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AIM & OBJECTIVE:

AIM:

Formulation & evaluation of multi-purpose cream is a way to increase drug application for skin problems.

OBJECTIVES:

1) To formulate and evaluate multi-purpose cream.
2) To demonstrate herbal drug applications by cream.
3) To formulate mosquito repellent cream.

ABSTRACT:

Nowadays there are many herbal cream formulations but most of theme only contains single active ingredient. But we can formulate a formulation which has multiple therapeutic activity In this research paper we will have to overview about formulation aspects and evaluation of medicated cream having multiple purpose property including mosquito repellent activity. Also cream are conventional dosage forms for all type of population. Cream containing curcumin, neem, aloe, amla, tulsi have their particular pharmacological activity on the human body. Curcumin has antibacterial and antiseptic action. Neem has antibacterial, acne pimple and wound healing activity. While aloe has anti acne activity. Amla has real potent anti inflammatory activity (Rasayana of Ayurveda), due to its multiple pharmacological actions. Cream containing multiple herbal medications can be proven a good therapeutic dosage form for all age groups. In this research article we will study about formulations of multi-purpose herbal cream and their evaluations.

INTRODUCTION:

Cream is defined as semisolid emulsions which are oil in water (o/w) or water in oil (w/o) type and these semisolid emulsions are intended for external application. Cream is classified as oil in water and water in oil emulsion. It is applied on outer part or superficial part of the skin and its main ability is to remain for a longer period of time at the site of application. The function of a skin cream is to protect the skin against different environmental condition, weather and gives soothing effect to the skin. There are different types of creams like cleansing, cold, foundation, vanishing, night, massage, hand and body creams. The main aim of our work is to develop a herbal cream which can give multipurpose effect, like moisturizer, reduce acne and skin irritation, reduce skin diseases like eczema, psoriasis, dry skin, wrinkles, rashes etc. and also adding glow to the face. We have used three herbal ingredients in our preparation which are Aloe Vera gel, Neem, Tulsi. Aloe Vera gel is used as a moisturizer, to reduce pimples and acne and also used for treatment of burn wounds. Neem is used as an antifungal and anti-inflammatory and it is also used to reduce scar, pigmentation, redness and itching of the skin. Tulsi is used to add glow to the skin and to promote wound healing.[1]

Now a days the demand of herbal cosmetics are increasing day by day. Herbal formulations are receiving more concentration in public because of their high-quality properties and less side effects. Additionally, it also provides the skin with necessary nutrients.1 The poly herbal cosmetic formulations are receiving recognition all over the world, as they give the enhanced feeling of purity, protection and effectiveness.[2]

LITERATURE REVIEW:

1) Archana Dhyani, Vikas Chander, Dr. Nardev Singh, Formulation and Evaluation of Multipurpose Herbal Cream, Journal of Drug Delivery & Therapeutics, 2019.

Herbal cosmetics are the preparations used to improve the individual appearance. The aim of the present study was to prepare the herbal cream for the use of moistening, nourishing and cure of various disease of the skin. Different crude drugs like Aloe barbadensis (Aloe Vera leaves), Azadirachta indica (Neem-leaves), Curcuma longa (Turmeric-rhizomes) and Emblica officinali (Amla) are used to formulate the cream. The selection of ingredients based on the different medicinal properties of the agents. The cream is subjected to various evaluation parameters.

2) Nikhil Nitin Navanagar, k. A. Kamalapurkar, Prashant s. Chavan, formulation and evaluation of multipurpose herbal cream, international journal of current pharmaceutical research vol 12, issue 3, 2020.

Cream is defined as semisolid emulsions which are oil in water (o/w) or water in oil (w/o) type and these semisolid emulsions are intended for external application [1]. Cream is classified as oil in water and water in oil emulsion. It is applied on outer part or superficial part of the skin and its main ability is to remain for a longer period of time at the site of application. The function of a skin cream is to protect the skin against different environmental condition, weather and gives soothing effect to the skin. There are different types of creams like cleansing, cold, foundation, vanishing, night, massage, hand and body creams. The main aim of our work is to develop a herbal cream which can give multipurpose effect, like moisturizer, reduce acne and skin irritation, reduce skin diseases

3) Ms. Shubhangi Sharad Bhide, Ms. Babita Himmatrao More, Ms. Suvarna Prabhakar Gajare, Mr. Sachin Vinayak Tembhurne, Bhide et al, "Development of mosquito repellent formulations and evaluation for its activity, World Journal of Pharmaceutical Research Vol 3, Issue 2, 2014.

