Pharmacological activity of manjistha (rubia cordifolia)

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Abstract:- Rubia cordifolia Linn, commonly known as manjistha or Indian madder, is a versatile perennial herb with a history of over 2000 years in traditional medicine, including Ayurveda and Chinese herbal medicine. Known for its blood-purifying properties, it is widely used to treat skin disorders, remove toxins (ama), and promote wound healing. It is especially beneficial for pregnant women, addressing issues like stretch marks, itching, and skin infections through its anti-inflammatory, antifungal, and antibacterial properties. Manjistha also stimulates collagen production, promoting skin regeneration and overall skin health.Beyond its dermatological uses, manjistha plays a significant role in treating free radical-related diseases such as arthritis and cancer, as it exhibits antioxidant, strong anti-cancer. and immunomodulatory activities. Its roots are a known source of anthraquinones, providing further therapeutic benefits such as hepatoprotective and anticancer effects. Manjistha has been traditionally used as a natural food coloring and dye, and its pharmacological properties extend to increasing appetite, stimulating the uterus, and treating urinary and blood-related disorders. This plant has been officially recognized in the Chinese Pharmacopeia for its medicinal value in treating conditions like dysmenorrhea and hemostasis, showcasing its broad potential for both therapeutic and cosmetic applications.

Keywords: Rubia cordifolia, ayurveda, Manjistha, anti – inflammatory, skincare

INTRODUCTION

Rubiacordifolialinn Is a flowering plant species. It is commonly known as manjistha. Rubia cordifolia Linn is also commonly known as Indian Maddar is a perennial, herbaceous prickly climber with long and cylindrical root with a thin red bark, well known for its versatile action. It is distributed in the Himalayas from Kashmir eastwards and Nilgiris and other hilly districts of India. This plant has a 2000-year history and was initially referenced as a cleansing herb in China's Divine Famer's Materia Medica, a wellknown pharmacy book. This plant has a 2000-year history and was initially referenced as a cleansing herb in China's Divine Famer's Materia Medica, a well-known pharmacy book. It removes poisons from the blood, known as "ama" in Ayurveda^(1,2). Women are more concerned about their appearance during pregnancy since 90% of them get striae lines on their tummy, breasts, and thighs, or scratch marks from itching, which make them look unattractive. It is said that healthy glowing skin is indicator of healthy mind. It is hard sometimes to use any synthetic cosmetic during pregnancy. However, there is a distinction between cosmetic and cosmeceutical goods, which are restricted from being sold without a medical prescription if they contain substances that can penetrate or alter the functioning of the skin^(3,4,5). Then in this regard, society look towards Ayurveda to develop better and safer remedy for these trouble causing striae during pregnancy. Manjistha's medicinal characteristics can help with the burning issue of striae markings and itching. Manjistha can prevent burning, itching, and other fungal or bacterial infections while also promoting skin healing through local action on the skin and collagen synthesis^(6,7, 8). Aside from its therapeutic properties, this plant has been used to make natural food colourings and hair dyes. The isolation of natural dyes and colourants is gaining popularity due to its applications in food, pharmaceuticals, and other human consumptions. This plant has also beenlisted officially as herbal medicine in the Chinese Pharmacopeia for the treatment of arthritis, dysmenorrhea, hematorrhea and hemostasis which are freeradical related diseases. It is helpful in treating skin diseases, in blood purification, increasing appetite andin stimulation and contraction of uterus(9,10). One of its unique action is anti-acne Effect through anti-bacterial, antiinflammatory, antioxidant and anti-androgen action. The roots and stems are well-known sources of anthraquinones; the roots have also been reported as antioxidants, antiinflammatory, anticancer, immunomodulator, and hepatoprotective, and they are widely used to treat blood, urinary, and skin diseases⁽¹¹⁾.

PHARMACOLOGICAL ACTIVITY

Anti-inflammatory activity :

Manjistha shows significant anti-inflammatory effects, which can be beneficial in treating various inflammatory conditions, such as arthritis or skin inflammation. This action is primarily due to its inhibition of pro-inflammatory enzymes and cytokines ^(12,13)

Inhibition of Pro-Inflammatory Enzymes: Inflammation in the body is mediated by enzymes like cyclooxygenase (COX) and lipoxygenase (LOX), which produce inflammatory compounds like prostaglandins and leukotrienes⁽¹⁴⁾.Compounds in Manjistha, including anthraquinones and flavonoids, have been shown to inhibit these enzymes, particularly Cyclooxygenase. By blocking these enzymes, Manjistha reduces the production of inflammatory molecules, helping to alleviate inflammation^{.(15)}

Anti cancer activity:

