



Application Of *Rubia Cordifolia* In Anti-Bacterial And Anti -Inflammatory Pillow Cover Fabrication For Acne Rosacea

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ABSTRACT

Synthetic dyes release huge amount of waste and uniform colourants lead to health hazard. It also disturbing the eco balance of the nature. Natural dyes are mostly derived from plants, invertebrates, or minerals. The most of the natural dyes are vegetable dyes from plant sources-roots, berries, bark, leaves, and wood—and other organic sources such as fungi and lichens. Natural dyes exhibit good biodegradability and are more compatible with the environment. They also offer a renewable and sustainable alternatives to synthetic dyes, reducing the negative impact on ecosystems. In spite of their inferior fastness, natural dyes are more acceptable to environmentally conscious people around the world. Natural dyes are also offering a safer option for textile applications because they have been shown to be less harmful and non -allergic. The present study deals with the natural dyes extracted from *Rubia Cordifolia* can be proven a best remedy to cure acne rosacea particularly in pillow cover. The application of *Rubia Cordifolia*, particularly that which is produced from medical plants to textile can yield additional benefits. *Rubia cordifolia* is popularly known as 'Indian Madder'. It possesses anti-inflammatory, antibacterial, antioxidant effects as these are important agent to break the acne rosacea. The extracted dye used to dye selected silk fabric and myrobalan mordant used for dye ability, fastness properties, absorbency test. In order to improve the practical application of natural dyes in textiles, the use of mordants such as myrobalan enhance the durability and colour retention. Absorbency properties of the dyes extracted from madder and sinking test was determined. The silk fabric functionalization with *Rubia Cordifolia* has been considered, this has improved the dyed fabric qualities and increased dye absorption. The colour fastness through washing and sunlight was an excellent satisfaction.

KEYWORDS Natural dye, *Rubia cordifolia*, Acne Rosacea, Pillow Cover.

1.INTRODUCTION

Rubia cordifolia commonly known as Indian Madder is a perennial, herbaceous prickly climber with long and cylindrical roots 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. One of its unique actions is the anti-acne effect through anti-bacterial, anti-inflammatory, anti-oxidant and anti-androgen action. The roots and stems are well-known sources of Anthraquinones, the roots have also been reported as antioxidant, anti-inflammatory, anticancer, immunomodulator and hepatoprotective and are extensively used against blood, urinary and skin diseases. In the ancient world, Manjistha is reputed as an efficient blood purifier and hence is extensively used against blood, skin and urinary diseases. Externally, Manjistha was applied on major burns, mixed with honey on freckles and blemishes. It remained a potent drug for obstinate skin diseases, erysipelas, leucoderma, and edema also used against blood disorders in Ayurveda. Traditionally, it is used in many

polyherbal formulations for various ailments and cosmetic preparations because of its inflammatory, antiseptic and galacto-purifier activity. The root is used externally and internally to gain luster and glow of the skin and aids in removing pimples, acne freckles and discoloration. Traditionally the roots are used to treat various systemic problems and pigmentation anomalies of the skin and are an excellent aid in the promotion of complexion.

Rosacea is an inflammatory facial dermatosis with varied clinical features; the commonest being persistent facial erythema, chiefly affecting the facial convexities along with some vascular changes, inflammatory lesions, hypertrophic changes or ocular involvement. However, the clinicopathological features and pathogenesis remain unclear without any confirmatory laboratory test. The diagnosis of this condition is more difficult in people with coloured skin and darker skin tones as the disease characteristics are less well-defined with hallmark erythema being indistinguishable. As a result, this condition remains underreported in the skin of colour, although its incidence is increasing in this group. We have tried to present a comprehensive review of this disorder, especially in the skin; to aid in its early diagnosis and appropriate treatment.

2.MATERIALS AND METHODS

2.1 Selection of Fabric

Silk fabric has been chosen because of its special chemical and structural characteristics, which make it incredibly friendly with natural dyes. Fibrin, the main component of silk, is a protein-based fibre with exceptional colour absorption properties. This is due to the fact that the dye molecules found in Indian madder easily establish strong chemical interactions with the amino groups found in silk threads. Vibrant and durable colours are the outcome of these relationships. Silk's glossy, smooth surface also improves the dye's appearance, resulting in a rich, uniform, and bright finish. Silk's inherent affinity for natural dyes guarantees that the colour penetrates deeply, producing a consistent and long-lasting effect, in contrast to synthetic textiles that frequently repel them. Additionally, silk is breathable, light, and hypoallergenic, which makes it a great option for sensitive skin items like pillowcases for acne rosacea. While its luxury feel enhances the final product's visual appeal, its smooth texture lessens friction on the skin, minimizing discomfort

