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Formulation and Evaluation of Polyherbal Cosmetic Multipurpose Cream.

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ABSTRACT
Face creams are semi solids Preparation used for improving the complexion of the face. The main aim of this research work is to prepare the face creams using different herbs and the prepared face cream are evaluated for the efficacy.The present study was to prepare and evaluate the polyherbal cosmetic cream comprising extracts of natural products such as Aloe vera, Allium cepa, Beta vulgaris, and Achyranthus aspera. Different types of formulations oil in water (O/W) herbal creams namely F1 to F7 were formulated by incorporating different concentrations of stearic acid and cetyl alcohol. The evaluations of all formulations (F1 to F7) were done on different parameters like pH, viscosity, spreadibility and stability were examined. Formulations F6 and F7 showed good spreadability, good consistency, homogeneity, appearance, pH, spreadability, no evidence of phase separation and ease of removal. The formulation F6 and F7 shows no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin. These studies suggest that composition of extracts and base of cream of F6 and F7 are more stable and safe, it may produce synergistic action. All the prepared novel formulations were found to comply with the stated cosmeceutical guidelines.
Key words : Formulation, Cream, Evaluation, Excipients

I. INTRODUCTION

Cosmetic products are used to protect skin against exogenous and endogenous harmful agents and enhance the beauty and attractiveness of skin[1]. The use of cosmetics not only developing an attractive external appearance, but towards achieving longevity of good health by reducing skin disorders[2]. The synthetic or natural ingredients present in skin care formulation that supports the health, texture and integrity of skin, moisturizing, maintaining elasticity of skin by reduction of type I collagen and photoprotection etc. This property of cosmetic is due to presence of ingredients in skin care formulation, because it helps to reduce the production of free radicals in skin and manage the skin properties for long time. The cosmetic products are the best choice to reduce skin disorders such as hyper pigmentation, skin aging, skin wrinkling and rough skin texture etc. The demand of herbal cosmetic is rapidly expanding. This expansion is due to the availability of new ingredients, the financial rewards for developing successful products, consumer demand, and a better understanding of skin physiology[3,4]. The plant parts used in cosmetic preparation should have varieties of properties like antioxidant, anti-inflammatory, antiseptic, emollient, antiseborrhatic, antikerolytic activity and antibacterial etc. Herbal products claim to have less side effects, commonly seen with products containing synthetic agents. The market research shows upward trend in the herbal trade with the herbal cosmetic industry playing a major role in fueling this worldwide demand for herbals[5].

The Aloe vera plant has been known and used for centuries for its health, beauty, medicinal and skin care properties. Aloe vera is a natural product that is now a day frequently used in the field of cosmetology. It can be applied topically as an emollient for burns, sunburn and mild abrasion, and for inflammatory skin disorders. It has antibacterial, antifungal, antiviral, antioxidant, and antiinflammatory effects. Aloe vera is used externally for its wound healing properties and is supported by clinical investigation[6-8].

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In cosmetics, Allium cepa has an excellent potential for acne-prone skin and also good for oily skin. Allium cepa extract is often used for skin problems and as an antibacterial, antiseptic, anti-inflammatory. **Author Jain et al.** reported the Allium cepa is boosted with sulphur, which is known to be good for oily and acne-prone skin as it helps dry out the complexion and reduces acne that is caused due to excessive production of oil in the sebaceous glands and also rich in skin vitamins, including Vitamins A, C, and E. It also removes blackness of skin.


Beta Vulgaris is a precursor of vitamin C, It also acts as a very good anti-oxidant which slows down the process of aging. Vitamin C produces collagen in the body which is an essential protein for making our skin elastic. It also prevents wrinkles on the skin. Beta vulgaris is also used in the treatment of acne. It also useful in skin brightening. The above properties are reason for selection of these plants in the preparation of cosmetic products to control the wrinkle and aging in skin. Achyranthus aspera is act as demulcent. It shows action of anti-infammatory, antibacterial, and anti-fungal

Therefore, the purpose of this study was to develop herbal cosmetic cream by mixing the extracts of Aloe vera, Allium cepa, Beta vulgaris, Achyranthus aspera, to produce multipurpose effect on skin such as fairness, acne treatment, antiaging and antiwrinkle properties.

II. MATERIALS AND METHODS

Preparation of extracts : Air dried and coarsely powdered (500 gm) of Aloe vera, Cucumis sativus and Beta vulgaris were placed in soxhlet extractor separately, using petroleum ether and then successively with ethanol. The extracts were then concentrated to dryness under reduced pressure and controlled temperature, respectively and they were preserved in a refrigerator.

