decora* Wall (Iridaceae) is a Himalayan medicinal plant widely used by indigenous communities in Nepal and neighboring regions for the treatment of gum disorders, gastrointestinal conditions, and inflammatory diseases. However, its traditional uses remain poorly validated through scientific studies. This study aimed to document the ethnomedicinal uses of *I. decora* in Jumla, Nepal, and to provide preliminary phytochemical validation through solvent extraction and qualitative screening. Ethnomedicinal data were collected using semi-structured interviews with local practitioners and farmers (n = 6). Plant rhizome was cleaned, dried, and extracted using solvents of varying polarity (methanol, ethanol, ethyl acetate, dichloromethane, hexane, and water). Extractive yield was calculated, and standard qualitative phytochemical tests were performed to detect major classes of secondary metabolites. The ethnomedicinal survey revealed that the rhizome is the most commonly used plant part, applied for gum swelling, toothache, constipation, abdominal pain, and infections. Methanol extraction yielded the highest extractive value (33.5%), followed by ethanol (25.5%), indicating the efficiency of polar solvents. Phytochemical screening of the methanolic extract showed a strong presence of flavonoids, tannins, alkaloids, and glycosides, while saponins were weakly present and steroids and proteins were absent. The findings provide preliminary scientific support for the traditional uses of *I. decora*, particularly in the management of inflammatory, infectious, and gastrointestinal conditions. Further studies involving compound isolation, bioactivity evaluation, and clinical validation are necessary to establish its therapeutic potential. This study highlights the importance of integrating indigenous knowledge with scientific validation for future drug discovery.

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## Introduction

Traditional knowledge of medicinal plants provides an important foundation for modern drug discovery and public health interventions, as many contemporary pharmaceuticals have originated from bioactive compounds initially identified through ethnomedicinal practices (Miya et al., 2020). In many developing countries, including Nepal, traditional medicine remains an accessible and culturally embedded form of healthcare, particularly in rural and mountainous communities. The Himalayan region is recognized as one of the world's major biodiversity hotspots and harbors a rich diversity of medicinal plant species widely used by indigenous communities in traditional healthcare systems. Despite their long history of use, many Himalayan medicinal plants remain scientifically underexplored, with limited phytochemical and pharmacological validation, highlighting the need for systematic scientific investigation(Anthal et al., 2026). Species belonging to the genus *Iris* (family Iridaceae) have attracted increasing scientific attention because of their diverse phytochemical composition. Numerous compounds, particularly flavonoids and is oflavonoids, have been reported from different *Iris* species and are associated with biological activities such as antioxidant, antimicrobial, anti-inflammatory, and cytotoxic effects (Wang et al., 2010). Additional compounds such as phenolic acids, terpenoids, and quinones further contribute to the pharmacological potential of the genus.

*Iris decora* Wall.(GBIF, 2023; Wallich, 1830) is a species of Himalayan iris native to regions including the **East and West Himalaya, Nepal, Pakistan, and S. Central China** (efloraofindia; efloras; Gardens; *Iris decora Wall*). The local name "Ninyajadi" is derived from the Nepali words "Ninyai," referring to gum pain and swelling, and "Jadi," meaning the root of a medicinal herb. The name thus reflects the traditional use of the plant root for the management of gum-related ailments. In Jumla, the species is commonly known as Ninyajadi, while other vernacular names reported in the literature include Padam Pushkar, Piperi, and Tarwal(Balami, 2004; Ghimire et al., 2021; Jumla, 2072 BS; NHPL; Singh et al., 1979). Although detailed ethnomedicinal documentation of this species remains limited in peer-reviewed ethnobotanical literature, traditional herbal sources describe the use of its roots as an aperient, diuretic,

and purgative, highlighting its importance in indigenous healthcare practices. The plant has also been applied externally for treating minor skin conditions such as sores and pimples(PFAF, n.d.) In addition, local ethnomedicinal practices report its use in the management of gum swelling, toothache, gastrointestinal disorders, and inflammatory conditions, with the rhizome being the most commonly utilized plant part.

