

Manjistha (Rubia Cordifolia): A Herbal Treasure of India

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Abstract

Rooted in the rich tapestry of traditional medicine systems such as Ayurveda Rubia cordifolia, commonly known as Manjistha, has captivated the curiosity of healers and scientists alike for centuries. This botanical marvel, with its crimson roots and storied history, holds a treasure trove of therapeutic potential waiting to be unearthed. Its benefits include improving complexion, reducing fever, detoxifying the body, treating skin disorders, reducing inflammation, and providing relief for various disorders. Manjistha also exhibits anti-carcinogenic, anti-acne, immunity-enhancing, antioxidant, and anti-inflammatory properties. Its phytochemical constituents include anthraquinones, glycosides, saponins, phenols, flavonoids, alkaloids, and tannins. The present review article is focused on phytochemical, pharmacological, Cosmetology and other important aspects of Manjistha.

Keywords: Rubia cordifolia, Bioflavonoids, Cosmetics, Skincare, Haircare

Introduction

मञ्जिष्ठा रसायनी च यस्य कान्तिर्यथाऽमृतम् [1]
सफलाऽश्वागन्धिनी च तस्यास्ताः परिकीर्तिताः॥

Translation: Manjistha, which is like nectar in its radiance and is a rejuvenator. Its successful properties, along with its pleasant aroma, are renowned.

This verse highlights the rejuvenating and aromatic qualities of Manjistha, indicating its importance in Ayurvedic medicine for promoting health and well-being.

Nature has given us solutions for all of our problems, and Ayurveda, the oldest branch of medicine, is enhanced with a wide variety of medicinal plants that may be used both internally and externally to treat a wide range of illnesses. Ayurvedic cosmetics have been used since the Indus Valley Civilization and are becoming more and more popular for its ability to treat skin conditions and enhance appearance. Since ancient times, cosmetics have played a significant role in the lives of all women. [1] Cosmetics help a woman seem beautiful so that she can maintain her mental health and confidence. [1] Cosmeceuticals, which combine the words "cosmetic" and "pharmaceutics," are cosmetic-pharmaceutical blends designed to improve health and appearance by utilizing components that affect the skin's natural texture and function. The intermediary between medications and personal care goods is being filled by cosmetics. Nowadays, the skin care market's fastest-growing category is skincare products. [2]

Historically, its inflammatory, antibacterial, and galacto-purifying properties have made it a common ingredient in numerous polyherbal remedies for a range of illnesses and cosmetic products. [3] An amazing face pack may be made with dried and crushed orange peels, powdered sandalwood, turmeric, and Manjistha. Applying a small amount of honey and finely crushed root powder to the face will help mend skin tissues that have been injured or infected. [2]

Taxonomic Classification [7], [15]

Kingdom	Plantae
Class	Dicotyledoneae
Subclass	Sympetalae
Family	Rubiaceae
Genus	Rubia
Species	Cordifolia
Common name	Manjistha

Vernacular Names- [7], [15]

English	Indian madder
Sanskrit	Aruna, Viksa, Yojanvalli
Hindi	Manjith
Marathi	Manjestha
Bengali	Manjishtha
Gujarati	Manjitha
Tamil	Mancitti
Telugu	Tamravalli
Kannada	Bhandeera, Manjishta
Malayalam	Manjithi
Punjabi	Kattha, Manjitha
Konkani	Itari
Manipuri	Moyum
Assamese	Majathi, Mandar

Geographical Distribution:

It frequently occurs at elevations of 8,000 feet in India's hilly regions. Frequently in the country's Himalayan area, which stretches from the north-west frontier eastward along the Himalaya to Ceylon and Malay, as well as in tropical Africa, China, Japan, and Java. It can be found in Nepal, Sri Lanka, Iran, Afghanistan, and India (Dehradun, Kashmir, Nagpur, and Malvan). It is spread by stem cuttings and seeds. There are four varieties of Manjistha: *chola*, *yojani*, *konchi*, and *sinhala*. [8]

Morphological Description:

