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FORMULATION AND EVALUATION OF POLYHERBAL CREAM COMPRISING EXTRACTS OF GREEN TEA, LIQUORICE AND BETEL LEAF

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ABSTRACT

Creams are semisolid dosage forms containing one or more substances dissolved or dispersed in a suitable base use as emollient. Herbal cosmetics are used to enhance human appearance. The natural content in the herbs does not have any side effects on the human body; instead enrich the body with nutrients and other useful minerals. The present study was to prepare and evaluate a polyherbal cream comprising extracts of natural products such as green tea extract, liquorice extract and betel leaf extract. Different types of formulations namely F1 to F3 were prepared by incorporating different concentrations of bees wax, borax, liquid paraffin and methyl paraben. The evaluations of all formulations (F1 to F3) were done on different parameters like pH, viscosity, spreadability and stability etc. were examined. Formulations F2 showed good spreadability, good consistency, appearance, pH and no evidence of phase separation. The formulation F2 shows no redness, inflammation and irritation during irritancy studies. These formulations are safe to use for skin. These studies suggest that composition of extracts and base of F2 cream is more stable and safe.

KEYWORDS: Polyherbal cream, Green tea, Liquorice and Betel leaf.

INTRODUCTION[1]

Creams are defined as semisolid dosage forms containing one or more substances dissolved or dispersed in a suitable base use as emollient. These are solid or semisolid preparation which is either oil in water (o/w) or water in oil (w/o) emulsion.[5] Their main function is to provide soothing effect on the skin. Herbal cosmetics are made from natural ingredients and have no side effects, smoothening effect, and they do not produce any irritation to the skin

and also toxic effects to the skin. Herbal cosmetics are suitable to all skin cosmetics. There is a wide list of synthetic compounds present in them, such as sodium lauryl sulfate, phthalates, nitrosamines, paraben and formaldehyde releasers, heavy metals, hydroquinone, nanoparticles, benzophenone, mineral oil, colour pigments, alcohol, ammonium lauryl sulfate and many others This might end up with exposure that is more frequent for such harmful agents. Synthetic chemicals are mainly present in the form of preservatives and fragrance agents. It is true that all the synthetic chemicals used in creams are dangerous and produce harm full effects on the skin. Synthetic creams are more toxic whereas herbal creams are suitable to all skin types. Herbal cosmetics are generally referred as natural cosmetics in which herbs are being used in crude or extract form to make them free from side effects. In addition to being free from ill effects they also provide nutrients and other useful minerals to the body. They contain natural antioxidants like vitamin C. Many other benefits can be seen with the use of herbal products such as; they are suitable for all skin types, more affordable than synthetic ones and wide selection to choose.[2] The main aim of our work is develop a polyherbal cream which give effects like reduce acne; reduce skin irritation; reduce skin redness and swelling. We have used three herbal ingredients in our cream such as green tea extract; liquorice extract; and betel leaves extract. Green tea belongs to family Theaceae and contains polyphenols which are also called as catechins which are benefit to the skin due to their anti- oxidant properties it is having anti - inflammatory properties and is used to reduce skin redness and swelling. Liquorice belongs to family fabaceae also called Leguminosae and contains active constituent called glycyrrhizin and treats skin conditions such as eczema; skin irritation and itching, used to treat acne. It is having anti –oxidant and anti - microbial properties .it also lightens the skin. Betel leaf belongs to family piperaceae, contain active constituent such as eugenol, hydroxychavicol and alpha-tocopherol to treat various skin problems like wound healing and used to treat acne. It has action of cleansing and purifying the skin and has anti-bacterial properties.

MATERIALS AND METHODS[3]

All the materials used in the present study are Green tea; liquorice; betel leaf was collected from garden and herbal stores in Hyderabad.

Table 1: Herbal ingredients and their roles.

SN	INGREDIENTS	ROLE OF INGREDIENTS
1	Green tea	Anti-inflammatory properties can help reduce skin irritation, skin redness, and swelling. antioxidant qualities, antiseptic action
2	Liquorice	Anti -oxidant; Anti- microbial, anti – inflammatory properties, helps to brighten and soothe itchy and irritated skin. Treat acne.
3	Betel leaf	Anti-bacterial; anti-oxidant, Anti – inflammatory properties, treat acne. Cleansing and purifying the skin.