Despite the ethnobotanical relevance of *I. decora* and other *Iris* species in traditional medicine, scientific investigations validating these traditional claims remain limited. Most available pharmacological knowledge within the genus *Iris* originates from studies conducted on other species rather than on *I. decora* itself, highlighting a significant species-specific research gap(Mykhailenko et al., 2026).

The taxonomy of *I. decora* has historically been complex, with multiple synonyms appearing in botanical literature and herbarium records. According to *Plants of the World Online* (Kew), *Iris decora* Wall. is the currently accepted name, first validly published in 1830.(Gardens) This complex synonymy has resulted in fragmentation of information across different names in earlier literature, making comprehensive data retrieval challenging.

**Homotypic synonyms**—names based on the same type specimen include *Junopsis decora* (Wall.) Wern. Schulze and *Neubeckia decora* (Wall.) Klatt. **Heterotypic synonyms**, which represent earlier or alternative classifications now consolidated under *I. decora*, include *Evansia nepalensis* Klatt(NHPL), *Iris nepalensis* D.Don (nom. illeg.)(NHPL; Rastogi, 1990), *Iris yunnanensis* H.Lév., and several others. (Gardens) Recognizing these synonyms is critical for **comprehensive literature searches and accurate interpretation of past ethnobotanical and pharmacological studies**, because older publications may refer to this species under different names (Gardens).

Therefore, the present study aims to: (i) document the ethnomedicinal uses of *I. decora* in Jumla, Nepal, (ii) perform preliminary phytochemical extraction and qualitative screening using solvents of varying polarity, (iii) correlate the observed phytochemical profile with traditional therapeutic uses, and (iv) identify key knowledge gaps requiring further scientific validation. By integrating indigenous knowledge with experimental validation, this study seeks to contribute to the scientific understanding

and potential therapeutic development of this limited-explored Himalayan medicinal plant.

## Literature Review

Empirical studies across different regions have documented the extensive reliance of indigenous communities on medicinal plants for primary healthcare. Globally, ethnomedicinal knowledge continues to play a critical role in healthcare delivery, particularly in resource-limited settings where access to modern medicine is restricted. For example, Taek *et al*. reported that the Tatun community in West Timor, Indonesia, utilizes several medicinal plant species, including newly documented taxa, with potential applications in malaria control programs (Taek et al., 2019). This study highlights the importance of indigenous knowledge not only in primary healthcare but also in identifying novel therapeutic leads.

In the Himalayan region, Sherpa *et al*. highlighted the dependence of rural ethnic communities on forest resources, including medicinal plants, for both healthcare and livelihood needs (Sharma et al., 2018). In Nepal, particularly in remote mountainous regions such as Jumla, medicinal plants remain an important component of primary healthcare. However, most ethnomedicinal studies are descriptive and lack species-specific scientific validation. Despite its traditional use, *I. decora* remains poorly investigated with respect to its phytochemical composition, pharmacological activities, and safety. Although related *Iris* species have demonstrated promising bioactivities, direct evidence for *I. decora* is limited. Therefore, integrating ethnomedicinal documentation with preliminary phytochemical validation is essential for supporting its traditional uses and guiding future pharmacological research.

## Research Methods

### Literature Survey

Relevant information on *I. decora* was collected from databases including PubMed, Google Scholar, NepJOL, and IMPPAT, along with regional floras and botanical databases such as Plants of the World Online and World Flora Online. Search terms included "*Iris decora*", "ethnomedicine", "Iridaceae", and "phytochemistry". To ensure comprehensive coverage of historical records, known taxonomic synonyms of *I. decora* were also included during the literature search.

**Ethnomedicinal Survey**

A preliminary ethnomedicinal survey was conducted in Jumla, Nepal, using semi-structured interviews with six informants (three local practitioners and three sheep farmers). Informants were selected through purposive sampling, and verbal informed consent was obtained prior to data collection. Information regarding plant parts used, preparation methods, dosage forms, and therapeutic applications was systematically recorded.

