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FORMULATION, DEVELOPMENT AND EVALUATION OF MULTI PURPOSE SKIN CREAM

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1. ABSTRACT

Aim: The Aim of the Present Study is to Formulate, Develop And Evaluate of Multi Purpose Skin Cream Prepared by using oil in water method. **Methods:** Different activities of aqueous and alcoholic extracts was assessed by oil in water type emulsion method. By discovering different types of formulations, such as oil in water, we were able to create several face creams respectively classified from C1 to C6, by incorporating different concentrations of stearic acid and acetyl alcohol. The evaluation of all formulations (C1 to C6) has been done by the analysis of different parameters like pH, viscosity, spread ability and stability. **Results:** An aqueous and alcoholic fraction analyzed from a sample of Natural remedies (plant extracts) showed a significant different activities. Among the six formulations (C1-C6) C3 and C6 showed good spread ability, good consistency, homogeneity, appearance, pH; there is no proof of a separation phase and ease of removal. Also the formulations C3 and C6 showed no redness or edema or erythema and irritation during irritancy studies. Conclusions: These formulations can be safely used on the skin. Hence, the study suggests that the composition of extract and the base of the cream C3 and C6 are more stable and safe.

KEYWORDS: Multy purpose skin cream, Aqueous and alcoholic extracts, oil in water type emulsion, different formulations.

1. INTRODUCTION

The word ‘Cosmetic’ derived from a Greek word – ‘kosmesticos’ that means to adorn. From that time any materials used to beautification or promoting appearance is known as cosmetic various types of natural material were used for these purpose.[1] Since the ancient times women have started to dress themselves because they wanted to increase their own beauty.

Even today, people especially in rural areas, choose natural remedies (plants extracts) for traditional cosmetics. Cosmetics are products which are used to purify and beautify the skin. These products are of active ingredients purporting to have medical and drug-like benefits. A certain number of women are still using herbal cosmetics to beautify their skin.

1.1. Creams[14]

Cream consist of medicament dissolved or suspended in water removable or emollient bases, classified as water-in-oil or oil-in-water and intended for application on the skin or accesible mucous membrane to provide localized and sometimes systemic effects at the site of application The function of a skin cream is to protect the skin against harshness from the environment and any dry conditions of the skin. A skin cream should aid the skin in carrying out its normal functions, that is, restoring moisture to dry skin, allowing the elimination of waste matter through the pores, and the cooling of the body by evaporation of water (perspiration) and radiation, thus aiding in the maintenance of the normal body temperature.

1.1.1. TYPES OF CREAM

On the basis of phase

1.1.1.1. OIL- IN-WATER (O/W)

As- Fluocinolone acetonide cream

1.1.1.2. WATER-IN-OIL (W/O)

As- cold cream

1.1.2. Classification of Cream on the Basis of Function

1.1.2.1. Cleansing and cold cream.

1.1.2.2. Foundation and vanishing cream.

1.1.2.3. Night and massage cream.

1.1.2.4. Head and body cream.

1.1.2.5. All purpose and general cream.

Topical skin infections commonly occur and often present therapeutic challenges to practitioners, despite the numerous existing antimicrobial agents available today. The necessity for developing new antimicrobial means has increased significantly due to growing concerns regarding multi drug resistant bacterial, viral, and fungal strains.[21-24] Consequently, attention has been devoted to safe, new, and/or alternative antimicrobial materials in the field

of antimicrobial chemotherapy. Common examples for topical skin infections include diaper rash, cold sores, and tinea (also called pityriasis) versicolor.

2. METHODOLOGY

2.1. Preparaton of Extract: Two methods are used for Preparation of extract.

2.1.1. Aqueous extract (Turmeric, lemon peel, Neem & Tulsi)

5gm of Each ingredient weighed accurately & dissolve each in 50 ml of water.This solution is placed on water bath at 80-100˚c. The heating solution was concentrated up to 20 ml. Then follow Filtration process of each ingredient and collect the each filter product.[10,11]

2.1.2. Alcoholic extract (papaya, Cinnamon)

5gm of Each ingredient weighed accurately & dissolve each in 50 ml of alcohol. This solution is placed on water bath at 80-100˚c. The heating solution was concentrated up to 20 ml. Then follow Filtration process of each ingredient and collect the each filter product.[Fig 4]

2.2. Formulaton Preparation

The formulation can be prepared by adding two phases which are mentioned as following.

