



International Journal of Chemistry and Pharmaceutical Sciences

Journal Home Page: www.pharmaresearchlibrary.com/ijcps



Research Article

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Preparation and Evaluation of Cosmetic Cream Containing Fruits

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ABSTRACT

The present study was aimed to prepare and evaluate the cosmetic cream containing fruit juices of five different fruits. Different types of formulations of oil in water (o/w) type creams namely F1-F6 were formulated from the mixture of five different fruits papaya, sappota, grapes, straw berry and pineapple. The different ingredients in the cream base include sunflower oil, stearic acid, cetyl alcohol, sodium hydroxide, glycerine and purified water. The evaluation of all formulations (F1-F6) was done for different parameters like organoleptic properties, p^H , viscosity, spreadability and stability along with irritancy test were examined. Formulations F4 and F5 showed good spreadability, good consistency, appearance, P^H , ease of removal, and no evidence of phase separation during stability studies. All the formulations showed no redness, edema inflammation and irritation during irritancy studies. The present study was concluded that these creams were formulated with the naturally available fruits as the main ingredients and we found good properties for the creams and further optimization studies are required on this study to find out the benefits of fruit juice creams on human use as skin cosmetic.

Keywords: cosmetics, cream, O/W type of emulsion, stearic acid, cetyl alcohol, Sodium hydroxide, spreadability, irritancy.

ARTICLE INFO

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Article History: Received 28 May 2016, Accepted 09 July 2016, Available Online 27 August 2016

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Manuscript ID: IJCPS3055



PAPER-QR CODE

Citation: Srinivasa Reddy Bhavanam, et al. Preparation and Evaluation of Cosmetic Cream Containing Fruits. *Int. J. Chem, Pharm, Sci.*, 2016, 4(8): 404-407.

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1. Introduction

A cream is a semi-solid topical preparation that is applied to the skin and can be a vehicle for the delivery of medications that can remain on the skin or be absorbed through the skin.

Creams are the age old necessity of mankind. This necessity leads to the continuous modification and invention of more and more skin care cosmetic preparations. Cosmetics are

the products that are created for application on the body for the purpose of cleansing, beautifying or altering appearance and enhancing the beauty. Cosmetics are developed to reduce wrinkles, fight acne and to control oil secretion. For various types of skin ailments formulations like skin protective, sunscreen, antiacne, antiwrinkle and antiaging are designed using varieties of materials, either natural or synthetic. The plant parts used in cosmetic preparation should have varieties of properties like antioxidant, anti-inflammatory, antiseptic, emollient, antiseborrheic, antikerolytic activity and antibacterial etc. the use of plants is as old as mankind and in the coming years, the market will see many new products containing natural oils and herbs. Plants were once the main source and foundation of all cosmetics, before methods were discovered of synthesizing substances with similar properties. These herbal products claim to have less side effects, commonly seen with products containing synthetic agents [1].

In the present work an attempt has been made to formulate a cosmetic cream containing five different fruits using an appropriate base and evaluating the creams for their organoleptic properties rheological properties and stability. By the physical and the stability studies the best formulations in terms of physical properties after subjecting to various climatic conditions were determined. The fruits such as Grapes (*Vitis vinifera*), Apple (*Malus domestica*), Pineapple (*Ananas comosus*), Sappota (*Manilkara zapota*) and Straw berry (*Fragaria ananassa*) has selected for formulation of cream. These plants are individually well described in the literature for their potential cosmetic benefits. Therefore, an attempt has been made in this study to combine the juices of the fruits in a cosmetic cream using a suitable cream base.

2. Experimental

Materials: All fruits required for the preparation of creams were purchased from the local market of Anantapur and chemicals used were of analytical grade and were purchased from SD fine chemicals, Mumbai.

Preparation of Creams:

The oil phase ingredients and the aqueous phase ingredients were taken separately and heated at 70°C. The oil phase ingredients include Sun flower oil, Stearic acid and Cetylalcohol were taken in a china dish and heated at 70°C. The water phase ingredients include Sodium hydroxide, Glycerin and Purified Water were taken separately in a beaker and heated carefully to get the same temperature as the oily phase ingredients. When the oily phase melts totally the aqueous phase was added slowly into the oily ingredients with continuous stirring until a white emulsion like preparation was formed. Then the contents of the china dish were allowed to cool at 30°C and appropriate amount of Fruit juice was incorporated and triturated vigorously until a smooth cream was formed [2]. The concentration of ingredients taken was mentioned in Table-1.