**Plant Material Collection and Authentication**

The dried *I. decora* material was purchased from a local herbal vendor in Jumla, Nepal. The sample was initially cleaned to remove foreign matter and then coarsely powdered using a mechanical grinder. The powdered material was stored in airtight containers until further use. Plant identification was performed using standard floras and authenticated with reference to Plants of the World Online (Kew). The local identity of the plant as "Ninyajadi" was further cross-verified through repeated consultations with indigenous knowledge holders and a botanist at the District Plant Research Office, Jumla.

**Preparation of Solvent Extracts**

Six solvents of different polarity were used for successive solvent extraction: methanol, ethyl acetate, hexane, dichloromethane, ethanol, and water. For each extraction, 2 g of the powdered sample was accurately weighed and transferred into clean, dry vials, followed by the addition of 15 mL of the respective solvent. The vials were labeled appropriately and kept on an orbital shaker for maceration at room temperature for 24 h. The mixtures obtained after extraction were filtered through Whatman No. 1 filter paper into pre-weighed vials. The solvents were evaporated using a water bath maintained at 45–50°C. The concentrated extracts were further dried at room temperature for 24 h to obtain a constant weight. The percentage extractive yield (%) was calculated using the formula:

Percentage Yield (%) = (Weight of dried extract / Weight of crude sample) × 100

**Phytochemical Screening**

Preliminary phytochemical screening of *I. decora* extracts was carried out using standard qualitative methods to detect major classes of secondary metabolites.

**Tests for Alkaloids**

Mayer's test: Formation of a white precipitate indicated the presence of alkaloids. (Tiwari et al., 2020)

Wagner's test: Formation of a reddish-brown precipitate confirmed alkaloids. (Sivaranjani et al., 2021)

Marquis test: Used as an additional confirmatory test for alkaloid detection. (Thapa et al., 2022)

**Test for Ammonium Compounds**

Nessler's test: Formation of a yellow to brown coloration indicated the presence of ammonium ions (Demutskaya & Kalinichenko, 2010).

**Tests for Glycosides**

NaOH test: Yellow coloration indicated glycosides. (Hussain et al., 2025)

Ammonium hydroxide test: Cherry-red coloration indicated anthraquinone glycosides. (Lamichhane et al., 2014)

Keller–Killiani test: Formation of a brown ring indicated cardiac glycosides. (Lamichhane et al., 2014)

**Tests for Tannins**

Lead acetate test: Yellow precipitate indicated tannins. (Ouandaogo et al., 2023)

Ferric chloride test: Blue-green or blue-black coloration confirmed tannins. (Lamichhane et al., 2014)

**Test for Saponins**

Foam test: Formation of stable foam indicated saponins.(Lamichhane et al., 2014)

***Test for Steroids:***

Salkowski test: Formation of a reddish-brown ring at the interface indicated steroids.(Lamichhane et al., 2014)

***Tests for Flavonoids:***

Lead acetate test: Yellow coloration indicated flavonoids.(Chen et al., 2022)

Alkaline reagent test: Yellow coloration that disappeared upon addition of acid confirmed flavonoids (Chen et al., 2022).

***Tests for Carbohydrates:***

Molisch's test: Formation of a purple ring indicated carbohydrates.(Chen et al., 2022)

Iodine test: Blue or purple coloration indicated starch-type polysaccharides(Chen et al., 2022).

Data obtained from literature review, ethnomedicinal survey, extractive yield, and phytochemical screening were compiled and analyzed descriptively. Results were summarized in tables and interpreted to identify correlations between traditional uses and phytochemical composition, as well as to highlight existing research gaps.

## Results and Discussion

### Botanical Description and Taxonomy

Scientific Name and Family: *I. decora* Wall. (Iridaceae) — recognized as the valid scientific name in major global plant databases.(Gardens) The species was first described by Nathaniel Wallich in Plantae Asiaticae Rariores in 1830 (Gardens).