The demand of cosmetics due to the availability of herbal cosmetics is increasing predominantly. Herbal formulations are receiving more concentration in public because of their high-quality properties and less side effects. Additionally it also provides the skin with necessary nutrients and required moisture. The herbal cream is basically water in oil type of emulsion. The natural ingredients chosen for preparation of herbal cream are turmeric, papaya, aloe-vera, tulsi, and neem. The choice of these ingredients is based on their individual properties. Aloe vera is used as a moisturizer and anti-acne agent (Christaki EV and Florou-Paneri PC, 2010) (Figure 1). Turmeric is an Asian cosmetic useful to impart a golden radiance to the complexion. It also provides anti-inflammatory and antiseptic properties

TRANSFLUTHRIN: A SUICIDAL POISON:

Transfluthrin, if used contrary to product instructions, may cause symptoms of poisoning including nervousness, anxiety, tremor, convulsions, skin allergies, sneezing, running nose and irritation. Treatment depends on symptoms. No specific antidotes are known, but antihistamines may help to control any allergies. Transfluthrin is a poisonous chemical that use in mosquito repellent liquids. Transfluthrin is being used as fast acting insecticide and liquid mosquito repellent. Case report of poisoning with transfluthrin (90 ml liquid containing 792 mg of transfluthrin) by a 25-year-old female. Tonic-clonic convulsions were not controlled with conventional drugs. In intensive care unit, patient was managed with muscle paralysis by neuromuscular blocking drug vecuronium and elective mechanical ventilation for more than 48 h under care of the anaesthesiologist with uneventful recovery. In experiments, transfluthrin was shown to kill 85 percent of mosquitos within one hour of exposure at concentrations below 0.3 µg/m3 (which was the detection limit) in air. (The data suggests that transfluthrin is effective at these concentrations within much less than an hour of exposure.)

Control of Mosquito Borne Diseases

Mosquito control and personal protection from mosquito bites are currently the most important measure to control this disease. Prevention of this type of disease involves protecting yourself against mosquito bites. Mosquito control methods are habitat Change, biological control, physical control and chemical control including individual safeguards from the mosquitoes. Among the Approaches for control of these mosquitoborne diseases is the interruption of the disease transmission by killing or preventing Mosquitoes from biting a human being. This can be achieved by use of repellents. [3]

What is a mosquito repellent?

A mosquito repellent is a substance applied to skin, clothing, or other surfaces which discourages mosquitoes from landing on that Surface. It is a substance that is synthesized in such a manner so that it makes the surface unpleasant and unattractive to mosquitoes So as to reduce the human mosquito contact. Mosquito repellents repel insects but do not kill them. Therefore, they are not technically Insecticides nor pesticides. They help prevent and control the outbreak of mosquito borne diseases such as Dengue fever, Malaria, Yellow fever, Japanese Encephalitis, etc. They contain active ingredient which is the only reason to repel mosquitoes by blocking Their olfactory senses which detects the carbon dioxide and lactic acid that gets released when the human perspires. These products Also contain some more ingredients which aids them with cosmetic finishing.[4]

METHOD OF EXTRACTION:

1) CURCUMIN:

Soxhlet extraction method

50 gm of dried curcumin bulb grinded coursly . Then extraction takes place in Soxhlet apparatus using 180 ml ethanol as a solvent. Extractive value find out using following formula.

