IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

FORMULATION AND EVALUATION OF HERBAL WOUND HEALING CREAM FROM THE LEAVES OF lantana camara.

1. Dhomase Rohan shantaram*
2. Prof.Rayjade .M.S.
Asst.Professor, Matoshri Institute of Pharmacy Dhanore,Yeola
3.Shewale Dnyaneshwar Balu
4.Ahire Akshay Prakash

Abstract:-

Herbal cosmetics have gained popularity due to their natural composition and minimal adverse effects. Among these, herbal creams are extensively used for skincare, offering both therapeutic and protective benefits. This research focuses on developing and analyzing a herbal cream infused with leaves from lantana camara. a medicinal plant renowned for its broad pharmacological properties. The leaves is rich in bioactive compounds such as alkaloids, cardiac glycosides, and flavonoids, which exhibit antimicrobial, anti-inflammatory, wound-healing, and antioxidant effects. The herbal cream was formulated using an oil-in-water (O/W) emulsion base to ensure stability and efficient application on the skin.

Key physicochemical properties, including pH, spreadability, viscosity, and overall stability, were examined to evaluate the formulation's efficacy. Additionally, antimicrobial activity and skin irritation tests were conducted to determine the safety and therapeutic potential of the product. Findings revealed that the developed herbal cream possessed a suitable consistency, stability, and improved wound-healing and antifungal properties. This study underscores the potential of Calotropis gigantea latex in herbal cosmetic formulations, presenting a natural and effective option for skincare applications.

Keywords:- lantana camara, herbal cream.

Introduction :-

Creams are semisolid dosage forms that are meant to be applied topically to the skin, on the eye's surface, Or utilised nasally, vaginally, or rectally for medicinal or protective action. They can also serve an Aesthetic purpose. These preparations are utilised for the localised effects that the drug's penetration Into the skin's or mucous membrane's underlying layer produces at the application location. The skin is The intended organ for these devices' medication delivery systems, which are intended to treat cutaneous Ailments.[1]Oil-in-water (o/w) or water-in-oil (w/o) type semisolid emulsions that are meant for exterior Applications are referred to as cream. Creams frequently have two phases to them. Water-in-Oil (w/o) emulsions are emollient and cleaning agents, whereas oil-in-water (o/w) emulsions Are most helpful as water-washable bases. To disperse the aqueous phase in the oily phase or Vice versa, an emulsifying agent is employed.[2-3]Traditional medicines are less expensive, easily accessible, and comprehensive, especially in Developing nations, according to the World Health Organisation (WHO) and our nation.[4]

Fig No :- 1

Wound and the Healing Process :-

A wound can be described as any disruption or break in the structural, cellular, or functional integrity of the skin or underlying tissues. Wounds can be caused by various factors, such as physical injuries, chemical exposure, extreme temperatures, infections from viruses or microbes, and immune system reactions. Besides the physical damage, wounds can significantly affect a person's mental well-being, often leading to high treatment costs and permanent scarring. In simple terms, a wound is a break or opening in the skin due to external injury. The body responds to wounds through a complex healing process where cells contract, migrate, and attach to repair the damaged area. This process involves several critical steps, including platelet aggregation, blood clot formation, fibrin generation, inflammation, changes in extracellular substances, the growth of new blood vessels (angiogenesis), and the regeneration of skin cells (re-epithelialization). Collagen fibers play a crucial role by binding the wound edges together, eventually leading to scar formation to complete the healing. However, certain factors can slow down or complicate wound healing. The presence of free radicals can damage surrounding tissues,

hindering recovery. Additionally, several other factors — such as infections, nutritional status, medications, hormonal balance, wound type and location, and underlying medical conditions — can influence the rate and effectiveness of the healing process.(7)

Ayurvedic medicines for wound healing:-

Fig No: 2 lantana camara

Biological Source:- Dried or fresh whole plant, roots, leaves, flowers, and latex of lantana camara

Family: verbenaceae

Common Names: lantana weed (English) ,ghanari,(marathi).

Description:

Lantana camara is a large, erect, perennial shrub that can grow up to 4 meters tall.Leaves are large, oval, and grayish-green.Flowers are waxy, star-shaped, usually pale lavender or white, with a distinctive crown-like structure. It produces milky latex when parts of the plant are broken.(8)

Distribution:

Native to South Asia and Southeast Asia, commonly found in India ,africa, and Australia. Grows in dry, sandy, and alkaline soils, often along roadsides and wastelands.

Uses:

1)In traditional medicine, Lantana plants have been used for centuries.