Synonymy: *Over time, I. decora has accumulated several historical synonyms in botanical literature*.(Gardens; NHPL; WFO)

**Homotypic:** *Junopsis decora* (Wall.) Wern.Schulze, *Neubeckia decora* (Wall.) Klatt

**Heterotypic (distinct historical names now consolidated under** *I. decora***):** *Evansia nepalensis* Klatt, *Iris nepalensis* D.Don, *Iris nepalensis var. khasiana* Baker, *Iris sulcata* Wall., *Iris yunnanensis* H.Lév., *Junopsis yunnanensis* (H.Lév.) M.B. Crespo, Mart., *Neubeckia sulcata* Klatt. These synonyms are important for ensuring completeness in ethnobotanical and pharmacological literature searches, as earlier studies may have used different nomenclature for the same species.

**Common Names: Reported in literature include** Padam pushkar (Ghimire et al., 2021; NHPL; Singh et al., 1979), Ninyaijadi(Jumla, 2072 BS), Piperi (Ghimire et al., 2021), Tarwal (Balami, 2004). Among these, "Ninyajadi" is locally significant in Jumla, reflecting its traditional use in treating gum-related disorders.

***Taxonomic Classification:*** *I. decora* Wall. belongs to the family Iridaceae, a group of perennial flowering plants commonly known as the iris family. It is placed under the order Asparagales, which includes several monocotyledonous flowering plant families (Gardens).

| Rank | Classification |
|---|---|
| **Kingdom** | Plantae |
| **Phylum** | Streptophyta |
| **Class** | Equisetopsida |
| **Subclass** | Magnoliidae |
| **Order** | Asparagales |
| **Family** | Iridaceae |
| **Genus** | *Iris* |
| **Species** | *Iris decora* |

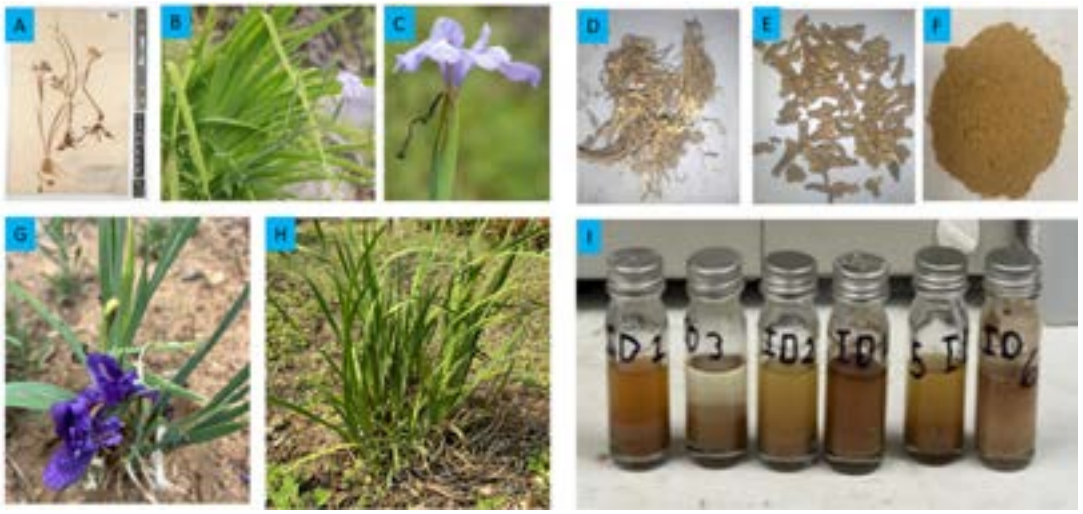
***Morphology*:** Figure 1 below shows the herbarium (from Kew's Herbarium - K002930916) (Gardens) of *Iris nepalensis* and a plant with flowers of *I. decora* (adapted from Ross) and its rhizome (purchased from a local vendor in Jumla). The rhizome is the most pharmacologically important part and is widely used in traditional medicine. Based on descriptions from regional floras and botanical databases, *I. decora* exhibits the following morphological characteristics(efloraofindia; NHPL):

