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DEVELOPMENT AND EVALUATION OF HERBAL COSMECEUTICAL FOR SKIN CARE

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ABSTRACT

Herbal cosmetics are the preparations used to enhance the human appearance. The aim of the present research was to formulate the herbal lotion for the purpose of moistening and nourishing the skin. Different crude drugs; *Glycyrrhiza glabra* (Liquorice-root and stolons), *Ocimum sanctum* (Tulsi-leaves), *Azadirachta indica* (Neem-leaves),,*Curcuma longa* (Turmeric-rhizomes) were taken. The pharmacognostical standardization has been done as per the, The Ayurvedic Pharmacopoeia (Volume I 1989, Volume II 1999, Volume III 2001) of India (API). It includes; for tulsi, foreign organic matter (0.76%), water soluble extractive (14.36%), alcohol soluble extractive (8.42%), total ash (15.03%), acid insoluble ash (2.24%), and loss of drying (7.91%). All the values are in compliance with API. Evaluation of herbal lotion has been done with the result- fatty matter (10.10%), water content (90.8%). The other parameters acid value, peroxide value, iodine value was also evaluated. Accelerated stability testing of two final sample has been conducted in the environmental chamber with temperature 25 ± 1^{o}C and humidity 60 ± 10% RH. All the products were found to be stable with no sign of phase separation and no change in the color. The patch test for sensitivity testing has also been done and no evidence of skin irritation and allergic sensitization were reported.

KEY WORDS: Cosmetic, Herbal lotion, Formulation, API.

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INTRODUCTION

Now-a-days the usefulness of herbs in the cosmeceutical production has been extensively increased in personal care system and there is a great demand for the herbal cosmetics.[1]Cosmetics are the substances intended to be applied to the human body for cleansing, beautifying, promoting attractiveness, and altering the appearance without affecting the body's structure or functions. But the usage of synthetic products becomes very harmful from long time for the youth as well as our environment. Various synthetic compounds, chemicals, dye and their derivative proved to cause various skin diseases having numerous side effects. Thus we are using herbal cosmetics as much as possible[1].The basic idea of skin care cosmetic lies deep in the Rigveda, Yajurveda, Ayurveda, Unani and Homeopathic system of medicine. These are the products in which herbs are used in crude or extract form. These herbs should have varieties of properties like antioxidant, anti-inflammatory, antiseptic, emollient, antiseborrhatic, antikerolytic activity and antibacterial etc.[2]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.[3] The word herbal is a symbol of safety in contrast to the synthetic one which has adverse effects on human health.[4]Lotion is a polyherbal formulation that consists of extracts of Ocimum sanctum, Glycyrrhiza glabra, Azadirachta indica and Curcuma longa. These herbs have been selected on the basis of a traditional system and scientific justification with modern uses.Literature survey revealed that the aqueous extract of Curcuma longa family zingiberaceae has been used for its anti inflammatory activity anticancerous activity, antioxidant, antitumor, antiviral, and wound healing properties. It is also used for glowing the complexation and premature skin aging induced by U.V radiation.. Curcumin the active compound of turmeric is a polyphenol, having anti inflammatory activity by inhibiting leukotriene formulation, inhibiting platelet aggregation and stabilizing neutrophilic lysosomal memberanes.[5] Extract from the leaves of Azadirachta indica family Meliaceae were first used in India to treat fungal infection, and skin diseases. It has also been used from centuries as anti inflammatory, antifungal, antibacterial, anti tumor activities.[6] Ocimum sanctum family labiteae; aqueous extract has been used traditionally and known to possess anti inflammatory, antioxidant, anticancer, antidepressant, antibacterial, rejuvenating and chemoprotective activity.[7]Antimicrobial, antiinflammatory, antioxidant, antidepressant, glowing complexation, and photoprotective activity has also been reported for Glycyrrhiza glabra family fabaceae.[8] The objectives of present research work is to prepare skin care formulation that not only moisturizes and softens the skin but also helps in healing of skin lesions and skin cracks. A herbal lotion that can give effective protection to skin and free from any toxicity or toxic residue or any irritation when regularly used and should also be cosmetically acceptable.

MATERIALS AND METHODS

All the drugs and excipients were collected from Bacfo Pharmaceuticals (India) Ltd, Limited C-15, sector- 2, Noida.