% Extractive value = Dried extract weight /course powder weight x 100

Alcohol soluble extract value = **12%**

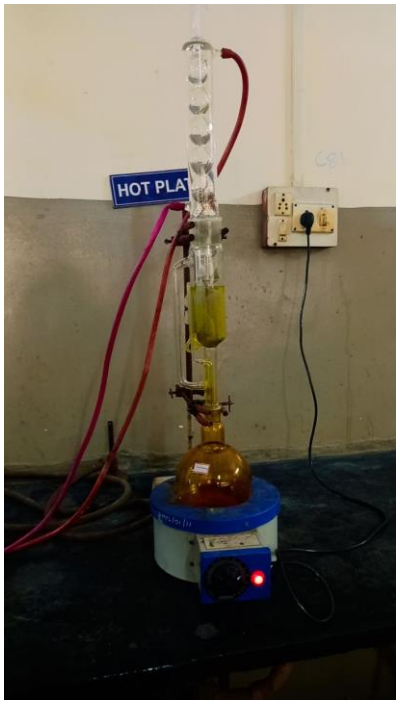


Fig 1. Extraction of curcumin

2) NEEM:

Soxhlet extraction method

40 gm of dried neem leaves grinded coursly . Then extraction takes place in Soxhlet apparatus using 180 ml ethanol as a solvent. Alcohol soluble Extractive value was found to be **12.5%**

Fig. 2. Extraction of neem

3) ALOE:

Collect mature and fresh aloe-vera leaf from plant and washed it with distilled water. Dried it is hot air oven. Leaf dissected longitudinally by sterile knife. The semi-solid aloe-vera is collected. Remove fibers and impurities form it. Aloe-vera extract is obtained.

Fig. 5. Extraction of Alove

4) AMLA:

Amount of amla seeds (10g) and quantity of solvent (150 ml) are kept constant. 10 g of seeds were crushed and extracted with Petroleum ether (60-80) ºC LR for different temperature and time in Soxhlet apparatus. The extract was concentrated under reduced under rotary evaporator.

5) TULSI:

Soxhlet extraction method

40 gm of dried neem leaves grinded coursly . Then extraction takes place in Soxhlet apparatus using 180 ml ethanol as a solvent. Alcohol soluble Extractive value was found to be **12.5%**

Fig. 5 Extraction of Tulsi

PHYTOCHEMICAL SCREENING OF HERBAL EXTRACTS:

For the confirmation of phytoconstituents present in the herbal extract phytochemical screening by the chemical test is performed. The confirmatory qualitative phytochemical screening of plant extracts was performed to identify the main classes of compounds (tannins, saponins, flavonoids, alkaloids, phenols, glycosides, steroids, and terpenoids) present in the extracts following standard protocols.

For determination and confirmation of different phytoconstituents present in herbal extracts phytochemical screening was performed. Chemical reactions of phytoconstituents with different chemical reagents gives presence or absence of chemical compound present in herbal extract. Each compound has their characteristic pharmacological action.

The presence of such a chemical compound assures that herbal extract can show that particular pharmacological action. A different chemical test was done for detection of Alkaloids, Flavonoids, Phenol, Tannin, Saponin, Anthraquinone, Volatile oil, Steroid, Ascorbic acid, Glycoside, Reducing sugar, Phlobatannin, Amino acid, Resin, Balsams, Acid test, Chalcone. The presence of phytoconstituents in herbal extracts was found to be as follows:

1) Test for tannin

0.5 g of plant extract was mixed with 2mL of water and heated on water bath. The mixture was filtered and 1mL of 10% $FeCl_3$ solution was added to the filtrate. A blue-black solution indicates the presence of tannin.

2) Test of flavonoid

5 mL of distilled water and about 0.2 g of plant extract were mixed thoroughly. And 1 mL of 1% $AlCl_3$ solution was added and shaken. A light yellow precipitate indicates the presence of flavonoids.

3) Test for phenol

About 0.5 g of plant extract was added to 1 mL of 10% $FeCl_3$ solution. A deep bluish green colouration was an indication for the presence of phenol.

4) Test for saponin

About 0.2 g of plant extract was shaken with 4 mL of distilled water and then heated to boil on a water bath. Appearance of creamy miss of small bubbles (Frothing) shows the presence of saponin.

5) Test for ascorbic acid

About 0.5 g of plant extract was added to 2 mL of acetic acid and it was shaken for 3 minutes and then filtered. Few drops of 2, 6-Dichlorophenolinddophenol solution were added to the filtrate. The presence of faint pink colour confirms that ascorbic acid is present.