- **Habit:** Perennial rhizomatous herb.
- **Rhizome/Roots:** Fusiform, tuberous roots with fibrous remains.
- **Leaves:** Linear, narrow leaves measuring 10–35 cm long and 2–8 mm wide.
- **Stem:** Flowering stems typically 10–25 cm long with one or two flowers.
- **Flowers:** Violet or pale blue, measuring approximately 2.5–6 cm across.
- **Blooming season:** Late spring to early summer (May–July).
- **Fruit:** Ellipsoid to ovoid capsule.

Figure 1, the dried rhizome of *I. decora* obtained from a local vendor in Jumla (left: as received (D)); right: after cleaning (E)), followed by powdering (F), and successive extraction using different solvents (I). Images of *I. decora* were captured at the Plant office, Jumla (H), and Dhitachaur Plant Garden, Jumla (G).

**Figure 1**

*Herbarium specimen of Iris nepalensis (A; Kew Herbarium: K002930916) and flowering plant of Iris decora (adapted from Ross) (B-C).*




***Habitat and Distribution*:** *I. decora* is native to temperate regions of Asia, particularly the Himalayan belt. (efloras) Its distribution includes: Nepal, India (Himalayan regions), Pakistan, Tibet, and South-central China (Sichuan and Yunnan). (NHPL) The species typically grows in grassy hillsides, open pastures, rocky slopes, and cliff edges at elevations ranging from 1,800 to 3,100 m above sea level. (efloraofindia) It prefers well-drained soils and sunny habitats typical of highland *Iris* species. (PFAF)

**Ethnomedicinal Uses of *Iris decora* Wall.** Ethnobotanical reports (Table 1) indicate that *I. decora* has been used traditionally for various medicinal purposes across Himalayan communities. (Jumla, 2072 BS) T**he rhizome paste is applied for gum swelling and toothache, while powdered rhizome may be mixed with tea or boiled to prepare an herbal extract(Birkha Nepali, 2026; Jumla, 2072 BS).** The Newar community in Nepal has also reported using this plant to treat constipation (Balami, 2004; Miya et al., 2020). Field survey data from Jumla (current study) further confirmed its widespread use among local practitioners and farmers, particularly for gum inflammation, gastrointestinal disorders, and wound healing.

**Table 1**

*Ethnobotanical survey reports documenting the traditional medicinal uses of I. decora*

| Plant Part | Traditional Use | Preparation/ Mode of Application | Region/ Community | Reference |
|---|---|---|---|---|
| **Rhizome** | Laxative, purgative, diuretic | Decoction or powder | Nepal, Sikkim | (PFAF) |
| **Rhizome** | Applied to small sores, pimples | Paste applied externally | Bhutan | (PFAF) |
| **Leaves** | Anti-inflammatory, wound healing | Crushed and applied topically | India (Himalayan regions) | (Miya et al., 2020) |
| **Rhizome** | Treat bilious disorders, Gum swelling, Constipation, Diuretics | Decoction orally/ Churna / Brush teeth | Nepalese traditional medicine | (Jumla, 2072 BS; PFAF) |
| **Whole plant** | General health tonic (folk use) | Infusion/ decoction | Himalayan villages | (Miya et al., 2020) |

Further, an ethnomedicinal survey on *I. decora* was conducted in Jumla, Nepal, through interviews with three sheep farmers and three local practitioners, following their informed consent to participate. A summary of the reported traditional uses, plant parts, and modes of preparation is presented in Table 2.