PHARMACOGNOSTICAL STANDARDIZATION

Quantitative standards of all the drug components were carried out as per The Ayurvedic pharmacopoeia of India (API) methods and compared with API standards. (Table 1)

Table 1
Quantitative standards

	Parameter/ drugs	Foreign matter (mg) % w/w	pH	Moisture %	Water Soluble Extractive % w/v	Alcohol Soluble Extractive % w/v	Total Ash % w/w	Acid Insoluble Ash % w/w	Reference (compliance with)
1	*Azadirachta indica*	1.7	6.65	9.95	18.83	8.08	5.88	0.589	API Part I Vol II
2	*Curcuma longa*	0.97	5.71	9.95	12.24	10.29	7.28	0.65	API Part I Vol I
3	*Ocimum sanctum*	0.76	5.59	9.92	14.36	8.42	15.03	2.24	API Part I Vol II
4	*Glycyrrhiza glabra*	1.67	6.01	8.52	22.82	10.94	8.34	2.01	API Part I Vol I

METHOD OF EXTRACTION

All the drugs were weighed accurately & aqueous extraction had been done (10 times of the weight of the drug i.e. 5g in 50ml of water on water bath at 80-100^{o}C). As the solution concentrated up to 20 ml, filtration was done. Residue had been taken & volume was making up to 40ml, again was boiled. After remaining 20 ml was filtered and the same procedure was followed again.

DRUG FORMULATION

The formulation components used were listed in Table 2. Oil in water emulsion of 1 and 2% of drugs were formulated. The emulsifier (glycerol monostearate) and other oil soluble components (sunflower oil, mineral oil, petroleum jelly, cetyl alcohol) were dissolved in the oil phase (Part A) and heated up to 80° C. Extract and water soluble components (Glycerin, Methyl paraban, Propyl paraban) were dissolved in (Part B) and heated up to 80° C. After heating, the aqueous phase was added in portions to the oil phase with constant stirring until cooling of emulsifier took place. Perfume was added when the temperature dropped to 45^{o}C ± 50^{o}C

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Table 2
Composition of Lotion

S.NO	INGREDIENTS	FORMULA % (W/W)	
		F1	F2
1.	Extract	1	2
2.	Glycerin	2.0	2.0
3.	Water	q s	q s
4.	Sunflower oil	4.0	4.0
5.	Mineral oil	2.0	2.0
6.	Petroleum jelly	1.0	1.0
7.	Cetyl alcohol	1.5	1.5
8.	Glyceryl monostearate	2.0	2.0
9.	Methyl paraben	0.2	0.2
10.	Propyl paraben	0.2	0.2
2	Fragrance	0.1- 1	0.1- 1

EVALUATION OF LOTION[9-11]

TEST FOR THERMAL STABILITY

Thermal stability of the formulation was determined by the humidity chamber controlled at 60- 70% RH and 37 ± 1^{o}C. (Table 3)

DETERMINATION OF PH

5 ± 0.01g of the lotion was weighed accurately in a 100ml beaker. 45ml of water was added & dispersed the lotion in it. The pH of the

suspension was determined at 27°C using the pH meter. (Table 3)

DETERMINATION OF TOTAL FATTY MATTER

2g of the sample was weighed in a conical flask, added 25ml of dil. HCL (1% v/v) & refluxed. Poured this into the separating funnel and 50ml of ethyl ether were added in to it. The separating funnel was shaken well until two layers were separated. The aqueous layer was separated out and added 50ml portion of ether twice. All the ether extracts were combined and filter through the filter paper containing dried sodium sulphate on it. Distilled off the ether (filtrate) & dried the material remaining in the flask at temperature 60±2°C to constant mass. (Table 3)

CALCULATION

Total Fatty Matter% = $100xM_1/M_2$

Where, M_1= mass in gram of residue

M_2= mass in gram of material taken for test

DETERMINATION OF WATER CONTENT

10g of the material was weighed and transferred it into the flask. 200ml of toluene and few pieces of pumice stone was added and connected the apparatus with condenser. The flask was heated until toluene was begin to boil and refluxed. When the H_2O was distilled over source of heat was removed. (Table 3)

CALCULATION

Water % by mass = V X D x 100/ M

Where, V = volume of water in ml at room temperature collecting in receiving tube

D = density of water at room temperature

M = Mass in gm of the material taken for the test

Table 3
General evaluation of Lotion

S.NO.	TEST	FORMULATION	
		F1	F2
1	Thermal stability (at RH 65% and 30 ± 40°C)	Stable, no oil separation	Stable, no oil separation
2	pH (at 27°C ± 2°C)	6.83	6.88
3	Total fatty matter	12.5%	12.5%
4	Water content	88%	88%
5	Herbal residue	Nil	Nil
6	Specific gravity	1.055g/ml	1.058g/ml