Extraction Process

Extraction Process of Green Tea

Dried green tea leaves were collected and weighed. Leaves are then subjected to blending to turn into a powder. Then powder is passed through a sieve of number 100 and size of 149 microns to obtain a fine powder.

Extraction Process of Betel Leaf

Betel leaf was extracted by three methods called maceration; sonication and soxhlet extraction by using acetone as solvent at 56°C for 8 h.

Fresh betel leaves were collected washed with distilled water and is air dried for 10 days at room temperature. After proper drying of leaves we have collected and grinded in to a coarse powder. 11gms of powder was weighed transferred to thimble. Then 250 ml of acetone was measured and transferred into a round bottom flask. Thimble containing drug is placed in soxhlet apparatus and the extra ends of the thimble was closed by its remaining ends. Set up the Soxhlet, finally extract gets collected at RBF.

Extraction Process of Liquorice

Dried stem powder of liquorice was collected and weighed two spoons of liquorice powder were transferred in to beaker and 50 ml of water is added. To the beaker containing water and liquorice power add 5oml of vegetable glycerin and stir continuously. Beaker is then subjected to double boiler method for 30-45 minutes at 60°C temperature. The liquid is rest for 24 -36 hours. After 24 hours give a little bit shake and filter the extract. The filtrate which is collected in beaker is used in the formulation.[6]

FORMULATION OF CREAM

The cream was prepared by mixing the three types of plant extract in the base formula. The base was prepared by heating liquid paraffin and beeswax in a borosilicate glass beaker at

75℃ and maintains that heating temperature (Oil phase). In another beaker, dissolve borax, sodium benzoate in distilled water and heat this beaker to 75℃ to dissolve borax and sodium benzoate and to get a clear solution (Aqueous phase). Both oil and aqueous phases were heated to 75°C. Then this aqueous phase was slowly added to heated oily phase and mixed vigorously. Then add a measured amount of Green tea extract, liquorice extract and betel leaf extract and stir vigorously until it forms a smooth cream. Then few drops of perfume were added as fragrance.

Table 2: Formulation table.

S.NO	INGREDIENTS	F1	F2	F3
1	Bees wax	10 gm	12 gm	8 gm
2	Liquid paraffin	45 ml	53 ml	37 ml
3	Borax	0.5 gm	0.7gm	0.3gm
4	Liquorice extract	0.5ml	1ml	0.5ml
5	Green tea extract	1gm	0.5gm	0.5gm
6	Betel leaf extract	0.5gm	0.5gm	1gm
7	Methyl paraben	0.04gm	0.04gm	0.04gm
8	Rose oil	Q.S	Q.S	Q.S
9	Water	Q.S	Q.S	Q.S

Evaluation of Creams[1,3]

Physical Evaluation: Formulated herbal creams was further Evaluated by using the following physical parameter physical parameter colour, odour, consistency, and state of the formulation.

Colour: The colour of the creams was observed by visual examination. The result was shows in table 3.

Odour: The odour of creams was examined. The result was shows in table 3.

State: The state of creams was examined visually. The result was shows in table 3.

Consistency: The formulation was examined by rubbing cream on hand manually. Cream does not leave any greasy substance on skin after application. The results were mentioned below in table 3.

pH: pH of prepared herbal cream was measured by using digital pH meter. The solution of cream was prepared by using 100 ml of liquid paraffin and set aside 2 hrs. pH was

determined in three times for solution and the average value was calculated. Results were shown in table 3.

Washability: Formulations were applied on the skin and then ease extends of washing with water was checked. The results were shown in table 3.

Viscosity: Viscosity of cream was done by using Brooke field viscometer at the temp of 25°C using spindle no 62, at 50 rpm. Results were shown in table 3.

Phase separation - The prepared creams were transferred in a suitable wide mouth container. Set aside for storage the oil phase and aqueous phase separation were visualizing after 24h. Result were shown in table no.3

After feel: Emoliency slipperiness and amount of residue left after the application of the fixed amount of cream was found to be good. Observation shown in table 3.