**Table 2**

*summary of the reported traditional uses*

| Informant (Age) | Reported Uses | Preparation / Mode of Application |
|---|---|---|
| **Jhir Bohara (64)** | Numbness with cheek and gum swelling; urinary obstruction; stomach pain; eye pain and itching | Root paste applied locally before sleep for 2–3 days; rhizome decoction in warm water taken orally on empty stomach for 2–3 days; root paste applied around eyes once daily before sleep |

| | | |
|---|---|---|
| **Nar Bahadur Rawal (70)** | Gum swelling and itching; blood in stool | Powdered root decoction taken orally or used as mouth rinse three times daily; root paste applied morning and night; decoction taken orally twice daily for blood in stool |
| **Dhan Bahadur Bohara (60)** | Gum pain and swelling; stomach pain | Powdered root prepared as warm decoction taken orally twice daily (morning empty stomach and at night after meal) |
| **Nanda Bahadur Pachhai (37)** | Gingivitis; abdominal pain; constipation | Rhizome paste applied for gingivitis; small amount of powdered rhizome decoction taken orally for abdominal cramps and constipation |
| **Parbati Pandey (42)** | Gastric reflux; mouth ulcers; gum infection | A pinch of powdered rhizome prepared as tea and consumed orally |
| **Surat Bahadur Hitan (63)** | Gingivitis; infections; wounds; gastric reflux | Taken as herbal tea or a small piece of rhizome sucked for extended time |

Ethnomedicinal uses of *I. decora* documented through interviews with sheep farmers and local practitioners in Jumla, Nepal.
The rhizome/root was the plant part primarily used.

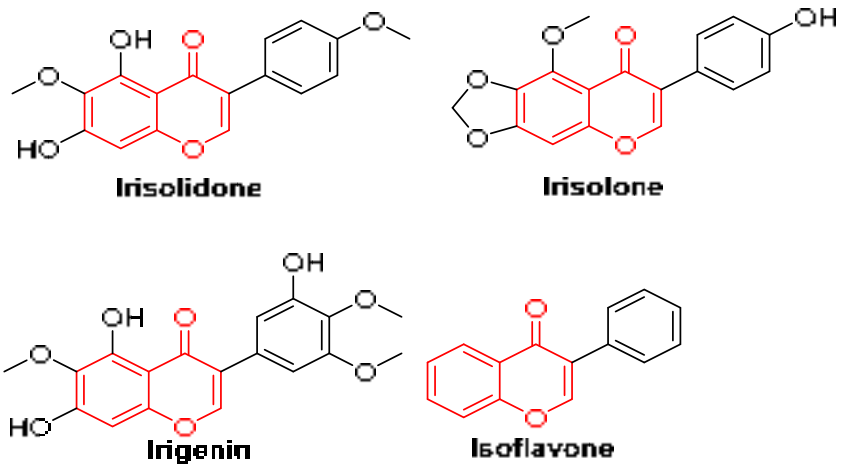
The convergence of literature-based and field-based data strengthens the reliability of traditional claims regarding the therapeutic potential of *I. decora*.

**Phytochemistry and Pharmacological Evidence**

Phytochemical Composition: Phytochemical investigations of I. decora remain limited; however, preliminary screening studies and database records provide insights into the possible chemical constituents of the species. The IMPPAT database lists four compounds associated with I. decora rhizome (Figure 2): Irisolidone(Prakash et al., 1965), Irisolone(Gopinath et al., 1961), Irigenin(Gopinath, 1963) and Isoflavone(Rastogi, 1990). Traditional medicinal uses reported in the IMPPAT database include treatment of acne vulgaris, furunculosis, vomiting, wounds healing, and diuretic conditions.(IMPPAT)

**Figure 2**

*IMPPAT database listed four compounds associated with I. decora.*




A qualitative phytochemical screening of crude rhizome extracts of *I. decora* revealed the presence of **flavonoids, glycosides, steroids, saponins, and tannins**, indicating a diverse secondary metabolite profile typical of medicinal plants (Thokar, 2018).