Cream formulation : Oil in water (O/W) emulsion-based cream (semisolid formulation) was formulated. The emulsifier (stearic acid) and other oil soluble components (Cetyl alcohol, almond oil) were dissolved in the oil phase (Part A) and heated to 75° C. The preservatives and other water soluble components (Methyl paraban, Propyl paraban, Triethanolamine, Propylene glycol, ethanol extract of Aloe vera, Cucumis sativus and Daucus carota were dissolved in the aqueous phase (Part B) and heated to 75° C. After heating, the aqueous phase was added in portions to the oil phase with continuous stirring until cooling of emulsifier took place. The formula for the cream is given in table 1.

Evaluation of cream pH of the Cream : The pH meter was calibrated using standard buffer solution. About 0.5 g of the cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured.

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Viscosity : Viscosity of the formulation was determined by Brookfield Viscometer at 100 rpm, using spindle no 7.

Dye test : The scarlet red dye is mixed with the cream. Place a drop of the cream on a microscopic slide covers it with a cover slip, and examines it under a microscope. If the disperse globules appear red the ground colourless. The cream is o/w type. The reverse condition occurs in w/o type cream i.e. the disperse globules appear colourless in the red ground.

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

Acid value : Take 10 gm of substance dissolved in accurately weighed, 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.

Acid value = n*5.61/w

n = the number of ml of NaOH required. w = the weigh of substance. Acid value = n*5.61/w n = the number of ml of NaOH required. w = the weigh 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.

Saponification value = (b-a)*28.05/w

The volume in ml of titrant = a The volume in ml of titrate = b The weigh of substance in gm = w

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.

Accelerated stability testing : Accelerated stability testing of prepared formulations was conducted for 2 most stable formulations at room temperature, studied for 7 days. They were formulation number 4 and 5 at 40 oC ± 1 oC for 20 days. The formulations were kept both at room and elevated temperature and observed on 0th, 5th, 10th, 15th and 20th day for the following parameters[3,4,12,13].

III. RESULT & DISSCUSSION

Table 1 : Composition of cream

Ingredients	Formula % w/w						
	F1	F2	F3	F4	F5	F6	F7
Ethanol extract of A. cepa	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Ethanol extract of A. vera	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ethanol extract of B. vulgaris	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ethanol extract of A. aspera							
Stearic acid	12	10	10	8	8	6	6
Cetyl alcohol	3	3	3	4	3	3	3
Glycerol	2	3	4	3	4	3	4
Methyl paraben	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Triethanolami	qs	Qs	qs	qs	qs	qs	qs

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ne							
Water qs. 100	qs	Qs	qs	qs	qs	qs	qs

Table 2 : Test applied for acid value and saponification value

Parameter	Formula						
	F1	F2	F3	F4	F5	F6	F7
Acid value	6.7	6.3	6.6	5.5	5.7	5.8	5.4
Saponification value	31.2	29.7	28.7	25.9	23.8	24.1	24.0

Table 3 : Types of Adverse effect of formulations

Formulation	Irritant	Erythema	Edema
F1	NIL	NIL	NIL
F2	NIL	NIL	NIL
F3	NIL	NIL	NIL
F4	NIL	NIL	NIL
F5	NIL	NIL	NIL
F6	NIL	NIL	NIL
F7	NIL	NIL	NIL

pH of the Cream : The pH of the cream was found to be in range of 5.6 to 6.8 which is good for skin pH. All the formulations of cream were shown pH nearer to skin required i.e pH of F1-5.6, F2-5.8, F3-5.9, F4-6.2, F5-6.5, F6- 6.8 and F7-6.7.

Viscosity : The viscosity of cream was in the range of 28001 – 27025 cps which indicates that the cream is easily spreadable by small amounts of shear. But F6 and F7 shows good spreadable property than other formulations.

Acid value and Saponification value : The results of acid and saponification value of all formulation of cream are presented in table 2, and showed satisfactorily values.

Irritancy test : The formulation F6 and F7 shows no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin (Table 3).

Dye test : This dye confirm that all formulation were o/w type emulsion cream. But formulation (F6) shows more stable in o/w type emulsion.

Homogeneity : All formulations produce uniform distribution of extracts in cream. This was confirmed by visual appearance and by touch (Table 4).