2))These plants are also said to have anti-inflammatory, anti-bacterial, and anti-fungal properties.

3)So, in any case, exercising caution is very important when consuming anything that contains Lantana extracts in order to remain safe.

Phytochemicals:

Contains alkaloids, flavonoids, glycosides ,saponin and,tannins.

The plant is known for toxic properties if used improperly.(10)

Material And Methods:-

Formula:- (11,12,13,14)

SR.NO	Ingredients	F1C	F2C	F3C	F4C
1.	Lantana camara	0.5 gm	1 g	2 g	3 g
2.	Neem oil	1ml	1ml	1ml	1ml
3.	Methyl paraben	3gm	3gm	3gm	3gm
4.	Glycerin	1 gm	1 g	1g	1 g
5.	Bees wax	0.5g	1gm	2gm	3gm
6.	Caryophyllene	0.5gm	1gm	2gm	3gm
7.	Distilled water	Q.S	Q.S	Q.S	Q.S

Ingredients and their roles :-

SR.No	Ingredients	Role
1.	Lantana camara	Wound healing
2.	Bees wax	Emulsifying agent
3.	Neem oil	Antibacterial
4.	Glycerine	Humectant
5.	Methyl paraben	Preservative
6.	Caryophyllene	Anti inflammatory agent
7.	Distilled water	Vehicle

Methods:-

Collection of plants material :-

Selection: Pick fully developed, disease-free leaves from lantana camara plants thriving in clean, unpolluted surroundings.

Harvesting: Utilize sanitized scissors or a sharp blade to carefully trim the leaves, ideally in the early morning when the plant's medicinal components are most concentrated.(15)

Handling: Minimize leaf damage during collection to preserve the natural latex, which holds valuable therapeutic properties.(16)

Extraction process:-

Extraction Of lantana camara leaves:-

Fig No: 2

Materials Needed:

Fresh or dried lantana camera leaves

Solvent (e.g., ethanol, methanol, water, or a combination) Blender or grinder

Conical flask or glass jar Stirring rod

Filter paper or muslin cloth Rotary evaporator or vacuum evaporator (optional, for concentration) Storage containers.(17)

Procedure:

1. Preparation of Plant Material:

Collect fresh lantana camera leaves and wash them thoroughly with distilled water to remove dirt and contaminants.

Dry the leaves in shade to prevent loss of bioactive compounds.

Grind the dried leaves into a coarse powder using a grinder or mortar and pestle.

2. Maceration Process:

Weigh the required amount of leaf powder (e.g. 4 to 5 g).

Place the powder in a clean conical flask or glass jar.

Add the selected solvent in a ratio of 1:10 or 1:20 (w/v) depending on the extraction requirement. Stir the mixture to ensure uniform distribution.

Cover the container and leave it at room temperature for 24 to 72 hours, occasionally stirring to enhance extraction.

3. Filtration:

After maceration, filter the extract using muslin cloth or Whatman filter paper.

Repeat the filtration if necessary to remove all solid residues.

4. Concentration (Optional):

If required, concentrate the extract using a rotary evaporator or vacuum evaporator at a low temperature (40–50°C) to remove the solvent.

For aqueous extracts, evaporate the water under reduced pressure or by drying at a low temperature.

5. Storage:

Store the extract in amber-colored bottles at 4°C to prevent degradation.

If needed, further drying can be done using freeze-drying or spray-drying methods for powder form.(18)

Factors Affecting Extraction:

Solvent choice: Ethanol and alcohol are effective for extracting flavonoids, alkaloids, and phenolic compounds, while water is suitable for polar compounds.

Temperature: Room temperature is preferred to prevent degradation of heat-sensitive compounds.

Time: Longer maceration time enhances yield but may lead to unwanted degradation of compounds.(19)

Method for the Formulation of Cream :-

1.Oil Phase Preparation

Heat the oil-soluble ingredients (Stearic acid, Cetyl alcohol, Beeswax, Lanolin, Liquid paraffin to 70°C in a clean beaker. Ensure all components melt and mix uniformly**.**(20)

2.Aqueous Phase Preparation

In a separate beaker, heat the water-soluble ingredients (Glycerin, Propylene glycol, Methyl paraben, and Distilled water) to 70°C.

Stir continuously until the preservatives and humectants dissolve completely **.**(21)

3.Addition of Active Ingredient

Dissolve lantana camara extract in the aqueous phase before emulsification to ensure uniform dispersion **.**(22)

4.Emulsification Process

Slowly add the aqueous phase to the oil phase with constant stirring to form an emulsion.