More broadly across the **genus** *Iris*(Mykhailenko et al., 2026), phytochemical research has documented a wide range of specialized metabolites including: phenolic acids, flavonoids and isoflavonoids, xanthones, stilbenes, quinones, terpenoids. More than 90 flavonoid compounds have been reported from various *Iris* species, highlighting the significant structural diversity within this genus(Wang et al., 2010). Phenolic acids such as caffeic acid, chlorogenic acid, ferulic acid, and vanillic acid have also been identified in *Iris* species and are believed to contribute to their antioxidant properties. (Khatib et al., 2022)

***Extractive Yield in Different Solvents***

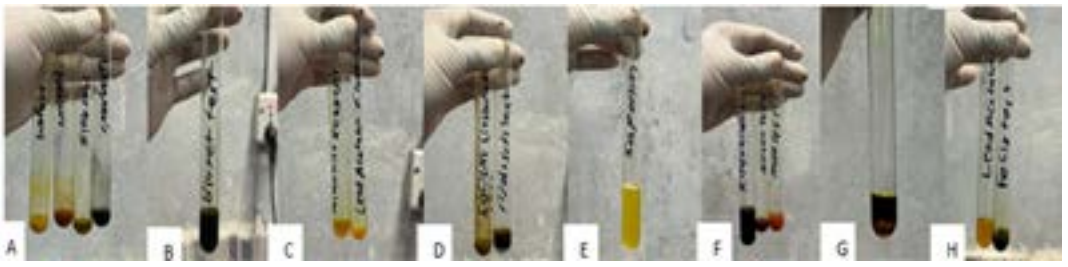
The yield of the extract varied significantly depending on solvent polarity. Methanol (70%) showed the highest yield (33.5%), followed by ethanol (25.5%), water (16.0%), ethyl acetate (15.5%), dichloromethane (13.0%), and hexane (1.5%). This trend clearly indicates that polar solvents are more efficient in extracting bioactive

constituents from *I. decora*. Similar extraction patterns have been reported in other medicinal plants and members of the genus *Iris*, where methanol preferentially extracts phenolics, flavonoids, and glycosides.

***Phytochemical Screening***

The methanolic extract showed a strong presence of alkaloids, tannins, flavonoids, and glycosides, while saponins were weakly present and steroids and proteins were absent. The strong presence of flavonoids and tannins suggests significant antioxidant and antimicrobial potential of the plant. Carbohydrates were strongly detected, while starch-type polysaccharides were absent. The absence of steroids and proteins may be due to extraction specificity, plant part selection, or environmental variation. (Figure 3 and Table 3). Overall, the phytochemical profile of *I. decora* supports its traditional use in treating infections, inflammation, and gastrointestinal disorders, as these activities are commonly associated with flavonoids, tannins, and alkaloids.

**Figure 3**




Phytochemical screening of *I. decora* methanolic extract: A. Alkaloid test (Mayer's, Marquis, Wagner's), Ammonia test (Nessler's); B. Protein test (Biuret); C. Flavonoid Test (Alkaline reagent, Lead Acetate); D. Carbohydrate test (Iodine, Molisch); E. Saponin test (Foam); F. Glycoside test (Killer kilani, $NH_4OH$, NaOH); G. Steroid test (Salkowski); H. Tannin test (Lead acetate, $FeCl_3$).

**Table 3**

*Phytochemical screening of the MeOH extract of I. decora.*

| Phytochemical Group | Test Performed | 100% MeOH Extract |
|---|---|---|
| **Alkaloids** | Mayer's Test | ++++ |
| | Wagner's Test | +++ |
| | Marquis Test | - |
| **Ammonia / Ammonium Compounds** | Nessler's Test | ++ |
| **Glycosides** | NaOH Test | +++ |
| | Ammonium Hydroxide Test | - |
| | Keller–Kiliani Test | - |
| **Saponin** | Foam Test | + |
| **Tannins** | $FeCl_3$ Test | ++++ |
| | Lead Acetate Test | ++++ |
| **Flavonoids** | Lead Acetate Test | ++++ |
| | Alkaline Reagent Test | ++++ |
| **Steroids** | Salkowski Test | - |
| **Carbohydrates** | Molisch's Test | ++++ |
| | Iodine Test | - |
| **Protein** | Biuret Test | - |

The intensity of phytochemical presence is indicated semi-quantitatively as follows: (++++) = strongly present, (+++) = moderately present, (++) = weakly present, (+) = trace amount, and (–) = absent.