Evaluation of creams:

pH of the Cream: The pH meter was calibrated using standard buffer solution. About 0.5g of the cream was

weighed and dissolved in 50.0 ml of distilled water and its pH was measured.

Dye test:

The scarlet red dye is mixed with a small amount of cream. Placed a drop of the cream on a microscopic slide covered it with a cover slip, and examines it under a microscope. If the disperse globules appear red and the background colorless, then the cream is o/w type. The reverse condition occurs in w/o type cream i.e. the disperse globules appear colorless in the red back ground [3].

Homogeneity: The formulations were tested for the homogeneity by visual appearance and by touch.

Appearance: The appearance of the cream was judged by its color, pearlscence and roughness and graded.

After feel: Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was checked.

Type of smear: After application of cream, the type of film or smear formed on the skin were checked.

Removal: The ease of removal of the cream applied was examined by washing the applied part with tap water [4].

Acid value [5]:

10 gm of substance was accurately weighed, dissolved in 50 ml mixture of equal volume of alcohol and solvent ether, the flask was connected to reflux condenser and slowly heated, until sample was dissolved completely, to this 1 ml of phenolphthalein added and titrated with 0.1N NaOH, until faintly pink color appears after shaking for 30 seconds

$$\text{Acid value} = n * 5.61 / w$$

n = the number of ml of NaOH required.

w = the weight of substance.

Saponification value: Introduce about 2 gm of substance refluxed with 25 ml of 0.5 N alcoholic KOH for 30 minutes, to this 1 ml of phenolphthalein added and titrated immediately, with 0.5 N HCL.

$$\text{Saponification value} = (b-a) * 28.05 / w$$

The volume in ml of titrant = a

The volume in ml of titrant = b

The weight of substance in gm = w

Irritancy test: The prepared creams were evaluated for irritation or allergic reactions. Non-irritancy of the preparation is evaluated by patch test. In this test definite quantity of creams was applied under occlusion daily on the back or volar forearm region for 21 days. Prior to the application of ointment any signs of irritation observed are noted. No visible reaction or erythema or intense erythema with oedema and vesicular erosion should occur. A good cream shows no visible reaction [6].

Phase separation: The formulated creams were evaluated for the signs of phase separation on Centrifugation at low, medium and high speeds. Specific quantity of cream was filled in to the centrifuge tube and kept in centrifuge. Then it was subjected for rotations at low speed for 5 mins followed by medium speed for 5 mins and high speed for 5 mins and any signs of separation of phases and change in consistency were checked [7,8].

Accelerated stability testing: Accelerated stability testing of prepared formulations was conducted for most stable formulation F6. The formulation was kept both at room and

elevated temperature and observed on 0th, 5th, 10th, 15th and 20th day for the properties of creams.

3. Results and Discussion

pH of the Cream: The pH of the cream was found to be in range of 6-7 which is good for skin pH. All the formulations were shown pH nearer to skin required (Table 2).

Dye test: This dye confirms that all formulations were o/w type emulsion cream.

Homogeneity: All formulations produce uniform distribution of fruit juices in cream. This was confirmed by visual appearance and by touch.

Appearance: No change in color of creams has observed when formulations were kept for long time and also after storing at accelerated storage conditions (Table 6).

After feel: Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was found were tabulated in Table 6.

Type of smear: After application of cream, the type of smear formed on the skin were non greasy (Table 6).

Removal: The cream applied on skin was easily removed by washing with tap water (Table 6).

Acid value and Saponification value:

The results of acid value and saponification value of all formulation were presented in table 3, and showed satisfactorily values.

Irritancy test: All formulations show no redness, edema, Inflammation and irritation during irritancy studies. These formulations are safe to use for skin (Table 4).

Phase separation: Signs of phase separation and were observed by subjecting the creams for centrifugation at different speeds and from the results it was found that all formulations were stable at low and medium speeds but at high speeds formulations F4 and F5 shown slight signs of separation[9]. The results were shown in Table 5.

Accelerated stability testing: The results of accelerated stability studies of the Formulation F6 were tabulated in Table 6.