2.2.1. Phase 1: The emulsifying agent stearic acid was dissolved in cetyl alcohol and heated to 75℃.It can be named as oil phase i.e., Part A.

2.2.2. Phase 2: In this phase mix the both above collected extracts of aqueous and alcoholic followed by adding preservatives & other water soluble components like methyl paraben, propyl paraben, triethanol amine, propylene glycol, Honey and heated to 75℃. It can be named as aqueous phase i.e., Part B.

After heating aqueous phase was added into oil phase at same temperature with continuous stirring the smooth & homogenous cream was prepared. The formula for given. (Table 1).[12,13]

Table. 1: Formulation of Cream.

S. No	Ingredient	Formulation 1(C1)	F2(C2)	F3(C3)	F4(C4)	F5(C5)	F6(C6)
1.	Ocimum tenuiflorum (Tulasi)	0.25 ml	0.25 ml	0.75 ml	0.75 ml	0.50 ml	0.50 ml
2.	Citrus limon (Lemon peel oil)	1.25 ml	1.25 ml	1.25 ml	1.25 ml	1.25 ml	1.25 ml
3.	Curcuma longa (Turmeric)	0.5 ml	0.5 ml	0.5 ml	0.5 ml	0.5 ml	0.5 ml
4.	Carica papaya	0.5 ml	0.5 ml	1 ml	1 ml	0.5 ml	1 ml
5.	Cinnamomum verum (Cinnamon)	1 ml	1 ml	1 ml	----	----	-----
6.	western honey bee	1.25 ml	1.25 ml	1 ml	1 ml	1.5 ml	1.5 ml
7.	Azadirachta indica (Neem leaves)	0.25 ml	-----	------	1.25 ml	1.25 ml	1.25 ml
8.	Stearic acid	2 g	2g	4 g	4 g	3 g	3 g
9.	Cetyl alcohol	1.5 g	1.5 g	2 g	2 g	2.5g	2.5g
10.	Methyl paraben	0.1 g	0.2 g	0.2 g	0.2 g	0.2 g	0.2 g
11.	Propyl paraben	0.1 g	0.2 g	0.2 g	0.2 g	0.2 g	0.2 g
12.	Trienthanolamine	1 g	1 g	1 g	1 g	1 g	1 g
13.	Propylene glycol	4 ml	4 ml	4 ml	4 ml	4 ml	4 ml
14	Distilled Water	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.

Figure-11: Extract of Natural plant Ingredients.

Figure. Formulated Creams(C1-C6).

4. EVALUATION OF CREAM

4.1) Physical Properties: The Cream was observed for color, odour and appearance.[4]

4.2) Test for Thermal Stability: The formulated cream was inserting into glass bottle with the help of spatula, and taped to settle to the bottom. Filled up to two-third capacity of bottle and insert plug and tighten the cap. Filled bottle was kept erect inside the incubator at 45˚ ± 1° for48 hrs. The sample passed the test, if on removal from the incubator shows no oil separation or any other phase separation.[5]

4.3) Test for microbial growth in formulated creams: The formulated creams were inoculated on the plates of agar media by streak plate method and a control was prepared by omitting the cream. The plates were placed in to the incubator and are incubated at 37 0C for 24 hours. After the incubation period, plates were taken out and check the microbial growth by comparing it with the control.[6]

4.4) Spreadability: The Spreadability was expressed in terms of time in seconds taken by two slides to slip off from the cream, placed in between the slides, under certain load. Lesser the time taken for separation of the two slides, better the Spreadability. Two sets of glass slides of standard dimensions were taken. The herbal cream formulation was placed over one of the slides. The other slide was placed on the top of the formulation, such that the cream was sandwiched between the two slides weight was placed upon the upper slides so that the cream between the two slides was pressed uniformly to form a thin layer. The weight was removed and the excess of formulation adhering to the slides was scrapped off. The upper slide allowed slipping off freely by the force of weight tied to it. The time taken for the upper slide was noted. Spreadability= m ×l /t m = weight tied to the upper slide (30g) l =length of glass slide (5cm) t =time taken in seconds.[7]

