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Formulation and Phytochemical analysis of Herbal Oil using Rubia Cordifolia Root

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Abstract: *The term "herbal cosmetics" refers to products made from plant-based ingredients that have cosmetic benefits. Recently, the use of botanicals in cosmetics has grown, primarily because they are gentle and non-toxic. The root of Rubia cordifolia, also known as Manjistha root, is widely used as a medicinal analgesic, blood purifier, and has anti-inflammatory and antibacterial qualities as well as anti-aging effects. Manjistha oil is made with natural components such as powdered Manjistha root and virgin coconut oil. Research conducted on phytochemistry and physiology of the Manjistha herbal oil after the formulation and it contains significant phytochemicals that is effective for nourishing the skin without any irritancy for the skin.*

1. Introduction

Nature has given us solution for all the problems and Ayurveda the oldest branch of medicine, is enhanced with a wide variety of medicinal plants that may be used since

the Indus valley civilization and are becoming more and more popular for its the ability to treat skin conditions and enhance appearance. Herbal cosmetics have a definite role in Ayurveda medicine. A holistic definition of beauty was given.¹

Cosmetics help a woman seem beautiful so that she can maintain her mental health and confidence.² Cosmeceuticals, which combine the words “cosmetic and pharmaceuticals”, 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 skin care products.³

Rubia cordifolia, commonly known as manjistha, was widely used in antiquity to treat blood, skin, and urinary disorders because it was thought to be an effective blood purifier. According to devipriya, the root has following properties: it is sweet, bitter, acrid, astringent, thermogenic, anodyne, anthelmintic antiseptic constipating, diuretic, rejuvenating, and tonic.⁴

Bioactive compounds such as anthraquinones and their glycosides, terpenes, bicyclic hexapeptides, iridoids, and various carboxylic acids (including malic, citric, quinic, and rosmarinic acids) as well as saccharides (like xylose, ribose, fructose, glucose, sucrose, and primrose) have been extracted from different parts of *Rubia cordifolia*. The roots contain a mixture of purpurine, munjistin, and small amounts of xanthopurpurin and pseudo-purpurin.⁵

Cosmeceutical Properties

Manjistha a natural wonder, has numerous benefits including anti - oxidant, anti-inflammatory, anti-microbial and wound healing properties. The anti-inflammatory properties of Manjistha are effective in reducing redness, soothing irritated skin, and purifying blood stream.⁶ This natural treatment eliminates impurities from the body, and helps in brightening the skin. This purifies blood and helps to address the root cause of skin problems.

Manjistha is acclaimed for its ability to reduce hyperpigmentation and improve skin tone. It also blocks melanin, the usual color for dark spots, and lightens skin tone. Manjistha flavonoids are effective in promoting skin health through their antioxidant properties, which help to combat free radical damage and premature aging.⁷ Manjistha also affects the maturing the cells by neutralizing free radicals and promoting collagen production.⁸

Maintaining high levels of collagen, the key component of skin elasticity and strength is achieved through the use of Manjistha for acne treatment. It is important to reduce skin irritation, while not too much to kill the microscopic organisms that cause it. In addition, Manjistha can help target sebum production and reduce breakdowns.

Benefits of virgin coconut oil

Virgin coconut oil is extracted from fresh coconut milk kernel of coconut. The procedure of extracting virgin oil may or may not involve heating. Because it contains an abundance of vitamins, minerals and antioxidants that promote excellent health, it is referred to as the mother of all oil.⁹ Virgin oil is full of many vital ingredients that support the development of a healthy body. Vitamins C and E, fatty acids such as lauric acid or medium -chain triglycerides (MCTs), myristic acid, etc. are among are among the nutrients found in virgin coconut oil. Proteins and Antioxidants help to rectify skin problems. Simultaneously it showing good antimicrobial property.¹⁰

2. Methodology

Materials

The manjistha used for the study was collected from Rasashastra pharmacy, BHU and coconut oil purchased from Ayurvedic shop located in Varanasi.



Manjistha**Biological name:** *Rubia cordifolia* L¹¹**Parts used:** Root**Color:** Reddish brown**Constituents:** Flavonoids, Quinones, Glycosides, Tannins**Virgin coconut oil****Biological name:** *Cocos nucifera* oil**Parts used:** Fruit**Color:** Transparent**Constituents:** Alkaloids, Saponins, Antioxidants, Flavonoids, Terpenoids**Composition**

Table 1: Procedure

Ingredient name	Composition
Manjishta root powder	20 grams
Virgin coconut oil	80 milliliters

- Grinded manjistha root in fine powder.
- Mixed manjistha powder with Virgin coconut oil.
- Heated the mixture for 20 minutes gently in a pan to allow the herb to infuse the oil.
- Let it cool and strain the oil to remove any particle.
- Stored in a glass bottle.