Discussion

By the evaluation of all formulated fruit creams, the all properties of creams like Homogeneity, change in color, spreadability, after feel and Removal were found to be Good at Room temperature and it was found that at 40° C ± 2° C after storing for 20 days a slight change has observed in homogeneity. The pH of the all formulations was found to remain within the limits and found satisfactory. All formulations were completely free from irritant effects, erethma and edema on the skin after application. During phase separation studies it was found that the no signs of separation in freshly prepared creams but the formulations F4 and F5 shown slight signs of separation at high speed of centrifugation [10,11,12].

Table-I: Ant-imicrobial activities of bischalcone (8a-f) and Pyrazole (11a-f)

S.No	Ingredients	F1	F2	F3	F4	F5	F6
1	Fruit Juice	25	25	25	25	25	25
2	Sun Flower Oil	5	5	5	6	6	6
3	Stearic Acid	-	-	-	16	15	13
4	Cetyl Alcohol	16	15	13	6	4	2
5	Sodium Hydroxide	-	0.2	0.2	0.35	0.35	0.35
6	Glycerine	5	5	5	7	7	7
7	Methyl Paraben	0.25	0.25	0.25	0.25	0.25	0.25
8	Propyl Paraben	0.1	0.1	0.1	0.1	0.1	0.1
9	Purified Water	48.65	49.45	51.45	39.30	42.05	46.30
10	Total	100	100	100	100	100	100

Table 2: pH of formulations

S.No	Formulation	pH
1	F1	6.7
2	F2	6.9
3	F3	6.7
4	F4	6.6
5	F5	6.4
6	F6	6.8

Table 3: Test for acid value and saponification value

S.No	Parameter	Formulation					
		F1	F2	F3	F4	F5	F6
1	Acid value	5.9	6.2	5.7	5.4	5.8	5.3
2	Saponification value	27.3	26.3	26.8	25.8	27.1	25.7

Table 4: Type of Adverse effect of formulations

S.No	Formulation	Irritation	Erethma	Edema
1	F1	Nil	Nil	Nil
2	F2	Nil	Nil	Nil

3	F3	Nil	Nil	Nil
4	F4	Nil	Nil	Nil
5	F5	Nil	Nil	Nil
6	F6	Nil	Nil	Nil

Table 5: Results of Phase separation

S.No	Formulation	Speed of Centrifugation		
		Low	Medium	High
1	F1	No	No	No
2	F2	No	No	No
3	F3	No	No	No
4	F4	No	No	Slight
5	F5	No	No	Slight
6	F6	No	No	No

Table 6: Physical parameter of F6 cream on room and accelerated temperature

S.No	Days	Temperature	Parameter						
			pH	X1	X2	X3	X4	X5	X6
1	0	RT	6.8	G	NO	G	E	NG	ES
		40° C ± 2° C	6.8	G	NO	G	E	NG	ES
2	5	RT	6.7	G	NO	G	E	NG	ES
		40° C ± 2° C	6.6	G	NO	G	E	NG	ES
3	10	RT	6.7	G	NO	G	E	NG	ES
		40° C ± 2° C	6.5	G	NO	G	E	NG	ES
4	15	RT	6.5	G	NO	G	E	NG	ES
		40° C ± 2° C	6.3	S	NO	G	E	NG	ES
5	20	RT	6.5	G	NO	G	E	NG	ES
		40° C ± 2° C	6.2	S	NO	S	E	NG	ES

X1-Homogeneity, X2-Change in color, X3-Spreadibility, X4-After feel, X5-Type of smear, X6-Removal, G: Good, S: Satisfactory, E: Emollient, NG: Non greasy, ES: Easy.

4. Conclusion

The present study was aimed to formulate and evaluate cosmetic creams containing fruits i.e. Grapes, Apple, Pine apple, Sappota and Straw berry. These creams were formulated by an appropriate cream base consisting of ingredients like Stearic acid, Sun flower oil, Sodium Hydroxide, Glycerine and Cetyl Alcohol. The formulated creams were tested for their Physical parameters, organoleptic characteristics, Test for Irritancy and Stability studies. These creams were formulated with the naturally available fruits and we found good properties for the creams and further Optimization Studies are required on this study to find the useful benefits of Fruit Juice Creams on human use as Cosmetic Product.

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