It is a deciduous climber with a .25-inch diameter and a fragile, flexible stem that can reach heights of up to ten feet. The base of the stem is frequently softly woody and persistent. Branches might be glabrous, or quadrangular. Tall, oval, sharp, base cordate, smooth, strong basal nerves; leaves in a whorl of four inches,

two of which are frequently larger and have longer petioles. Less than one inch in diameter, terminal cymose, leafy panicles hold dark crimson or pinkish brown flowers. The fruits are globose, succulent, meaty, dark purple or black, and contain scarlet juice. ^[8]

- **Macroscopic:** Root - Cylindrical, often surmounted by a knotty crown of root stock; about 2 to 9 cm in length and 0.2 to 0.6 cm in width; surface smooth finely striated longitudinally and occasionally grooved, often exhibiting lateral root scars; dark reddish brown both externally and internally. Fracture short, taste sweetish, acrid and disagreeable, odor pleasant. (shown in Figure 4) ^[6]
- **Microscopic:** TS of root shows a well-developed cork, consisting of 3 to 8 layered suberized radially arranged cells, occasionally filled with reddish brown content, followed by a cortex of 3 to 10 cell layers; some cortical cells filled with acicular and sandy crystals of calcium oxalate more towards periphery. Phloem 8 to 12 layers wide, consists of sieve tubes, companion cells and phloem parenchyma. Xylem comprises vessels, fibers, tracheids, and xylem parenchyma. Vessels widen towards the outer edges of the xylem. Their dimensions range from 30 to 270 μm in length and 18 to 90 μm in width. Medullary rays are either single or multiple layers thick, and contain oval to circular starch grains within cortical and phloem parenchyma cells.(shown in Figure-1) ^[6]
- **Powder:** Shows numerous fragments of cork, lignified xylem vessels, tracheid and fibres, raphides, clusters and sandy oxalate crystals, parenchyma with red content and starch grains.(shown in Figure-5) ^[6]



Figure- 1 *Rubia Cordifolia* Plant



Figure- 2 Leaves



Figure- 3 Seeds



Figure- 4 Roots



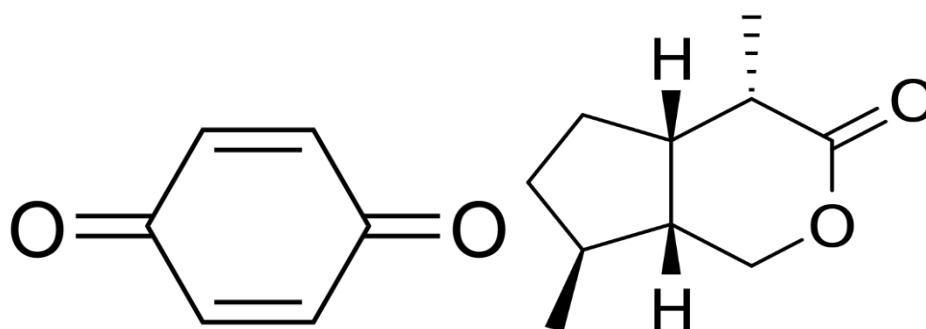
Figure- 5 Powder (Roots)

Cultivation & Harvesting:

Manjistha thrives in moist, loamy soil with high rainfall, requiring support as a climbing plant. It is propagated through seeds or two-node root cuttings, with seeds preferred for their cost-effectiveness and high germination rates. Nursery raising begins in January by sowing seeds or utilizing root cuttings treated with rooting hormones. While cuttings boast a 90% success rate, seed propagation remains economically favourable, yielding 80%–85% germination within 20 days. Approximately 350 g of seeds are needed to establish a nursery for 1 hectare of land, with higher quantities required for direct sowing in fields. ^[14]