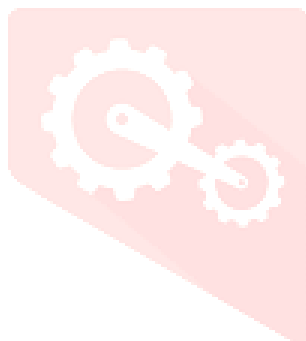


Fig:2.1.1 Raw Silk Fabric

2.2SELECTION OF HERB:

2.2.1*Rubia Cordifolia*

Rubia Cordifolia has traditionally been an important natural source of red colour for textiles. The *Rubia cordifolia* belongs to the family of Rubiaceae, also known as manjistha, it is a perennial herbaceous climbing plant with very long roots, cylindrical, with a thin red bark. Stem often have a long, rough, grooved, woody base. The colour pigment especially present in the root of *Rubia Cordifolia*.



Fig:2.2.1.1 *Rubia Cordifolia* Root

2.3 PREPARATORY PROCESS

2.3.1 Desizing

Raw silk does not possess the lustre and softness for which this fibre is known. The gummy substance called sericin (about 20%–25% in mulberry silk and about 15% in wild silk) covering the fibrous material, fibroin, imparts a harsh handle and must be removed in order to bring out the supple and lustrous qualities. Although sericin and fibroin, the two components of raw silk are removed by the soap solution.

Degumming also removes accompanying substances such as fats, oils, natural pigments, and mineral components. The complete and uniform removal of these impurities are important not only for uniform dyeing, but also particularly for good printing results. The process for removal of sericin is known as degumming, boiling off.



Fig:2.3.1.1 Desizing of Silk Fabric

2.3.2 Dye Extraction

The 50 grams *Rubia Cordifolia* root and the 25 grams of myrobalan as mordant both are put into the vessel with the 4 liters of water then the mixture is heated at 80–90°C for 1–2 hours. Stirring occasionally helps in the uniform release of dye compounds. During this process, anthraquinones from *Rubia cordifolia* and tannins from Myrobalan dissolve in the water, changing its colour. The dye extraction process maintains with the appropriate temperature, as excessive heat can degrade some dye compounds, reducing their effectiveness.



Fig:2.3.2.1 Myrobalan Powder

2.3.3 Filtration And Concentration

Once the boiling process is complete, the dye solution is filtered to separate the solid residues from the liquid extract. Filtration can be done using a muslin cloth is used better separation. The extracted dye solution will be keep separated and the raw silk fabric which is already done with the degumming process with be soaked into this dye solution.

Fig:2.3.3.1 *Rubia Cordifolia* Dye Extraction

Fig:2.3.3.2 Dyeing of Silk Fabric

3. RESULT AND DISSCUSSION:

3.1 Determination Antibacterial Activity

This test was carried out according to the method of Jahir *et al.*, 2011. The plates were inoculated with freshly prepared overnight inoculums which were swabbed over the entire surface of the medium, rotating the plate 60 degrees after each application by using a sterile cotton swab, to ensure the spread of the tested microbes on the surface of the plate completely. The 6mm of well was made with borer on the agar plates. The test material of cloth was placed on the plate. The standard antibiotic was added in well which used as positive control. After 24 hrs incubation period, observed the zone of inhibition around the wells and measure the zones.

S.No.	Isolates	Zone of inhibition in mm	
		Test sample	Std- ciprofloxacin/itraconazole
1.	<i>E. coli</i>	18	16
2.	<i>K.pneumoniae</i>	-	-
3.	<i>S.aureus</i>	22	18
4.	<i>E.faecalis</i>	-	18
5.	<i>C.albicans</i>	-	15

3.2 Determination of Anti-Inflammatory activity

The percentage inhibition of protein denaturation can be compared with the standard drug Diclofenac (1 mg/mL) to determine the anti-inflammatory potential of the sample.

Ensure that the pH of the PBS is 6.4 to maintain the stability during the experiment.

Perform all measurements in triplicates to ensure accuracy and reliability of results.

The lower the absorbance of the sample, the higher the protein denaturation inhibition, which suggests a higher anti-inflammatory effect.

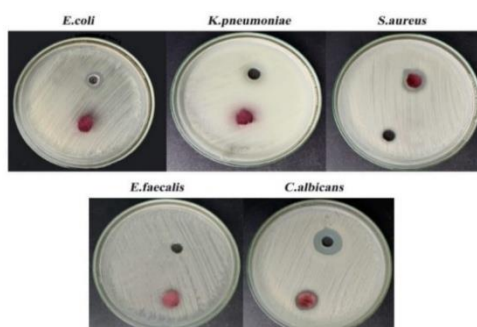


Fig:3.1.1 Anti-bacterial and Anti- inflammatory Test

4. DURABILITY TEST:

4.1 COLOUR FASTNESS TO WASHING

Colour fastness through washing was determined. The fabric was stitched on edge of four corners. The silk fabric was washed in water by detergent solution. Colour change in the fabric was assessed by grey scale. The rating of grey scale ranges grade 4 for washing.