4.5) Irritancy test: Mark an area (1sq.cm) on the left hand dorsal surface. The cream was applied to the specified area and time was noted. Irritancy, erythema, edema, was checked if any for regular intervals up to 24 hrs and reported.[8]

4.6) Wash ability: a small amount of cream applied on hand & washed under running tap water.[8]

4.7) Viscosity: Viscosity of formulated cream was determined by book field viscometer at 100 rpm using spindle No 7.[8]

4.8) pH of the cream:-The pH of various formulations was determined by using digital pH meter. About 1 g of the cream was weighed and dissolved in 100 ml of distilled water and stored for two hours. The measurement of pH of each formulation was done in triplicate and average values were calculated.[9]

4.9) Phase separation: The formulated cream was kept intact in a closed container at 25 – 300 C not exposed to light. Phase separation was observed carefully every 24 hrs for 30 days. Any change in phase separation was checked.[9]

4.10) Moisture absorption studies: About 50 mg of cream was taken on a watch glass. A beaker was taken with full of water and was kept in a desiccator without adsorbents and allowed to get saturated. Watch glass with cream was introduced into the dessicator. It was left for 24 hrs.[9]

5. RESULTS AND DISCUSSION

In our work we are prepared six (C1-C6) different cream formulations. Among these formulations to choose final selection, the all formulations are tested for further final selection purpose.

5.1) Physical Properties: The physical properties & all formulated cream were judged by its color, Odour & texture. The results are tabulated below.

Table. 4: Physical Properties of cream.

Parameters	Formulations					
	C1	C2	C3	C4	C5	C6
Color	Cinnamamic red	Cream	cream	cream	Light yellow	white
Odour	Characteristic	Characteristic	characteristic	characteristic	characteristic	Characteristic
Texture	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth

5.2) Test For Thermal Stability: Thermal stability of the formulation was determined by the humidity chamber controlled at 60- 70% RH and 37 ± 1^0C. Finally all the formulations stable and no oil separation was observed.

Table. 5: Thermal Stability of cream.

Test/Formulations	C1	C2	C3	C4	C5	C6
Thermal Stability (at RH 65% and 30 ± 40oC)	Stable, no oil separation	Stable, no oil separation	Stable, no oil separation	Stable, no oil separation	Stable, no oil separation	Stable, no oil separation

5.3) Test for Microbial Growth in Formulated Creams: The formulated creams were inoculated on the plates of agar media by streak plate method and a control was prepared by omitting the cream. The plates were placed in the incubator and are incubated at 37 ^{0}C for 24 hours. After the incubation period, plates were taken out and check the microbial growth of gram positive (Bacillus) and gram negative (E.coli) by comparing it with the control.

Table. 6: Microbial Growth of cream.

Sl. No	Formulation	Growth	
		Bacillus	E-coli
1	C1	Absent	Absent
2	C2	Absent	Absent
3	C3	Absent	Absent
4	C4	Absent	Absent
5	C5	Absent	Absent
6	C6	Absent	Absent
7	Control	Absent	Absent

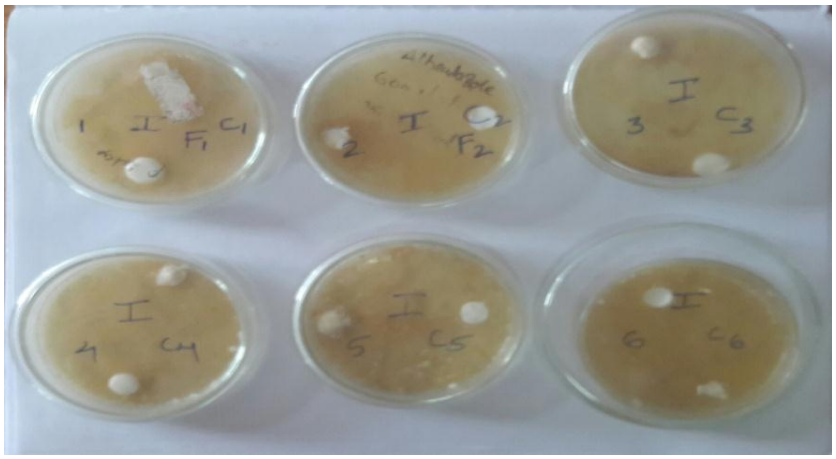

Figure: Microbial study of Creams.