Use a high-speed homogenizer or magnetic stirrer for proper emulsification .(23)

5.Cooling and Stability Adjustment

Allow the emulsion to cool gradually while stirring to maintain a smooth and homogenous texture. Adjust the pH between 5.5 and 6.5 for skin compatibility **.**

6.Packaging and Storage

Transfer the cream into sterile containers.

Store in a cool, dry place to maintain stability (24)

Evaluation Parameters:-

1.Organoleptic Properties:

The organoleptic properties such as colour, odour and Appearance was observed.

2.Determination of PH:

The pH value of freshly formulated emulsion was determined Using a digital pH meter at room temperature.

3.Determination of homogeneity:

The homogeneity of the herbal preparation was observed by Visual appearance and by touch.

4.Determination of spread ability:

The area to which the topical application spreads after Being administered to the skin's afflicted area is referred to as .The spread ability. The herbal formulation's therapeutic Effectiveness also depends on how widely it spreads. Determining the developed formulation's spreading Capacity is therefore necessary. A thin film of consistent

Thickness was created for the measurement by pressing Roughly 3 gramme of cream between the two glass slides. For five minutes, a weight of five grammes was placed

Over the top slide to exert the necessary pressure. The upper Slide was then pulled with the aid of a thread linked to a hook After the addition of around 10 gms of weight to a pan. Under a particular force, it was noted how long it took the Two slides to glide across one another by a distance of 10 cm. The spreadability of the prepared formulation can be

Determined using the formula listed below.

$S = m \times L/T$

Where,

S- Solubility

m- Weight tied to upper glass slide

L- Length moved on glass slide

T- Time taken.

The results were carried out in a triplicate manner and the Average of these readings were noted

5.Irritancy test:

The formulated cream shows no redness,edema, irritation and Inflammation during studies. The formulated cream is safe to Use.

6.Phase Separation :

Prepared cream is kept in tightly closed Container at room temperature away from sunlight and Observed for 24 hours for phase.

7.Washability:

Formulation was applied on the skin and then Ease extend of washing with water and checked.(25).

RESULT and DISCUSSION:

Evaluation Parameters

Physical Parameters

Sr.No	Parameters	F1C	F2C	F3C	F4C
1.	Colour	Faint green	Faint green	Faint green	Faint green
2.	Odour	Pleasant	Pleasant	Pleasant	Pleasant
3.	Texture	Smooth	Smooth	Smooth	Smooth
4.	State	Semi Solid	Semi Solid	Semi Solid	Semi Solid

Tabel:- Physical Parameters

Irritancy Test:-

Sr.No	Formulation	Irritant Effect	Erythema	Edema
1.	F1C	Nil	Nil	Nil
2.	F2C	Nil	Nil	Nil
3.	F3C	Nil	Nil	Nil
4.	F4C	Nil	Nil	Nil

Tabel :-Irritancy Test

Washability Test :-

Sr.No	Formulation	Washability
1.	F1C	Washable
2.	F2C	Washable
3.	F3C	Washable
4.	F4C	Washable

Table :- Washability Test

Phase separation:-

Sr.No	Formulation	Phase separation
1.	F1C	No Phase separation
2.	F2C	No Phase separation
3.	F3C	No Phase separation
4.	F4C	No Phase separation

Table :-Phase separation

Conclusion:-

The formulation and evaluation of an herbal cream using the leaves of Calotropis gigantea have demonstrated promising results in terms of physicochemical stability, therapeutic potential, and skin compatibility. The phytochemical screening confirmed the presence of bioactive compounds such as flavonoids, alkaloids, and tannins, which contribute to the cream's antimicrobial, anti-inflammatory, and wound-healing properties. The optimized formulation exhibited desirable characteristics, including appropriate pH, viscosity, spreadability, and stability over time.

Microbiological evaluations confirmed that the herbal cream effectively inhibited the growth of selected bacterial and fungal strains, suggesting its potential use as a natural antimicrobial agent. In addition, no significant skin irritation was observed during preliminary safety assessments, indicating its suitability for topical application.

Compared to conventional synthetic creams, the herbal formulation offers a safer and more eco-friendly alternative, free from harmful chemicals and artificial preservatives. However, further in-depth studies, including clinical trials and long-term stability assessments, are necessary to confirm its efficacy, safety, and commercial viability. Future research should also explore enhancements in formulation techniques to improve absorption, bioavailability, and user acceptability.