Spreadability: Spreadability of formulated creams were measured by placing sample in between two slides then compressed to uniform thickness by placing a definite weight for defined time. The specified time required to separate the two slides was measured as spreadability. Lesser the time taken for separation of two slides results showed better spreadability. Spreadability was calculated by the following formula and results were shown in table 3.

$$\text{Spreadability} = \frac{\text{Weight tide to upper slide (W) x Length of glass slide (L)}}{\text{Time taken to separate slide (T)}}$$

Test for microbial growth in formulated Cream

The Formulated Creams were inoculated on the plates of agar media by streak plate method and a control was prepared by excluding the cream. The plates were placed into the incubator and are incubated at 29°C for 24 hours. After the incubation period, plates were taken out and checked for the microbial growth.

Stability study: Stability study over a period of three months was conducted. The physical appearance, pH value, drug content, was determined periodically after the 15 days, 30 days,

45 days after cream preparations. The stability of the formulated cream was tested under different temperatures which are 2°C, 25°C and 37°C.

Grittiness: Formulation was evaluated with the help of compound microscope to observe for the presence of any particles.

Non-irritancy test: Herbal cream formulation was evaluated for the non-irritancy test in rats. Observation of the state was done for 24 h results was shown in table 3.

RESULTS AND DISCUSSION

Colour: The colour of the cream was found to be light Green for F1 and Green for F2 and F3 Formulations upon visual observation.

Odour: Odour was found to be characteristics in all formulations.

State: the cream was found to be thick in nature in F1, and semi solid form in F2 and F3.

Consistency: The cream was found to be having better smooth consistency in F2 AND F3 compare to F1.

pH: The pH of the cream was found to be in range 6.3 -6.8 pH which is good for skin. The pH of all formulated creams shown near to the skin i.e., 6.6, 6.4, 6.5.

Washability: The cream was found to be not easily washable in all formulations.

Viscosity: The viscosity of cream was in the range of 20678- 25870 cps which indicates the cream easily spreadable by small amounts of shear. F2 and F3 are having good spreadability.

Phase separation: There is no evidence of phase separation was seen in all formulations.

Spreadability: The cream was found to more spreadable in F2 and F3 when compared with F1.

Grittiness: The cream was found to be less gritty in all formulations.

Irritancy: There was no irritancy and redness for F2 formulation and slight irritation and redness for F1 and F3 formulations.

Stability: The cream of F2 and F3 was found to be more stable in all temperatures when compared to F1, there is a slight change in colour.

Test for microbial growth: There is no evidence of microbial growth was observed in all formulations.

Table 3: Evaluation Parameters.

S.NO	INGREDIENTS	RESULTS		
		F1	**F2**	**F3**
1.	Colour	Light Green	Green	Green
2	Odour	Characteristic odour		
3	State	Thick in nature	Semi solid	Semi solid
4	Consistency	Thick	Smooth	Smooth
5	pH	6.6	6.4	6.5
6	Washability	Not Easily washable	Not Easily washable	Not Easily washable
7	Viscosity	18350 cps	21080 cps	11820 cps
8	Phase separation	No phase separation	No phase separation	Slight phase separation
9	Spreadability	Less spreadable	More spreadable	More spreadable
10	Grittiness	Less Gritty	Less Gritty	Less Gritty
11.	Irritability	Slight irritation and redness	No irritation and redness	Slight irritation and redness
12.	Stability	Slight change in colour	Stable	Stable
13.	Microbial growth.	No growth	No growth	No growth.

The present work was the formulation and evaluation of polyherbal cream. The herbal cream was formulated by using W/0 emulsion method by using mixture of green tea extract, liquorice extract, betel leaf extract. The present work was focus on the anti-inflammatory activity of herbal extracts. This cream formulation was W/0 type of emulsion; hence this formulation was not easily washed with plane water after application. The prepared formulation was good Spreadability. Viscosity and PH of the cream was good. The cream was greasy in nature and there is no phase separation in the formulation.

CONCLUSION

From this it is concluded that current work was done to formulate polyherbal cream containing, the prepared formulations were evaluated with different parameters and was found that F2 formulation showed good spreadability, good consistency, no irritancy, no evidence of phase separation during the study process. The antimicrobial activity of cream was determined, and further aim was to determine the anti -inflammatory activity of green

tea The results of different tests of cream was showed that the formation could be used topically in order to protect skin against diseases and damage.

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