5.4) Spreadability: Spreadability of cream formulations, that is, the ability of a formulated cream to evenly spread on the skin plays an important role while comparing with the administration of a standard dose of a medicated formulation to the skin and the efficacy of a topical therapy. The spreading values, that is, diameters observed for the formulations, after one minute. Results indicated that our cream had comparable spreadability to that of commercial product which was used as comparator in the study. The results was noted on the table no 7.

Table. 7: Spreadability of cream.

Formulations	TIME (sec)	*Spreadability (g×cm/sec)*
C1	15	8.3
C2	14	8.9
C3	16	7.8
C4	15	8.3
C5	15	8.3
C6	16	7.8

5.5) Irritancy: All formulation shows no irritation, Erythrema & edema during Irritancy test study. The results of Irritancy test formulations were safe to use for skin. The results were shown in below table No. 8.

Table. 8: Irritancy of cream.

Formulation	Irritant	Erythema	Edema
C1	Nil	Nil	Nil
C2	Nil	Nil	Nil
C3	Nil	Nil	Nil
C4	Nil	Nil	Nil
C5	Nil	Nil	Nil
C6	Nil	Nil	Nil

5.6) Washability

A small amount of cream applied on hand & washed under running tap water. The washability of all formulations shown as below table.

Table. 9: Washability of cream.

Formulation	Wash Ability
C1	Easily Washable
C2	Easily Washable
C3	Easily Washable
C4	Easily Washable
C5	Easily Washable
C6	Easily Washable

5.7) pH of the Cream

The result of pH of prepared creams (C1 – C6) was found to be around 6 which were suitable for topical application. Because skin has pH in between 4.5-6. The result of pH summarized in table No. 10.

Table. 10: pH of cream.

Formulation	PH
C1	7.80
C2	7.30
C3	5.72
C4	5.80
C5	5.95
C6	5.75

5.8) Moisture Absorption Studies

About 50 mg of cream was taken on a watch glass. A beaker was taken with full of water and was kept in a desiccator without adsorbents and allowed to get saturated. Watch glass with cream was introduced into the dessicator. It was left for 24 hrs. After 24hrs the moisture absorption was noted and results shown in below table.

Table. 11: Moisture Absorption Studies of cream.

Formulation	Moisture Absorption
C1	Moisture Not Absorption
C2	Moisture Not Absorption
C3	Moisture Not Absorption
C4	Moisture Not Absorption
C5	Moisture Not Absorption
C6	Moisture Not Absorption

5.9) Phase Separation: The formulated cream was kept intact in a closed container at 25 – 100^0C not exposed to light. Phase separation was observed every 24 hrs for 30 days. In this cream formulations no phase separation was observed and results were shown in below table.

Table. 12: Phase Separation of cream.

Formulation	Phase Separation
C1	No Phase Separation
C2	No Phase Separation
C3	No Phase Separation
C4	No Phase Separation
C5	No Phase Separation
C6	No Phase Separation

5.10) Viscosity

Viscosity of formulated cream was determined by brook field viscometer at 10 rpm using spindle No LV-4(64). The viscosity of cream was found in range of 20000 to 16000cp which indicates that cream was easily spreadable by small amount of shear. The result is tabulated below.

Table. 13: Viscosity of cream.

	Formulations					
	C1	**C2**	**C3**	**C4**	**C5**	**C6**
Viscosity	19520	19550	197200	196280	19580	196820

6. CONCLUSION

The present study involves Formulation, Development and Evaluation of Multipurpose Skin Cream. The present work mainly focuses on the potential of extracts from cosmetic purposes. The uses of cosmetic have been increased in many folds in personal care system. The prepared body cream was o/w type emulsion, hence can be easily washed with plane water which gives better customer compliance. Our study indicated that the formulations(C3 and C6) were more stable. The prepared formulations showed good spreadability, no evidence of phase separation. These formulations (C3 and C6) had almost a constant PH, emollient properties; they were not greasy and easily removable after the application. The stable formulations were safe and skin irritations and allergic sensitizations were scarce. All the formulations passed the microbial limit test which included some parameters like total bacterial count and fungal count; pathogens like E.Coli and Bacillus were also absent.

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