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FORMULATON AND EVALUATION OF ANTIMICROBIAL CREAM OF ARGEMONE MEXICANA L. , NEEM, TURMERIC EXTRACT

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ABSTRACT :-

Now a day's herbal medicine has great impact on human health and disease. Herbal medicine plays a important role in overall aspect such as economical and medicinal. Although uses of these herbal medicines is increased day by day because of their quality, efficacy, and safety. The present research study focuses on the formulation and evaluation of an antimicrobial cream incorporating extracts of Argemone Mexicana, neem (Azadirachta indica), and turmeric (Curcuma longa). The herbal ingredients, known for their traditional medicinal uses, were selected for their broad-spectrum antimicrobial properties. Ethanolic extracts of the plants were prepared and incorporated into a cream base using standard formulation techniques. The resulting herbal cream was subjected to physicochemical evaluations, including pH, viscosity, spreadability, and stability testing. Antimicrobial activity was determined against common bacterial (lactobacillus) and fungal strains using the agar well diffusion method. Results demonstrated that the cream exhibited significant antimicrobial activity, with notable inhibition zones against Lactobacillus, and Candida albicans.

KEYWORD :- Argemone Mexicana, Neem, Turmeric, Extraction, Antimicrobial activity, Cream, Formulation.

I. INTRODUCTION :-

Cream are semisolid dosage forms and intended for topical application to the skin on the surface of skin for therapeutic or protective action or cosmetic function. These preparations are used for the localized effects produced at the site of their application by drug penetration in to the underlying layer of skin or mucous membrane. These products are designed to deliver the drug into the skin in treating dermal disorders, with the skin as the target organ. They are divided into two types: oil in-water (O/W) ointment which are composed of small droplets of oil dispersed in a continuous phase, and water-in-oil (W/O) ointment which are composed of small droplets of water dispersed in a continuous oily phase.

Argemone mexicana is traditionally used in folk medicine for treating wounds, skin infections, and inflammation due to its antibacterial and antifungal properties. Neem, often referred to as the "village pharmacy," possesses a broad spectrum of antimicrobial, anti-inflammatory, and healing effects, making it ideal

for skin care formulations. Turmeric, rich in curcumin, is well-known for its strong antibacterial, antifungal, and antioxidant activities, contributing to the prevention and treatment of various skin disorders.

Combining these natural extracts into a topical cream offers a synergistic approach to enhancing antimicrobial effectiveness while minimizing the risk of adverse effects associated with chemical formulations. This study aims to develope a herbal antimicrobial cream using Argemone mexicana, neem, and turmeric extracts and to evaluate its physicochemical properties and antimicrobial efficacy. The goal is to create a stable, effective, and natural topical preparation that can serve as an alternative treatment for bacterial and fungal skin infections.

II. PLANT PROFILE :-

- **Argrmone Mexicana Linn. :-**

Fig.1 Argemone maxicana

Common Name: Mexican Poppy, Prickly Popp, Ghamoya, Shialkanta, Satyanashi, Bilayti.

Scientific Name:-Argemone mexicana L.

Family: Papaveraceae (Poppy family).

Major Chemical Constituents: Sanguinarine, Dihydrosanguinarine, Berberine, Protopine, Allocryptopine, Argemonine, Chelerythrine, Coptisine.Quercetin, Rutin, Kaempferol, Ferulic acid, Sinapic acid, Caffeic acid, Argemonoside. Argemone saponin

Uses :- antioxidant activity comparable to free radical scavenging activity of ascorbic acid , antimalarial activity, anti-helminthic, anti-inflammatory, wound healing, antibacterial, antifungal activities.

- **Neem :-**

Fig. 2 Azardirchta Indica

Botanical Name: Azadirachta Indica

Family: Meliaceae

Synonyms: Neem

Biological Source: Fresh or dried leaves and seed oil of Azadirachta Indica.

Chemical Constituents: Natural compounds present in Neem are Triterpenes or Limonoids Azadirachtin, Salannin, meliantriol and nimbin are well known the bitter constituents The nimbin contains an acetoxy, a Lactone, an ester, a methoxy and an aldehyde group.

Medicinal uses: Acne treatment, Oral, skin and hair care, Anti-wrinkle and anti- aging, Skin Disorders, Dermatitis prevention, Skin whitening.