MICROBIAL EXAMINATION OF LOTION

1g of material was weighed and aseptically transferred into the conical flask containing 50ml of dil. phosphate buffer at pH 7.2 and pipette out 1ml portion into 3 sterile plates. Melted soyabean casein digest agar (SCDA) medium was poured over it (at 45°C) and cooled. After that plates were rotated to mix properly. Then the plates were incubated at 30 ± 40°C for 74 hrs in an inverted portion. Average number of colonies was determined by multiplying the dilution factor.(Fig 1, Table 4)

Table 4
Microbiological Evaluation of Lotion

S.NO.	TESTS	FORMULATION	
		F1	F2
1	Total aerobic microbial count	$1x10^2$	$1x10^2$
2	Mould and yeast count	$2x10^2$	$0x10^2$

PATCH TEST

About 1-3gm of material to be tested was placed on a piece of fabric or funnel and applied to the sensitive part of the skin e.g. skin behind ears. The cosmetic to be tested was applied to an area of 1sq.m.of the skin. Control patches (of similar cosmetic of known brand) were also applied. The site of patch is inspected after 24 hrs. As there was no reaction the test was repeated three times. As no reaction was observed on third application, the person may be taken as not hypersensitive.

ACCELERATED STABILITY TESTING

Accelerated stability testing of prepared formulations i.e. F1andF2 were conducted at 40 ± 2^{o}C temperature and 75± 5% relative humidity and studied for 90 days. (Table no.5)

Table 5
Accelerated stability testing

MONTHS/ TESTS	HERBAL LOTION (1%)				HERBAL LOTION (2%)			
	Initial month	After – 1 month	After– 2month	After– 3month	Initial month	After–1 month	After – 2month	After– 3month
Physical appearance	Semi liquid	Semi liquid	Semi liquid	Semi liquid	Semi liquid	Semi liquid	Semi liquid	Semi liquid
Texture	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok
Color	Cremish brown	Cremish brown	Cremish brown	Cremishbrown	Cremish brown	Cremish brown	Cremish brown	Cremish brown
Odour	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic
pH value	6.81	6.80	6.81	6.83	6.92	6.88	6.89	6.86
Water content (%)	88%	88%	88%	88%	88%	88%	88%	88%
Specific gravity (wt/ml)	1.153g/ml	1.151g/ml	1.156g/ml	1.154g/ml	1.168 g/ml	1.159g/ml	1.158 g/ml	1.168g/ml
Thermal stability	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok
Total fatty matter	12.5%	12.5%	12.5%	12.5%	12.5 %	12.5%	12.5 %	12.5%
Degradation of product	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Microbial count(cfu/gm)	$0x10^2$ $0x10^2$	$1x10^2$ $0x10^2$	$1x10^2$ $0x10^2$	$2x10^2$ $0x10^2$	$0x10^2$ $0x10^2$	$1x10^2$ $0x10^2$	$2x10^2$ $0x10^2$	$1x10^2$ $0x10^2$

RESULT AND DISCUSSION

The lotion applied on skin was easily removed by washing with tap water Emolliency, slipperiness and amount of residue left after the application of fixed amount of lotion was found. (Table 6). The pH of the lotion 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. Dye test confirms that all formulations were o/w type emulsion lotion. But the formulation (F2) shows more stable in o/w type emulsion. Both formulations produce a uniform distribution of extracts in lotion. This was confirmed by visual appearance and by touch. When formulations were kept for long time, it was found that no change in colour of lotion. The results of water content and total fatty matter value of both formulations showed satisfactory values. The formulation F4 and F5 shows no redness, edema, Inflammation and irritation during irritancy studies. These formulations are safe to use for skin. The result of total aerobic microbial count and Mould and yeast count were presented in table and showed satisfactorily values. Stability studies of the lotion were studied and confirmed that the both formulation (F1 and F2) found to be stable when stored for 90 days.

Table 6
Organoleptic Evaluation of Lotion

S.NO.	SPECIFICATIONS	FORMULATION	
		F1	F2
1	Physical appearance	Semi liquid	Semi liquid
2	Texture	Ok	Ok
3	Colour	Cremish brown	Cremish brown
4	Odour	Characteristic	Characteristic

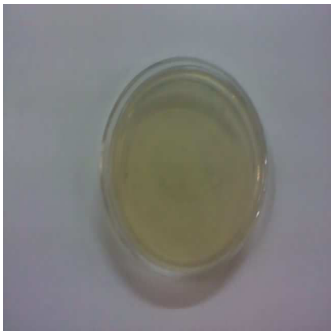

Figure 1
Photograph showing microbial count

CONCLUSION

The present work focuses on the potential of herbal extracts from cosmetic purposes. The uses of cosmetic have been increased in many folds in personal care system. The use of bio active ingredients in cosmetic influence biological functions of skins and provide nutrients necessary for the healthy skin or hair.

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