6) Test for reducing sugar

2 mL of distilled water and 0.2 g of plant extract were mixed together and thoroughly shaken in a test tube. 1 mL each of Fehling solution A and B were added to the mixture. A brick-red precipitate at the bottom of the test tube confirms the presence of reducing sugar.

7) Test for glycoside

0.2 g of plant extract and 2.5 mL of dilute sulphuric acid were mixed together and boiled for 15 minutes, cooled and neutralized with 5 mL each of Fehling solution A and B. The formation of brick red precipitate confirmed glycoside.

8) Test for steroids (Salkowski test)

0.2 g of plant extract and 2 mL of chloroform were added together, 2 mL of concentrated sulphuric acid was added to form a layer. The formation of a violet/blue/green/reddish-brown ring at the interface indicates the presence of steroidal ring.

9) Test for alkaloids

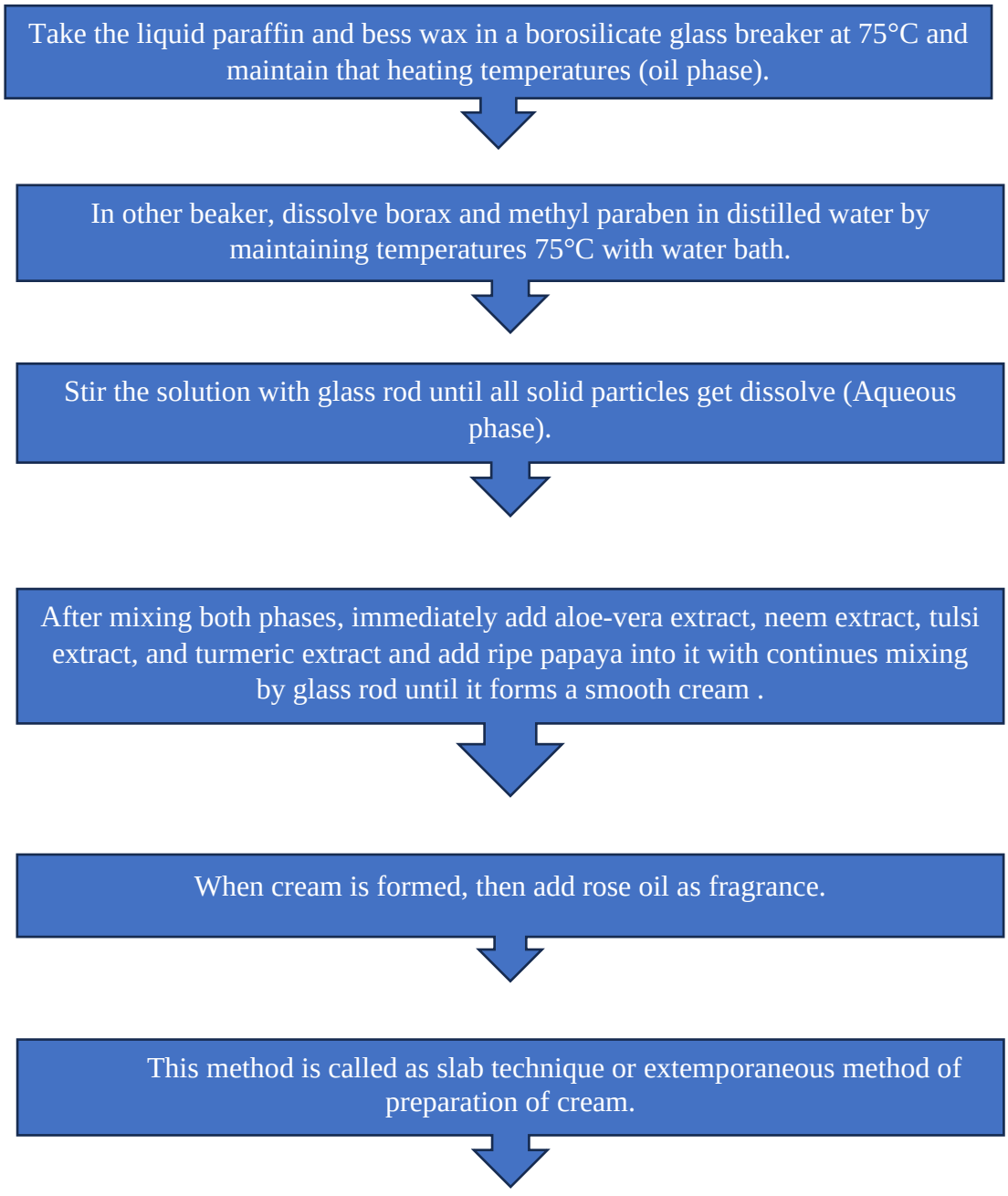
2ml of 1% HCl was mixed with crude extract and heated gently. After heating, Mayer's And Wagner's reagents were added to the mixture. If precipitate was observed in the reaction mixture which indicated the presence of alkaloids.