- **Turmeric :-**

Fig. 3 Curcuma longa

Botanical Name: Curcuma longa and Curcuma aromatica

Family: Zingiberaceae

Synonyms: Haldi, manjal, Indian saffron curcuma

Biological Source: It is a dried rhizomes of Curcuma Longa

Chemical Constituents: Turmeric powder is about 60-70% carbohydrates 6-13% water, 6-8%proteins, 5-10% fat, 3-7% dietary mineral, 3-7% essential oils, 2-7% dietary fibre, 1-6% curcuminoids. Phytoconstituents of turmeric include diarylheptanoids, a class including numerous curcuminoids- Curcumin, demothoxycurcumin, and bisdemethoxycurcumin.

Medicinal uses of Turmeric : When applied topically to aseptic and septic wounds, it seems to have good promise as a wound healing powder. Additionally, it is used to prevent, treat, or manage psoriasis as well as other skin disorders such acne, burns, eczema, UV damage to the skin, and early ageing. These qualities could provide the skin brightness and shine. Additionally, turmeric may benefit your skin by enhancing its natural brightness.

III. METHOD AND MATERIALS:-

Collection of Plants :-

Argemone mexicana Linn leaves was collected from Digras city, Yavatmal.leaves of Ficus religiosa, leaves of Azadirachta indica and rhizomes of Curcuma longa were collected from the botanical garden of Ishwar

Deshmukh Institute of Pharmacy. Soon after the collection, parts of these plants are cleaned, dried in shade and crushed to a coarse powder, and stored in an air tight plastic container, until further use.

Method of preparation of extract:-

a. Argemone mexicana L. Extract :- (By Maceration Method)

1. Take a 30 gm of powdered leaves are soaked in 100 ml of 99.9% v/v Ethanol, and kept for maceration for about 3 to 4 days with occasional shaking.

2. After a couple of days filter the content of conical flask by using filter paper in the beaker and transfer the content into china dish.

3. Take the china dish over the boiling water bath to evaporate the sample and dried the ethanolic content completely.

4. After drying remove the china dish from the water bath you can see the solvent is completely evaporate and ethanolic extract is completely dried.

Fig 4. Method of preparation of argemone mexicana extract

b. Turmeric extract :- (by maceration extraction method)

1. Take 20 gm of dried portion was poured in 200 ml of methanol. Later it was suspended for 48 hours by stirring it from time to time.

2. After that it was sorted out by using Whatman no.1 filter paper and filtrate was collected into china dish.

3. Filtrate was evaporated on water bath to obtain semi solid extract.

C. Neem :- (by maceration method)

1. Take 15 gm of dried portion was poured in 150 ml of methanol. Later it was suspended for 72 hours by stirring it from time to time.

2. After that it was sorted out by using Whatman no.1 filter paper.

3. filtrate was collected and evaporated on water bath to obtain semi solid extract.

Antimicrobial activity of extract :-

Antimicrobial activity was done by well agar diffusion method to determine MIC of the extracts. Muller Hinton agar was prepared for bacteria and sabouroud agar was prepared for fungi according to manufacturer directions. Different concentrations of extracts (ethanolic and methanolic) from (0.4 – 50 mg/ml), dispersed in DMSO, and wells were made by cork-borer, 4-5 wells in each plate; 6mm diameter holes were cut in the agar, 20 mm between one and another on agar. Each well was incorporated with 40µl of serially extract concentrations. Then these plates were incubated in the incubator for 24 hours at 37°C for bacteria and for 48hours at 28°C for fungi and the result was recorded.

Formulation Table:

Sr.No.	Ingredients	Quantity	Function
1.	Argemone mexicana L. extract	0.4 g	Antimicrobial activity.
2.	Turmeric extract	0.4 g	Antimicrobial activity, anti-inflammatory activity.
3.	Neem extract	0.4 g	Antifungal activity, Antibacterial activity .
4.	Bees wax	1.6 g	Thickening agent.
5.	Emulsifying wax	1 g	Emulsifier.
6.	Stearic acid	1g	Thickener and stabilizer.
7.	Cetyal alcohol	0.4 g	Emollient.
8.	Coconut oil	1.6 g	Moisturizer and carrier for active ingredient.
9.	Glycerine	1 g	Humectant (moisture retention).
10.	Distilled water	11 g	Solvent.
11.	Tea tree oil	0.2 g	Fragrance.
12.	Methyl paraben	0.1 g	Preservative.
13.	Citric acid	0.1 g	pH adjustcent.