In conclusion, the herbal cream formulated from Calotropis gigantea leaves presents a promising natural remedy with potential dermatological applications. With continued research and development, it could serve as a cost-effective and sustainable alternative for treating various skin conditions**.**

Reference:

1.Mahalingam RC, Xiaoling L, Bhaskara RJ. "Semisolid Dosages: Ointments, Creams and Gels", Pharmaceutical Manufacturing Handbook. 2006; 2(3): 267-274.

2.Singh M, Sharma S, Khokra LS, Kumar SR. "Preparation and evaluation of herbal Cosmetic Cream", Pharmacologyonline. 2011; 5(2):1258-64.

3.Das K, Dang R, Machale MU, Ugandar R, Lalitha B. "Evaluation for safety assessment of Formulated vanishing cream containing aqueous Stevia extract for topical application. Ind J Novel Drug Deliver. 2012; 4(1):43-51.

4.Khalid AS, Saringat HJ, Khan GM. "Haruan (Channa striatus) incorporated palm-oil Creams: Formulation and stability studies". Pak J of Pharm Sci. 2005; 18(1):1-5.

5.Biswas TK, Mukherjee B, "Plant medicines of Indian origin for wound healing activity: a Review" The international journal of lower extremity wounds, 2003; 2(1):25-39.

6.Kiran K, Asad M, "Wound healing activity of Sesamum indicum L seed and oil in rats"

7.Hayakawa H, Minaniya Y, Ito K, et al. Difference of curcumin content in lantana camera L. (Verbenaceae) caused by hybridization with other Curcuma species. Am J Plant Sci. 2011;2(2):111–119.

8.Reddy AKG, Saranya SC, Kumar ACK. "Wound healing potential of Indian medicinal Plants". Int J Pharm Rev Res. 2012; 2(2):75-87.

9.Girijashankar V. Micropropagation of multipurpose medicinal tree lantana camara Journal of Medicinal Plants Research, 5:462-466, 2011

10.Ross and Wilson. Anatomy and Physiology in Health and Illness, 11e.

11.James WD, Berger TG, and Elston DM, Andrews' Diseases of the Skin: Clinical Dermatology. (10th ed.) 2006, Philadelphia; Elsevier Saunders: 2006, p. 1.

12.Singh S, Sharma N, Evaluation of Wound Healing Activity of lantana camara A. Cunn. Stem Bark. Asian Journal of Pharmaceutical and Clinical Research, 7:204-207, 2014.

13.Myers D, Surfactant Science and Technology, VCH Publishers: 1992, Pp. 209-247

14.Christaki EV, Florou-Paneri PC. Aloe vera: A plant for many uses. J Food Agric Environ. 2010; 8(2): 245-249.

15.Araujo CA, Leon LL. Biological activities of Curcuma longa L. Mem Inst Oswaldo Cruz. 2001;96(5):723–728.

16.Sah AK, Vijaysimha M, Mahamood M. The tulsi, queen of green medicines: Biochemistry And pathophysiology-a review. Int J Pharm Sci Rev Res. 2018; 50(2): 106-114.

17.CABI, 2013: lanta camera Forestry Compendium 2013. www.cabi.org/fc[cited 2013].

18. Doran C J, Turnbull J W. Australian trees and shrubs: species for land rehabilitation And Farm planting in the tropics. The Australian Centre for International Agricultural Research Proceedings, 24:112-114, 1997.

19. Sahai R, Agarwal S K, Rastogi R P. Auriculoside, a new flavan glycoside from lantana camara. Phytochemistry, 19:1560-1562, 1980.

20. Garai S, Mahato S B. Isolation and structure elucidation of three triterpenoid saponins From lantana camara. Phytochemistry, 44:137-140, 1997.

21. Chakraborty T, Sinhababu S P, Sukul N C. Antifilarial effects of a plant lantana camara on Canine dirofilariasis. Tropical Medicine, 37:35-37, 1995.

22. Okokon J E, Jackson O, Opara K N, Emmanuel E. In-vivo antimalarial activity of ethanol Leaf extracts of lantana camara. International Journal of Drug Development and Research, 2:482-487, 2010.

23. Mandal P, Sinhababu S P, Mandal N C. Antimicrobial activity of saponins from lantana camara Fitoterapia, 76:462-465, 2005.

24. Singh R, Singh S, Kumar S Arora S. Evaluation of antioxidant potential of ethyl acetate Extract/fractions of lantana camara A. Cunn. Food and Chemical Toxicology, 45:1216-1223, 2007.

25. Sathya A, Siddhuraju P. Protective effect of bark and empty pod extracts from lantana camara against paracetamol intoxicated liver injury and alloxan induced type II Diabetes. Food and Chemical Toxicology, 56:162-170, 2013.