Extract	Alkaloid	Flavonoid	Phenols	Tannins	Saponin	Anthraquinone	Steroid	Glycoside	Reducing sugar
Curcumin	+	+	-	+	+	-	-	-	-
Neem	+	+	+	+	+	-	-	+	-
Tulsi	+	+	-	+	+	-	-	+	+
Amla	-	+	+	+	-	+	-	-	-
Aloe vera	-	+	-	+	+	-	+	+	-

Table 1. Phytochemical Screening Of Herbal Extracts

MATERIALS AND METHODS:

Powdered crude drug of curcumin, neem, tulsi and amla was purchased from commercial sources. All other excipients and chemicals was obtained from college laboratory.



FORMULATION OF CREAM:

Take the liquid paraffin and bess wax in a borosilicate glass breaker at 75°C and maintain that heating temperatures (oil phase). In other beaker, dissolve borax and methyl paraben in distilled water by maintaining temperatures 75°C with water bath. Stir the solution with glass rod until all solid particles get dissolve (Aqueous phase). The gently add heated aqueous phase in heated oily phase with continue stirring). After mixing both phases, immediately add aloe-vera extract, neem extract, tulsi extract, and turmeric extract and add ripe papaya into it with continues mixing by glass rod until it forms a smooth cream .

When cream is formed, then add rose oil as fragrance. Put this cream on the slab and add few drops of distilled water if necessary and mix the cream in a geometric manner on the slab to give a smooth texture to the cream and to mix all the ingredients properly. This method is called as slab technique or extemporaneous method of preparation of cream.

INGREDIANTS	QUANTITY		
	F1	F2	F3
Curcumin	100 mg	200 mg	300 mg
Neem	100 mg	150 mg	200 mg
Aloe	0.5 ml	01 ml	1.5 ml
Amla oil	0.5 ml	01 ml	1.5 ml
Tulsi	50 mg	100 mg	150 mg
Bees wax	3 gm	3 gm	3 gm
Liquid paraffin	2 ml	2 ml	2 ml
borax	100 mg	150 mg	200 mg
Methyl paraben	10 mg	15 mg	20 mg
lanolin	13 gm	10 gm	15 gm
Rose oil	q.s	q,s	q.s
water	q.s	q.s	q.s

Table 2. Composition of Multi-purpose Herbal Cream

[5][6

Fig 6. Multi-purpose cream batch 1

Fig 7. Multi-purpose cream batch 2

Fig 8. Multi-purpose cream batch 3

EVALUATION OF CREAM:

1) Organoleptic Observations:

The prepared Cream were observed organoleptically for color, taste, shape, texture, and clarity. The texture observation was conducted by mildly rubbing the surface and rubbing the cream between two fingers.

PARAMETER	RESULT		
	F1	F2	F3
Colour	Faint green	Dark green	Faint green
Texture	smooth	smooth	Smooth
Odour	pleasant	pleasant	pleasant
State	Semi-solid	Semi-solid	Semi-solid

Table 3. Organoleptic Evaluations

2) Irritancy:

Mark the area (1 cm^2) on the left hand dorsal surface. Then the cream was applied to the area and the time noted. After interval up to 24 hr. it is checked for irritant effect, erythema and edema if any than reported.