Appearance : When formulation were kept for long time, it found that no change in colour of cream (Table 4).

After feel : Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was found (Table 4).

Type of smear : After application of cream of F6 and F7, the type of smear formed on the skin were non greasy (Table 4).

Removal : The cream of F6 and F7 applied on skin was easily removed by washing with tap water (Table 4).

Table 4 : Physical parameter of F5 and F6 cream on room and accelerated temperature

Days	Temperature	Formulation	Parameter						
			pH	X1	X2	X3	X4	X5	X6
	RT	F6	6.7	**	NCC	**	E	NG	ES
0		F7	6.6.	**	NCC	**	E	NG	ES
	40°C + 1°C	F6	6.5	**	NCC	**	E	NG	ES
		F7	6.5	*	NCC	**	E	NG	ES
	RT	F6	6.6	**	NCC	**	E	NG	ES
5		F7	6.5	**	NCC	**	E	NG	ES
	40°C + 1°C	F6	6.4	**	NCC	**	E	NG	ES
		F7	6.6	*	NCC	**	E	NG	ES
	RT	F6	6.7	**	NCC	**	E	NG	ES

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10		F7	6.5	**	NCC	**	E	NG	ES
	40°C + 1°C	F6	6.6	**	NCC	**	E	NG	ES
		F7	6.6	**	NCC	**	E	NG	ES
	RT	F6	6.5	**	NCC	**	E	NG	ES
15		F7	6.4	*	NCC	**	E	NG	ES
	40°C + 1°C	F6	6.7	**	NCC	**	E	NG	ES
		F7	6.6	**	NCC	**	E	NG	ES
	RT	F6	6.5	**	NCC	**	E	NG	ES
20		F7	6.5	**	NCC	**	E	NG	ES
	40°C + 1°C	F6	6.4	**	NCC	**	E	NG	ES
		F7	6.4	**	NCC	**	E	NG	ES



IV. DISCUSSION

Aloe vera, Allium cepa, Beta vulgaris, and Achyranthus aspera are well known for its medicinal and cosmeceuticals value in Indian traditional system of medicine. In the present work, it was decided to extract and formulate polyherbal cosmetic cream.

The tyrosinase inhibitors substances are used in cosmetic products as skin whitening agent to reduce skin pigmentation by decreasing the melanin production. The aloesin, a C-glycosylated chromone reported to exhibit antityrosinase activity, and also inhibited melanin production in cell culture. It has reported that aloesin are present in Aloe vera extract as bioactive compound. Furthermore Aloe vera has been reported to have a protective effect against damage to skin from ultra violet radiation due to its antioxidant activity. Aloe vera contains mucopolysaccharides help in binding moisture into the skin. Aloe stimulates fibroblast which produces the collagen and elastin fibers making the skin more elastic and less wrinkled. Aloe's benefits can be attributed at least partly to its nutrients, since it contains proteins, carbohydrates (including mucopolysaccharides), vitamins (including B1, B2, B3, B6, C, and folic acid) and minerals. These nutrients, although beneficial individually, may work synergistically to soothe, heal, moisturize and regenerate the skin[7,14-17]. From above it concluded that this plant extracts produce excellent whitening, antiwrinkle and sunscreen effect on skin.

The drug boosted with sulphur is Allium cepa, its ability to protect the skin from acne, and its ability to help even the skin tone, deeming it an active anti-aging ingredient[18,19]. It is reported that Allium cepa contain abundant amount of sulfurous components and Vitamin C, A, and E, moreover Beta vulgaris exhibited highly antioxidant and anti-inflammatory activity. From above discussion it is assumed that sulphur containing plant as well as antioxidant activity producing plant can be used in face care cream, to produce anti-acne, antiaging and antiwrinkle effects. Hence both extracts of plants are good choice to use as ingredient in face cream.

The prepared polyherbal face cream was O/W type emulsion, hence can be easily washed with plane water that gives better customer compliance. There is a growing demand for herbal cosmetics in the world market and they are invaluable gifts of nature. Therefore, we tried to make a polyherbal face cream containing the extract of Aloe vera, Allium cepa, Beta vulgaris and Achyranthus aspera. Our study indicated that the formulation F6 and F7 found to be more stable, while remaining formulations were not stable and resulted in breakdown of the emulsion when stored for long time. These formulations F6 and F7 had almost constant pH, homogeneous, emollient, non-greasy and easily removed after the application.

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The stable formulations were safe in respect to skin irritation and allergic sensitization.

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