Phytochemical analysis**Detection of Alkaloid**

Iodine Test: To 5 ml of aqua extract, a few drops of iodine solution are added. The resulting blue color, which disappears upon boiling and returns upon cooling, indicates the presence of alkaloids.¹²

Test for Glycoside

Killer-Killiani Test: To 2 ml of the sample solution in glacial acetic acid, add a few drops of FeCl₃ and concentrated H₂SO₄. The formation of a reddish-brown color at the interface between the two layers, along with a bluish-green tint in the upper layer, suggests the presence of glycosides.¹³

Detection of flavonoid

Alkaline reagent test:

1 ml of the sample solution is taken, and then 2 ml of a 2% NaOH solution is added along with a few drops of diluted HCl. The appearance of a vivid yellow color that becomes colorless when diluted acid is added suggests the presence of flavonoids.¹⁴

Detection of Anthraquinones

Borntrager's test:

Add 10 ml of 10% ammonia solution to a few ml of the extract and shake vigorously for 30 seconds. A pink, violet, or red solution indicates the presence of anthraquinones.¹⁵

Detection of phenolic compound

Iodine test:

To 2ml extract, few drops of dil. Iodine sol added. A transient red color indicates presence of phenol.¹⁶

Detection of Quinones

Add 2 ml of chloroform to 5 ml of the plant extract (which has been evaporated in a water bath), then add 3 ml of concentrated H₂SO₄. This will produce a grey-colored solution.¹⁷

Detection of Tannins

The plant extract is dissolved in 5 ml of distilled water and 1% gelatin solution, followed by the addition of 10% NaCl. The formation of a white precipitate indicates the presence of tannins.

HCl test

2 ml of the sample solution is mixed with 2 ml of hydrochloric acid (along with a few ml of ammonia). A pink-red solution forms, which changes to blue-violet upon the addition of ammonia, indicating the presence of anthocyanins.

PH: PH meter used

Irritancy: The oil was applied twice daily on clean facial skin of ten women aged 20-40. Participants were subjected to this experiment for three weeks.¹⁸

Results

Table 2: Phytochemical Screening

Phytochemical test	Observation for manjistha oil
Alkaloids	Absent
Flavonoids	Present
Phenols	Present
Glycosides	Present
Anthraquinone	Present
Anthocyanin	Present
Quinones	Absent
Tannins	Present

Table3: Physical evaluation

Physical evaluation	Observation for Manjistha oil
PH	5.9
Irritancy	Nil

Discussion

The phytochemical analysis of Manjistha stem is included in the Ayurvedic Pharmacopoeia of India (A.P.I.), but similar details for the Manjistha root are not available. The phytochemical findings for the Manjistha root are similar to those of the stem. Therefore, a phytochemical study of the root has been carried out, and its therapeutic significance has been compared with the therapeutic uses described in Ayurveda.

The phytochemical tests indicated the presence of phenolic compounds. Given that phenols have antiseptic properties, a decoction of Manjistha could be utilized as an antiseptic solution to help prevent infections.¹⁹ Additionally, Ayurveda already recognizes the Raktashodhak property of Manjistha is helpful for treating skin ailments and cosmetic concerns, such as acne vulgaris..²⁰

Gelatin test to detect the presence of tannin in *Manjistha* is positive indicating Tannin is main ingredient of root. Tannin solution removes most of the poison like alkaloids and metal. Acharya Charak has also included it in the Vishaghna Mahakashaya.²¹ Baljet test for glycoside has found positive, it acts as hydrating agent. Borntrager's test for anthraquinone has come positive which proves antiviral, insecticidal, antibacterial and antiparasitic qualities. Alkaline reagent test for flavonoid also found positive, flavonoid have antiviral, anticarcinogenic and antioxidant qualities.

Conclusion

All the phytochemical constituent present in Manjistha oil showed that it has potent benefits on skin, simultaneously physiological screening shows low

irritancy potential on facial skin of 10 women examined for 21 days. Anthraquinone has antiviral, insecticidal, skin brightening qualities, promoting an even complexion. Anti-inflammatory effects (purpurin) soothing and calming irritated skin. Therefore, Manjistha has demonstrated its therapeutic properties as outlined in Ayurveda, supported by findings from medicinal chemistry.

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