

Formulation and Evaluation of Herbal Skin Lotion Containing Millingtonia Hortensis Extract: Physicochemical and Antibacterial Assessment

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ABSTRACT:

The present study aimed to formulate and evaluate a herbal skin lotion incorporating *Millingtonia hortensis* (Indian Cork Tree) extracts prepared using aqueous and ethanolic extraction methods. The flowers were collected during peak blooming season and subjected to maceration (aqueous extract) and Soxhlet extraction (ethanolic extract). These extracts were incorporated into an oil-in-water lotion using beeswax, Carbopol 934, stearic acid, liquid paraffin, avocado oil, vitamin E, borax, citric acid, parabens, and rose water. The formulations were evaluated for physicochemical properties and antibacterial activity. The aqueous extract herbal lotion (AEH) showed better spreadability (8.5 cm) and higher antibacterial activity against *Pseudomonas aeruginosa* (20 mm zone of inhibition) compared to the ethanolic extract herbal lotion (EEH), which showed 7.9 cm spreadability and 15 mm inhibition zone. Both formulations were smooth, homogenous, non-irritant, and easily washable; however, their pH values were above normal skin range (5.5–6.5), indicating the need for optimization. The study confirms that *M. hortensis* contains bioactive phytoconstituents such as flavonoids, phenolics, and tannins that contribute to antimicrobial and skin-beneficial properties. The formulated herbal lotion demonstrates potential as a safe, eco-friendly, and effective topical formulation.

Keywords: *Millingtonia Hortensis, Herbal Lotion, Phytoconstituents, Antibacterial Activity, Cosmetic Formulation, Skin Care*

1. INTRODUCTION:

Herbal cosmetics have gained significant importance due to their safety, biocompatibility, and

minimal side effects compared to synthetic formulations. Herbal skin lotions are widely used for moisturization, protection, nourishment, and

treatment of skin disorders. A lotion is a semi-solid topical preparation designed to improve skin health and appearance. Modern skincare products often contain synthetic additives such as parabens and silicones, which may cause irritation or long-term adverse effects. In contrast, herbal formulations contain phytoconstituents such as flavonoids, tannins, phenolics, alkaloids, and essential oils that

exhibit antioxidant, antimicrobial, and anti-inflammatory activities.

Millingtonia hortensis (Indian Cork Tree) is a medicinal plant known for its pharmacological potential, including antioxidant and antimicrobial properties, making it a suitable candidate for topical formulations.



Fig: 1 Body Lotion

1.1 Types of Herbal Lotions:

Herbal lotions can be classified based on their usage:

- Moisturizing lotions (Aloe vera, Calendula)
- Anti-inflammatory lotions (Turmeric, Chamomile)
- Antibacterial lotions (Neem, Tea tree)
- Anti-aging lotions (Green tea, Ginseng)
- Acne treatment lotions (Witch hazel, Tea tree)

- Oil-based lotions
- Emulsion-based lotions
- Gel-based lotions

2. MATERIALS AND METHODS:

2.1 Plant Profile: *Millingtonia hortensis*

Common Names: Indian Cork Tree, Tree Jasmine
Family: Bignoniaceae

The plant is a tall deciduous tree with fragrant white tubular flowers. It contains phytochemicals such as flavonoids, tannins, phenolics, alkaloids, and essential oils responsible for its therapeutic properties.

1.2 Classification by Formulation:

- Water-based lotions



Flower



Tree



Leaves



Bark

Fig 2: *MillingtoniaOfficinalis*

2.2 Materials Used:

- Beeswax (Emulsifier)
- Carbopol 934 (Thickener)
- Liquid paraffin (Emollient)
- Stearic acid (Stabilizer)
- Vitamin E (Antioxidant)
- Borax (Emulsifier)
- Rose water (Soothing agent)
- Parabens (Preservatives)

2.3 Extraction of Plant Material:

Aqueous Extraction (Maceration):

- 50 g plant powder + 500 mL distilled water
- Macerated for 24 hours
- Filtered and concentrated at 40–50°C

Ethanollic Extraction (Soxhlet):

- 50 g powder extracted with 95% ethanol
- 6–8 hours continuous extraction
- Concentrated and stored in airtight container



Fig 3: Aqueous & Ethanollic Extract

2.4 Formulation of Herbal Lotion:

Oil phase (beeswax, stearic acid, liquid paraffin, avocado oil, vitamin E) and aqueous phase (extract,

preservatives, rose water, borax) were heated separately at 70–75°C and mixed under continuous stirring to form an oil-in-water emulsion. The formulation was cooled, homogenized, and pH-adjusted.

Table 1: Formulation Of Herbal Skin Lotion

S.NO	PHASE	INGREDIENTS	QUANTITY
1.	Oil phase	Bees wax	4g
		Carbopol 934	0.3g
		Liquid paraffin	15ml
		Stearic acid	2g
		Vitamin E	0.5ml
		Avocado oil	5ml
2.	Aqueous phase	Millingtonia extract	5ml
		Citric acid	0.5g
		Methyl paraben	0.05g
		Propyl paraben	0.02g
		Borax	0.5g
		Rose water	Q.S



Fig 4: Herbal Lotion

2.5 Evaluation Parameters:

- Appearance
- pH
- Viscosity
- Spreadability
- Washability
- Homogeneity
- Irritation test
- Antibacterial activity (agar well diffusion method)

3. RESULTS:

3.1 Physicochemical Evaluation

Table 2: Evaluation Of Herbal Lotion

Parameter	EEH	AEH
Colour	Yellowish white	Yellowish white
Odour	Rose-like	Rose-like
pH	8.2	10
Spreadability	7.9 cm	8.5 cm
Consistency	Greasy	Non-greasy
Viscosity	3.9 poise	0.01 poise
Irritation	None	None

Both formulations showed good cosmetic acceptability; however, pH was above skin compatibility range.