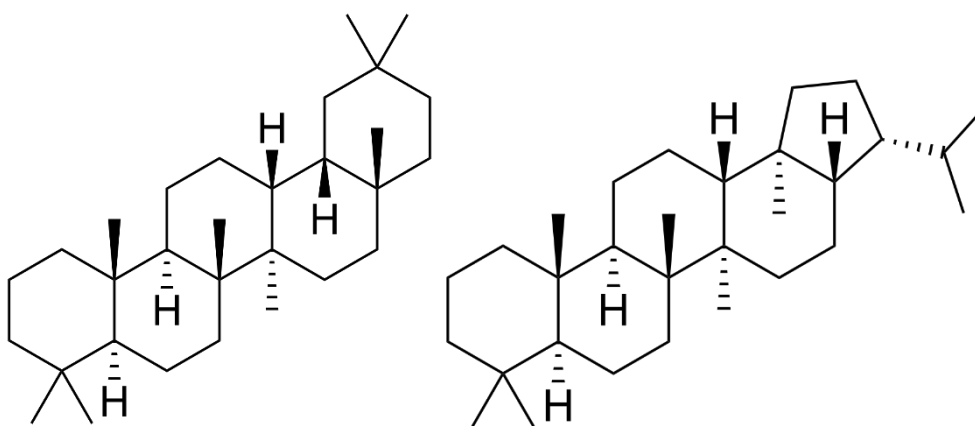
Chemical Constituents:

Various chemical constituents present in Manjistha are quinones, iridoids, oleananes triterpenoid, bicyclic hexapeptides, and anthraquinones. Some notable anthraquinones are alizarin, purpurin, and rubicordifolin. The ethyl alcohol extracts of *Rubia cordifolia* L. roots yielded seven anthraquinones upon isolation. By means of spectrometric data combined with physio-chemical properties, six of them were identified as 2-methyl-1,3,6-trihydroxy-9,10-anthraquinone, 1-hydroxy-9,10-anthraquinone, 1,2,4-trihydroxy-9,10-anthraquinone, 2-methyl-1,3,6-trihydroxy-9,10-anthraquinone-3-O-beta-D-glucoside, 1,2-dihydroxy-9,10-anthraquinone-2-O-beta-D-xylosyl(1-6)-beta-D-glucoside and 1,3-dihydroxy-2-hydroxymethyl-9,10-anthraquinone-3-O-beta-D-xylosyl(1,6)-beta-D-glucoside. The structure of seventh compound was elucidated as 2-methyl-1,3,6-trihydroxy-9,10-anthraquinone-3-O-beta-D-xylosyl(1-2)-beta-D-(6'-O-acetyl) glucoside. ^[13]



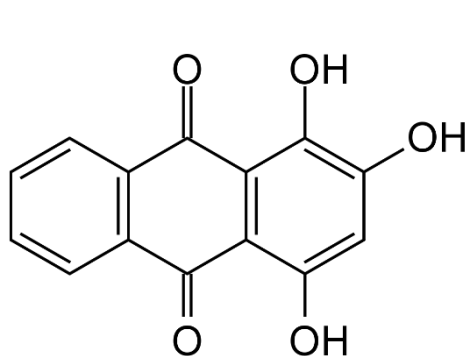
a. Quinone

b. Iridoid

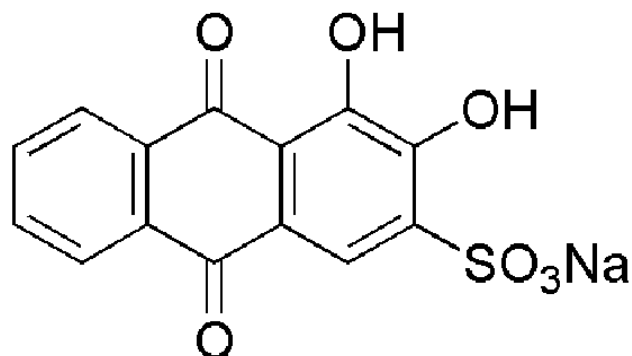


c. Oleanane

d. Triterpenoids



e. Purpurin



f. Alizarin

Chemical structures of some phytochemical constituents of Manjistha (*Rubia cordifolia*).