Table 1. List of Ingredients

Method of preparation of Antimicrobial Cream :-

Oil in water (o/w) cream base was prepared by using emulsification technique. Firstly, all excipients and the extract were weighed accurately by calibrated analytical balance as shown in table (1). The oil phase was prepared where 1 gm of emulsifying wax and 1.6 gm of bees wax was added to and heated until molten after that 1gm of stearic acid, cetyal alcohol was added to them with stirring, and 1.6 gm coconut oil/almond oil was added with continuous stirring. The aqueous phase was prepared by add 1 g of glycerin then 11 g of distilled water heated seperately. the both phases (oily phase and aqueous phase) were heated to the same temperature 60-70 °C. the aqueous phase was added gradually to the oily phase with continuous stirring. After that 0.4gm of the A.P.I. (Argemone mexicana extract, turmeric extract and neem extract) was added. Then add 0.2 g of tea tree oil, and 0.1 g of pottasium sorbate as preservative. The add 0.1 Gram of citric acid to adjust the pH (5.5-6.5). Then the mixture was kept to cooling down until the thicken. After that the prepared cream was transfer into the sterile container.

Evaluation parameter :

1. Physics Evaluation:-

Sr. No.	Parameter	Observation
1.	Colour	Green
2.	Odour	Pleasant
3.	Texture	Smooth
4.	Test	Semi-solid

Table 2. Physical evaluation parameters of cream

2. Irritancy :-

Mark the area (1cm2) on the left-hand dorsal surface. After that, the cream was administer there, and the duration was recorded. Then it is checked for irritancy, erythema, and edema if any for an interval up to 24 h and reported. According to the results, the formulation is showing no sign of irritancy, erythema, and edema.

3. Washability :-

Applying a small quantity of cream to the hand and then washing it with tap water served as the wash ability test.

4. Phase Separation :-

The prepared cream was kept in a closed container at a temperature of 25-100 °C away from light. The phase separation was then monitored for24 hour for 30 days. Any change in the phase separation was observed/checked. According to the results, no phase separation was observed in the formulation

5. Spreadability :-

The spreadablity of the formulation was carried out and the time taken by the 2 slides to separate is less so as said in the description of the evaluation test lesser the time taken for separation of the two slides better the spreadablity so according to this state better spreadablity.

6. Greasiness :-

Here the cream was applied on the skin surface in the form of a smear and checked if the smearwas oily or grease-like. According to the results, we can say that the formulation were non greasy.

7. pH :-

According to the results, the pH formulation was found to be 6.41 so it can be safely used on the skin.

8. Antifungal activity :-

• Take a slice of bhakri. Sprinkle some water on both sides of bhakri slice.

• Place a bhakri slice in a container closed it and wait for 3 to 5 days.

• After 5 days we can observe cluster of tiny plants on bhakri slice, mould

(Aspergillums) is a type of the fungi that grow on bhakri.

• After growing the fungus on bread add extract on the bhakri.

• After adding our extract of Argemone mexicana wait for a 2 days.

Result :-

The present study was done to prepare and evaluate the herbal cream. For this the herbal extracts were prepared by using simple maceration process to obtain a good yield of extract and there was no any harm to the chemical constituents and their activity. The physicochemical properties were studied which shows satisfactory results for spreadablity, pH, irritancy, Washability, Solubility, etc.

Fig 7. Final product

Evaluation parameter	Observation
Apperance	Semi solid in nature
Colour	Green
Odour	Pleasant
pH	6.41
Spreadablity	Easily speadable
Consistency	Smooth
Skin irritation test	No irritation
Washability	Easily washable
Phase separation	No separation

Table 3. Observational tablet

Conclusion :-

From our ancient period, herbal plant parts and crude drugs were directly used as a medicine. But in this research paper it is formulated with new cream. The plant and their parts such as Argemone mexicana L. (leaves), Azadirachta indica (leaves), and Curcuma longa (rhizomes) was taken for this present study and formulated for cream. And their properties. As this cream (O/W) formulation was found to be good with characteristics w.r.t such as pH, viscosity, spreadability, etc. As this formulation was successfully prepared with help of cream base which contains ceatyl alcohol, bees wax, stearic acid, etc. As a preservative methyl paraben were used. Sample of this formulation shows anti-microbial activity against lactobacillus. As this individual extracts have different properties such as hepatoprotective activity, skin infection, anti-inflammatory, antioxidant activity, wound healing, etc which is already proved in other papers. As mixture of this extracts, develop in new cream formulation in this present which will show this entire properties and can be effective and safe. Thus it is concluded that growing demand for herbal formulation in the market is increasing day by day due to it is safe and effective. And one of the reason behind this formulation is its better absorption and penetration of the active moiety into the skin for early and better effect.

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