3.2 Antibacterial Activity:

Table 3: Anti – Bacterial Activity For Herbal Lotion

S.No	Microorganisms	Control	EEH	AEH	EE	AE	Ciprofloxacin
		Zone of inhibition in mm					
1.	<i>Pseudomonas aeruginosa</i>	-	15	20	2	1	40

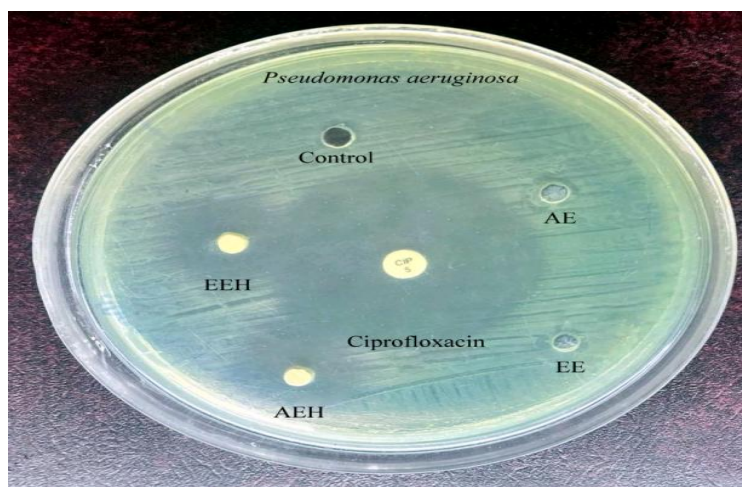


Fig 5: Anti – Bacterial Activity For Herbal Lotion

Against *Pseudomonas aeruginosa*:

- EEH: 15 mm
- AEH: 20 mm
- Standard (Ciprofloxacin): 40 mm

The aqueous extract formulation exhibited better antibacterial activity, likely due to higher availability of polar bioactive compounds.

3.3 Label:





Fig 6: Label & Instruction

4. DISCUSSION:

The results indicate that both aqueous and ethanolic extracts of *M. hortensis* contribute beneficial phytoconstituents responsible for antimicrobial activity and skin compatibility. The aqueous formulation showed superior spreadability and antibacterial efficacy, suggesting better dispersion and release of active compounds.

However, both formulations exhibited alkaline pH, which is not suitable for human skin and requires optimization. The presence of flavonoids and phenolic compounds supports the observed biological activity.

5. CONCLUSION:

The study successfully formulated and evaluated a herbal skin lotion containing *Millingtonia hortensis* extracts. Both formulations demonstrated good physicochemical properties and moderate antibacterial activity. The aqueous extract lotion showed better performance compared to the ethanolic formulation.

Although the formulation is safe and non-irritant, pH optimization is necessary for improved skin compatibility. Further studies on stability, clinical evaluation, and formulation refinement are recommended.

The study confirms the potential of *M. hortensis* as a promising natural ingredient for eco-friendly and effective cosmetic formulations.

6. REFERENCES:

1. Harborne JB. Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis. 3rd ed. Springer; 1998.
2. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 50th ed. Pune: NiraliPrakashan; 2017.
3. Trease GE, Evans WC. Pharmacognosy. 16th ed. London: Saunders Elsevier; 2009.
4. Khandelwal KR. Practical Pharmacognosy Techniques and Experiments. 23rd ed. Pune: NiraliPrakashan; 2014.
5. Mukherjee PK. Quality Control of Herbal Drugs. 2nd ed. New Delhi: Business Horizons; 2011.
6. World Health Organization. Quality Control Methods for Medicinal Plant Materials. Geneva: WHO; 1998.
7. Cowan MM. Plant products as antimicrobial agents. ClinMicrobiol Rev. 1999;12(4):564–582.
8. Eloff JN. Which extractant should be used for screening and isolation of antimicrobial components from plants? J Ethnopharmacol. 1998;60(1):1–8.
9. Sarker SD, Latif Z, Gray AI. Natural Products Isolation. 2nd ed. Humana Press; 2006.
10. Handa SS, Khanuja SPS, Longo G, Rakesh DD. Extraction Technologies for Medicinal and Aromatic Plants. Trieste: ICS-UNIDO; 2008.
11. Ansel HC, Popovich NG, Allen LV. Pharmaceutical Dosage Forms and Drug Delivery Systems. 9th ed. Lippincott Williams & Wilkins; 2012.
12. Aulton ME. Aulton's Pharmaceutics: The Design and Manufacture of Medicines. 4th ed. Elsevier; 2013.
13. Lachman L, Lieberman HA, Kanig JL. The Theory and Practice of Industrial Pharmacy. 3rd ed. Varghese Publishing; 2009.
14. Sharma PP. Cosmetics: Formulation, Manufacturing and Quality Control. 4th ed. Vandana Publications; 2010.
15. Barel AO, Paye M, Maibach HI. Handbook of Cosmetic Science and Technology. 4th ed. CRC Press; 2014.