1. Traditional Uses:-

"Charaka Samhita" contains Manjistha as it is referenced in eleven different Varnya medications, as well as Visaghna Jvarahara, which is powdered dried roots and fruits that can be taken internally to treat spleen and skin issues. In addition, it is used to cure blood-borne infections, enhance complexion, and treat serious burns, fractures, and dysentery. In Vyang, Manjistha paste is combined with honey. It is used to treat blood and skin disorders and possesses blood-purifying, pigment-stimulating, and tonic qualities. It is recommended for Yoni roga (menstrual illness), Kustha (skin disease), Sarpavisa (snake bite), Visarpa

(herpes virus), Aksi roga (eye disease), Arsa (haemorrhoids), and Bhagna (fracture) in Indian Ayurvedic pharmacopoeia. Manjistha is a primary constituent in formulations used to treat skin diseases. [7]

Ayurvedic Properties

[7]

Rasa	Tikta(Bitter), kashaya (astringent), madhur (sweet)
Guna	Guru (heavy), ruksha (dry)
Veerya	Ushna (hot)
Vipaka	Katu (pungent)
Dosha	Pacifies kapha and pitta
Karma	Varnaropana, Jwarhara, shothahar, kushthaghna

2. Pharmacological activity:-

- **Anti-acne property-**

Propioni bacterium acne is inhibited in its proliferation by Manjistha methanol extract. It exhibits poor action against IL-8 and is only marginally effective against TNF alpha. It is thought to be astringent and beneficial for external inflammations such as skin conditions and ulcers. In a gel formulation, the anthraquinones-rich portion of *R. cordifolia* was visible. In comparison to normal Clindamycin gel, the anti-acne activity against *Propionibacterium acne*, *Staphylococcus epidermidis*, and *Malassezia furfur* was evaluated. [9]

- **Wound Healing property-**

The root extract of Manjistha was reported as an effective wound healing property in experimental models as wound healer. Ethanolic extract and the hydrogel formulation of roots were found to be effective in the functional recovery and healing of wounds and also lead to histo-pathological alterations. [8]

- **Anti-microbial activity-**

It was reported that the antibacterial activity of Manjistha root extracts against a range of pathogenic microorganisms has been investigated. *Daucosterol* and *sitosterol* have antimicrobial properties. Significant antibiotic action against gram-positive bacteria such as *Bacillus subtilis*, *Streptococcus faecalis*, and *Bacillus cereus* has been documented for *rubiaccordone*. *Vibrio alginolyticus*, *pseudomonas aeruginosa*, *Shigella pp*, *plesiomonas v*, and *Vibrio parahaemolyticus* were among the bacterial pathogens that were significantly inhibited by the green produced silver nanoparticles made from Manjistha plant root extract. Their antibacterial efficacy was greatest against *plesiomonas shigelloides* and *pseudomonas aeruginosa*. [8]

- **Anti-oxidant property-**

The antioxidant properties of Manjistha extract for protection against lipid peroxidation and reduced glutathione (GSH) content in rat liver homogenate were compared with vitamin E and Para benzoquinone (PBQ). Hydroxyanthraquinones emerged as the primary antioxidant phenolic components in *R. cordifolia* root, with both its alcoholic extract and the constituent rubiadin demonstrating antioxidant properties. [3]

- **Anti-per oxidative activity-**

During the studies conducted by researchers alcoholic extract of Manjistha showed anti-per oxidative

property in rat liver homogenate. The anti-per oxidative property of Manjistha can be attributed to its antioxidant compounds. Peroxidation is a process where free radicals steal electrons from lipids in cell membranes, causing cell damage. ^[8]

- **Anti-platelet activating effect-**

In Ayurvedic system, the plant is prescribed to cure blood related ailments. Partially purified fraction of the whole plant inhibits the action of platelet activating factor at its receptor level either by its blocking or by desensitization property. ^[8]

- **Gastro-protective activity-**

Rubia cordifolia has both gastro-protective and ulcer healing properties. Triterpenoids present in root extracts are potent antiulcer and antioxidant compound which can be clinically explored. ^[8]

- **Anti-ulcer activity-**

The effect of alcoholic extracts of roots of Manjistha and its antiulcer potential on alcohol, ibuprofen, cold restraint stress and pyloric ligation-induced gastric lesions was studied along with ranitidine, a standard drug. ^[8]