Sr.no	formulation	Irritant effect	erythema	Edema
1	F1	Nil	Nil	Nil
2	F2	Nil	Nil	Nil
3	F3	Nil	Nil	Nil

Table 4. Evaluations For Irritancy.

3) Wash ability:

Wash ability test was carried out by applying a small amount of cream on the hand and then washing it with help of tap water. All three formulations were easily washable.

Sr.no	formulation	Wash ability
1	F1	Easily washable
2	F2	Easily washable
3	F3	Easily washable

Table 5. Evaluations For Wash Ability.

4) **Phase separation**:

Prepared cream is kept in tightly closed container at room temperature away from sunlight and observed for 24 hours for phase

Sr.no	formulation	Phase separation
1	F1	No phase seperation
2	F2	No phase separation
3	F3	No phase seperation

Table 6. Evaluations For Phase Separations .

5) **pH:**

Take 0.5 g of cream and dispersed it in 50 ml distilled water. Then check it's pH by using pH paper.

Sr.no	formulation	pH
1	F1	7
2	F2	7
3	F3	7

Table 7. Evaluations For pH.

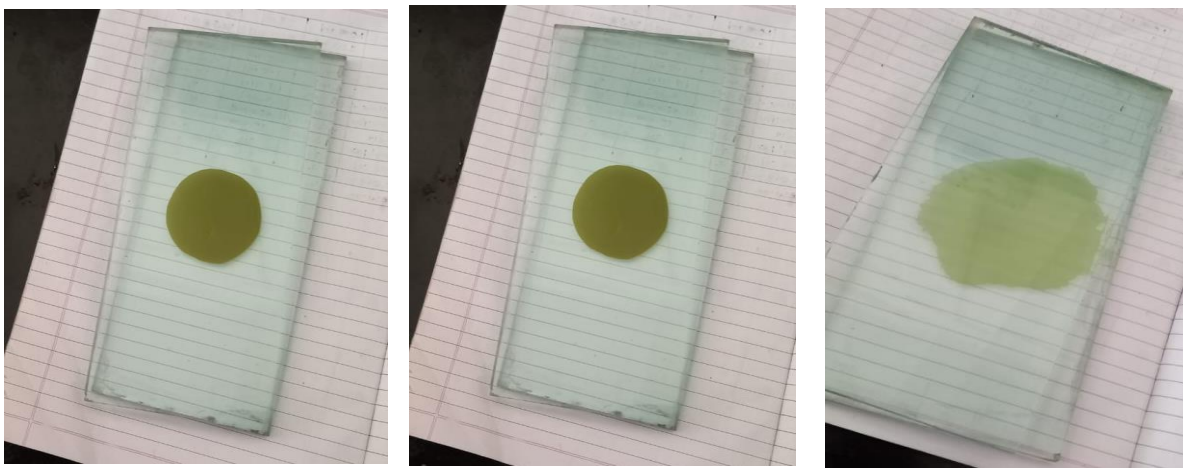
6) **Spreadability**:

Spreadability is carried out for all three formulations that is, F1C, F2C and F3C. The less time take for the separation of both the slide better the spreadability. Therefore according to statement F2C had better spreadability

Formula: Spreadiability= Weigh Tied to Upper Slide × Length Of Glass Slide/ Time Taken to Separate Slide

Sr.no	formulation	Time (sec)	Spreadability (gcm/sec)
1	F1	45	11.90
2	F2	50	10.71
3	F3	48	11.15

Table 8. Evaluations For Spreadability.



F1 **F2** **F3**

Fig. 9, 10 & 11. Spreadiability of Cream

7) **Viscosity**:

Viscosity of cream was done by using Brooke field viscometer at a temperature of 30℃ using spindle No.4 at 12.0 RPM. According to the results all the three formulations showed adequate viscosity.

Sr.no	formulation	Viscosity (mPa.s)
1	F1	18082
2	F2	22584
3	F3	17592

Table 9. Evaluations For Viscosity.