Pharmacological Activities (Genus-level evidence)

Direct pharmacological studies on *I. decora* remain limited. However, studies on related *Iris* species have demonstrated antioxidant, antimicrobial, anti-inflammatory, and cytotoxic activities. For example, Iris kashmiriana demonstrated significant antioxidant activity in flower extracts using DPPH and ABTS assays. The extracts contained high levels of phenolic compounds (208.5 mg GAE/g) and flavonoids (487.7 mg RE/g) and showed cytotoxic activity against MCF-7 human breast cancer cells (Chandni et al., 2024). Although these results were obtained from a different species, the similarity in phytochemical composition within the genus suggests that I. decora may also possess comparable bioactive potential.

Various studies have reported multiple pharmacological activities in *Iris* species, including anti-inflammatory activity, antimicrobial and antiviral effects, antioxidant activity, cytotoxic and antitumor properties, and hepatoprotective activity (Mykhailenko et al., 2026). These activities are generally attributed to phenolic compounds, flavonoids, and isoflavonoids commonly present in the genus.

The combined ethnomedicinal and phytochemical evidence strongly suggests that *I. decora* has significant therapeutic potential, particularly for inflammatory and gastrointestinal conditions. However, the lack of species-specific pharmacological and toxicity studies remains a major limitation.Knowledge Gaps and Future Research Needs.

Despite preliminary phytochemical information and ethnomedicinal relevance, several critical research gaps remain for *I. decora*:

- Lack of comprehensive and quantitative phytochemical profiling of the species using advanced analytical techniques (e.g., LC-MS, GC-MS, HPLC)
- Absence of species-specific pharmacological investigations
- Limited isolation, purification, and structural characterization of individual bioactive compounds
- Lack of toxicity and safety studies
- Absence of *in vivo* and clinically relevant pharmacological evaluations
- Limited ethnomedicinal survey data

Addressing these gaps will be essential to validate the traditional medicinal uses of *I. decora* and to explore its potential as a source of bioactive compounds. Furthermore, systematic integration of ethnobotanical knowledge with modern pharmacological approaches will be crucial for translating traditional claims into evidence-based therapeutic applications. In line with the future research needs identified above, our ongoing work aims to further characterize *I. decora* through advanced phytochemical analyses (GC–MS and LC–MS) and biological evaluations, including antioxidant and antimicrobial studies. These investigations are expected to contribute to a more comprehensive understanding of the species and will be communicated in future publications.

## Conclusion and Implications

*Iris decora* is less explored Himalayan medicinal plant with documented ethnomedicinal uses and preliminary phytochemical evidence suggesting the presence of bioactive secondary metabolites. However, scientific validation of its traditional uses remains limited. Future studies should focus on comprehensive phytochemical profiling using advanced analytical techniques, bioactivity-guided isolation of compounds, and pharmacological evaluations to establish the therapeutic potential of this species. Such studies may contribute to the development of novel plant-derived therapeutic agents while supporting the conservation and sustainable utilization of Himalayan medicinal plants. Importantly, validating such indigenous medicinal knowledge may also strengthen the scientific basis of traditional healthcare systems in Himalayan communities.

## Author Contributions

RS and PR contributed to the ethnomedicinal survey and experimental work. AS and NA assisted throughout the research process. RS prepared the initial draft of the manuscript. DRJ conceived and supervised the study, critically revised the manuscript, and finalized the manuscript for submission. All authors read and approved the final version of the manuscript.

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## Declaration

ChatGPT is used only for language editing in this article.

## Conflict of Interest

The authors declare no conflict of interest related to this manuscript.

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