- **Antiviral activity-**

It has been reported that three naphthoquinones—furomollugin, mollugin, and rubilactone—isolated from the root of Manjistha have antiviral action. In human hepatoma Hep3B cells, furomollugin and mollugin significantly reduce the release of hepatitis B surface antigen while having no influence on the cells vitality. ^[8]

3. Cosmeceutical Properties-

- **Skin-**

- **Striae gravidarum:**

It is a condition characterized by linear, atrophic skin bands in areas of dermal damage caused by stretching. They are present in 90% of pregnant women due to hormonal factors and increased stress on connective tissues. The natural evolution of striae is for red to purple, raised wavy lesions to fade and leave white linings with a wrinkly surface. If we look etiology behind the formation of these stretch marks termed as *Kikkisa* (Striae gravidarum) in literatures. Manjistha can play a very good role in this burning issue of striae marks and itching due to their medicinal properties. It can prevent Burning, itching and other fungal or bacterial infection and promotes skin healing by local action on skin and promotes collagen formation. *Ropana-sothahar* properties facilitate wound healing and exhibit local anti-inflammatory effects, aiding in reducing edema resulting from itching. *Kandughana* and *Vishghana* properties shows anti-allergic action, antibacterial, antifungal action actions prevents skin from secondary infection of skin due to itching. *Pittashamak* and *Varnya* property promotes skin texture, color and luster. ^[11]

- **Mud/ Face Pack:**

As Now-a-days, there are various trending Manjistha infused mud packs in the market which claims to have bioflavonoids in it. Bioflavonoids are natural antioxidants that help energies the skin by replenishing its natural moisture and reducing photo-induced skin damage. They are also known to reduce inflammation and give the skin an even tone.

- **Face Wash:**

Manjistha is believed to have skin-brightening effects as they have anthraquinones present in them, helping to even out skin tone and reduce the appearance of dark spots or hyperpigmentation. By

incorporating Manjistha into face wash products, leaving the skin looking brighter and more radiant over time.

Manjistha is sometimes included in face wash formulations for its cleansing properties. It may help to remove dirt, oil, and impurities from the skin, leaving it feeling clean and refreshed. Additionally, Manjistha's detoxifying properties may assist in purifying the skin and promoting a clearer complexion.

- **Hair-**
- **Hair Dye:**

Manjistha powder is used as a hair dye. As it comes from a reddish root vine known as madder root which contains a red pigment used for dyeing and can be used with henna to give red tones which comes from alizarin and purpurin present in the roots of the plant. It has more potent red stain than hibiscus and beetroot. It will stain red & will noticed it even on black hairs but this is semi-permanent color. ^[19]

Toxicity

There is no such evidence of toxicity of manjistha but here are some precautions to be taken care-off:-

- It should be avoided during pregnancy and lactation.
- Direct Consumption can lead to change the color of urine and stool.
- Proper dosage is required excessive intake can lead to adverse effects.
- Ensure using a high quality product of manjistha.
- Also some may face allergic reactions like skin irritations etc. ^[10]

Conclusion

Manjistha, an ancient herb, was used by Acharya for therapeutic management. *Rubia cordifolia*, a natural wonder, has numerous benefits including anti-oxidant, anti-inflammatory, anti-cancer, anti-convulsant, anti-diabetic, anti-microbial, anti-proliferative, anti-stress, anti-ulcer, and wound healing properties.

It offers potential benefits for the cosmetic industry due to its Antioxidant (Bioflavonoids) properties for protecting skin from damage, Anti-inflammatory effects (purpurin), soothing and calming irritated skin. Skin-brightening qualities (Anthraquinones), promoting an even complexion. Cleansing and detoxifying abilities, refreshing and purifying the skin.

It's incorporation into the cosmetic products not only enhances skin health and appearance but also supports the industry's shift towards sustainable and eco-friendly ingredients.

Manjistha presents a promising natural ingredient for skincare formulations, aligning with consumer demand for clean, botanical-based beauty products.

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