F1 **F2** **F3**

Fig.12, 13 & 14. Viscosity Of Cream.

8) **Greasiness**

Here the cream was applied on the skin surface in the form of smear and checked if the smear was oily or grease-like. According to the results, we can say that all three formulations were slightly-greasy.

Sr.no	formulation	greasiness
1	F1	Non-greasy
2	F2	Non-greasy
3	F3	Non-greasy

Table 10. Evaluations For Greasiness.

9) Stability:

All formulation was tested for stability testing at room temperature for period of 2 months. There is no phase separation found in any formulation. All formulations was found to be stable.

10) Anti-microbial Activity:

i. Preparation of Agar Plate:

Agar plates was prepared by using nutrient agar, peptone, sodium chloride and distilled water. Agar solution was heated for homogenous mixing and allow to cool. Cooled agar solution poured into petri dish to form culture media.

ii. Inoculation and development of microbes:

Microbial strain direct obtained from curd sample are spread on petri dish and petri dish allow to growth of microbes in incubator for 48 hours at a room temperature of 37^0C.

iii. Agar well diffusion method:

After complete growth of microbes; small wells of 5-6 mm diameter was created in petri dish and sample of formulation was placed in the well. further observation takes place for zone of inhibition.

iv. Zone of Inhibition:

Zone of inhibition of cream formulation for lactobacillus was found as given below:

Parameter	Result		
	F1	F2	F3
Zone of Inhibition	4 mm ± 0.3 mm	3 mm ± 0.3 mm	5 mm ± 0.3 mm

Table 8: Zone of Inhibition For Cream

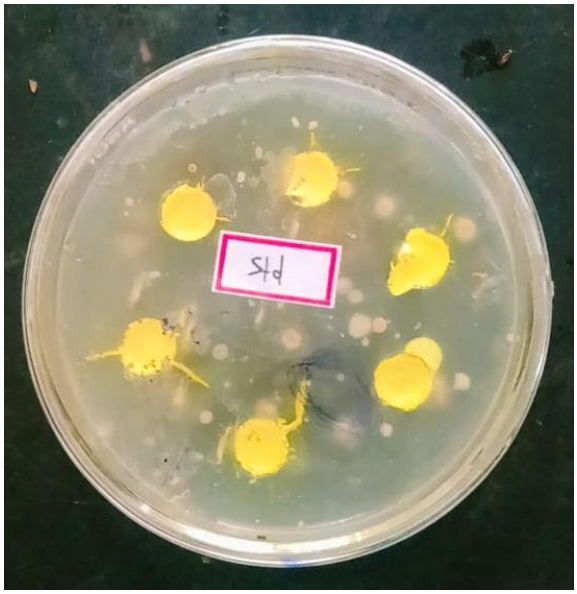


Fig. 9. Zone of Inhibition For Tetracycline Standard Solution

Fig. 10. Zone of Inhibition For Cream Formulation

Fig. 11. Fully Growed Lactobacillus In Petri Dish.

11) Mosquito Repellent Activity:

Mosquito repellent activity of cream was checked by applying cream on left hand of the body and observation for mosquito biting. It was observed that no lump of mosquito bite was found on area where cream applied. Cream shows good mosquito repellent activity.

Fig. 12 Before Applying Cream

Fig. 13 After Applying Cream

RESULT & DISCUSSION:

Formulated cream using beeswax and lanolin has smooth constituency and texture. Cream has light green color due to the green color of herbal extracts. Addition of rose oil as a fragrance gives good odor to the formulation. Cream was evaluated for its irritancy and not found any irritation to the skin. Also cream can be easily washable through water. All batches have a pH 7 and have a good spreadability. Brookfield viscometer used for determine viscosity of cream and it found within limits. Formulations are stable at room temperature and having very slight greasiness. Cream was checked for its antibacterial action and F3 formulation has grater antibacterial action against Lactobacillus.

CONCLUSION:

By using Aloe Vera, Neem and Tulsi the cream showed a multipurpose effect and all these herbal ingredients showed significant different activities. Based on results and discussion, the formulations F1, F2 and F3 were stable at room temperature and can be safely used on the skin.

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