4.2 COLOUR FASTNESS TO SUNLIGHT

Colour fastness through sunlight was determined. The fabric will be kept in the direct sunlight for 7 days in the atmospheric conditions of 70°F to 90°F. After exposure the colour change is evaluated using a grey scale. The observation of the sample has no visible change. The interpretation of the sample results in the Excellent colour of sunlight in the grade of 5.

5. SUMMARY AND CONCLUSION

Acne rosacea is determined as a skin condition considered by redness, inflammation, and sensitivity, often degraded by bacterial growth. Bedding, especially pillow covers plays a important role in skin condition, *Rubia cordifolia* (Indian Madder) is a well-known medicinal herb with powerful antibacterial and anti-inflammatory properties. By incorporating *Rubia cordifolia* into pillow cover fabrication, it is possible to create a skin-friendly, natural solution to help manage acne rosacea. The use of *Rubia cordifolia*-infused pillow covers offers a natural way to managing acne rosacea. By combining antibacterial protection with anti-inflammatory support, these pillow covers helps to create a cleaner, gentler sleeping environment that promotes healthier skin and prevent from acene rosacea. *Rubia cordifolia*-based pillow covers could become a valuable adding to skincare routines, offering a way to cure acne rosacea.

6. ANNEXURE:

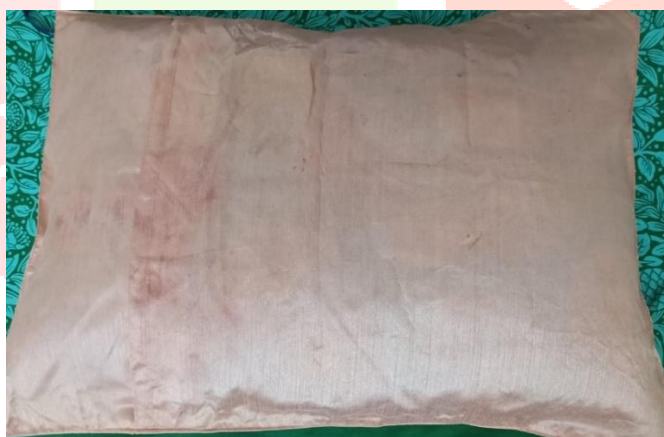


Fig:6.1 End Product

REFERENCE

1. Crawford GH, Pelle MT, James WD. Rosacea I: etiology, pathogenesis, and subtype classification. J Am Acad Dermatol. 2004;51:327–341.
2. Samanta, A.K and Agarwal, P. (2009), “Application of natural dyes on textiles” ,Indian journal of Fiber and Textile Research, Vol. 34
3. Warriar PK, Nambiar VPK, Ganapathy PM, Some Important Medicinal Plants of the Western Ghats India: A Profile, International Dev Res Cent, New Delhi, 2001, 329-342.
4. Gulrajini, M.L (1992), “Natural dyes and their application to textiles, edited by Gulrajini M.L., Gupta., D IIT New Delhi, India.
5. Abdullah, S. T., Ali, A., Hamid, H., Ali, M., Ansari, S. H., and Alam, M. S. (2003). Twonewanthraquinones fromtherootsof*Rubia cordifolia* Linn. Pharmazie 58 (3), 216–217. doi:10.1023/A:1024895515316

6. Adams, M., Berset, C., Kessler, M., and Hamburger, M. (2009). Medicinal herbs for the treatment of rheumatic disorders-a survey of European herbals from the 16th and 17th century. *J. Ethnopharmacol.* 121 (3), 343–359. doi:10.1016/j.jep.2008. 11.010
7. Adwankar, M.K., and Chitnis, M. P. (1982). In vivo anti-cancer activity of RC-18: A plant isolated from *Rubia cordifolia*, linn. Against a spectrum of experimental tumour models. *Chemotherapy* 28 (4), 291–293. doi:10.1159/000238092
8. Adwankar, M. K., Chitnis, M. P., Khandalekar, D. D., and Bhadsavale, C. G. (1980). Anti-cancer activity of the extracts of *Rubia cordifolia* Linn. (NSC b668893). *Indian J. Exp. Biol.* 18 (1), 102.
9. Akhtar, M., Ali, M., Mir, S. R., and Singh, O. (2006). New anthraquinones from *Rubia cordifolia* roots. *ChemInform* 45, 1945–1950. doi:10.1002/chin.200701211