The herb contains compounds like quinones, which exhibit anti-cancer effects, potentially inhibiting the proliferation of cancer cells and inducing apoptosis (programmed cell death) in tumor cells.Manjistha has been investigated for its potential as an anti-cancer agent, especially in breast and colon cancer cell lines.^(16,17)

Bioactive Compounds with Anti-Cancer Potential: Manjistha contains anthraquinones (like purpurin, rubiadin, and munjistin), quinones, and alizarin. These compounds have shown promise in inhibiting the growth of cancer cells and inducing cell death (apoptosis) in laboratory .Purpurin and rubiadin, in particular, are known for their cytotoxic effects on cancer cells, which they preferentially target while causing minimal damage to healthy cells.^(18,19)

Anti -oxidant activity:

Manjistha contains bioactive compounds like anthraquinones, tannins, and flavonoids that contribute to its strong antioxidant properties. These antioxidants help neutralize free radicals, thereby reducing oxidative stress in the body.^(20,21)

Immunity enhancing activity:

The ethanolic ex-tracts of the whole plant of Rubia Cardifolia were tested for many immunity enhancing activities using A murine model.⁽²¹⁾The active component in the extract increased both cell-mediated and humoral immunity.immunosuppressive drug, phos-phamidon showed significant restoration in immunity⁽²²⁾

Anti – diabetic activity:

Manjistha has shown potential as an anti-diabetic agent by lowering blood sugar levels. It may work by enhancing insulin sensitivity and regulating glucose metabolism.The compound polyphenols and anthraquinon present in manjistha which helps in glucose metabolism through which blood sugar level balance.⁽²⁴⁾ Inhibition of Alpha-Glucosidase Enzyme: Alpha-glucosidase is an enzyme that breaks down complex carbohydrates into glucose, leading to a rise in blood sugar levels after meals.⁽²⁵⁾ Manjistha can naturally inhibit this enzyme, slowing carbohydrate breakdown and gradual glucose absorption. This helps prevent rapid spikes in blood sugar after eating, which can be especially beneficial for diabetic patients.(26)

Anti- convulsant activity:

In modern medicine, R. Cordifolia has been claimed to have anticonvulsant properties. In rats, triterpenes reduced seizures caused by electrical shock, kindling, and chemoconvulsants. The compound's ability to increase brain gaba and serotonin (5-HT) levels supports its anticonvulsant properties⁽²⁷⁾.

Anti-Microbial activity:

The herb has shown potent antimicrobial , particularly against Staphylococcus aureus and Escherichia coli. This makes it valuable for treating skin infections, wounds, and other microbial infections.⁽²⁸⁾

Anti hyperglycemic, anti stress activity:

The effect of an alcoholic extract of Rubia cordifolia roots on high blood glucose levels was investigated in alloxan-treated mice. The extract lowered blood sugar levels caused by alloxan. Alcoholic extract increased brain GABA levels while decreasing dopamine and plasma corticosterone levels. Alcoholic extract effectively suppressed acidity and ulcers caused by cold stress. It also inhibited scopolamine-induced learning and memory deficits.⁽²³⁾

Hepatoprotective activity:-

Manjistha exhibits liver-protective effects, helping in detoxifying the liver and promoting better liver function. This is especially important in cases of drug-induced liver damage or liver..Studies indicate that Rubia cordifolia can aid in the recovery of liver tissues by reducing oxidative damage.⁽²⁰⁾

Wound healing activity:

In experimental models, R. Cordifolia root extract was shown to be an excellent wound healer. Ethanolic extract and hydrogel formulation of roots improved wound healing and caused histopathological changes⁽²⁹⁾.

Anti- acne property:

A gel formulation containing anthraquinone-rich R. Cordifolia demonstrated anti-acne effectiveness against Propionibacterium acne, Staphylococcus epidermidis, and Malassezia furfur when compared to clindamycin gel⁽³⁰⁾.

CONCLUSION

Rubia cordifolia Linn (Manjistha) is a versatile medicinal plant with a rich history and diverse pharmacological properties. It is highly valued in Ayurveda for its role as a blood purifier and its ability to treat various skin conditions, particularly in pregnant women, by alleviating itching, stretch marks, and promoting skin healing. Beyond its dermatological applications, Manjistha offers antiinflammatory, antibacterial, and antioxidant benefits, making it effective against a range of health conditions, including arthritis, dysmenorrhea, and certain cancers. Additionally, its use as a natural dye and its official listing in the Chinese Pharmacopeia further underscore its significance in both traditional medicine and modern therapeutic applications. This plant holds promise as a natural, safer alternative to synthetic treatments in various fields, from cosmetics to medicine. Future research into these plants is crucial to fully understand their active compounds, mechanisms of action, and potential interactions with conventional treatments. Clinical studies and pharmacological investigations can validate traditional uses, ensuring that these herbal remedies are supported by scientific evidence.

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