



Formulation and Evaluation of Antibacterial Herbal Vanishing Cream

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ABSTRACT

People were obsessed with looking attractive. Therefore, a variety of beauty products has been used to look attractive and youthful. In cosmetics, the usage of herbal compounds is widespread. The market for herbal cosmetics is expanding and is a gift from nature. Comparing herbal cosmetics to those made of chemicals, herbal cosmetics are safer to use because they are all-natural. The fact that herbal formulations are free of all dangerous synthetic ingredients that could otherwise be detrimental to the skin has always received significant attention. The aim of this study was to create and test an antibacterial herbal vanishing cream with natural components. By including the health advantages offered by carefully chosen various herbs in the formulation, problems including early ageing, radiation damage, loss of pigmentation, moisture, nourishment, and acne could be resolved. These created formulations were tested for pH, viscosity, spreadability, dilution test, dye solubility test, and antibacterial activity. The optimized batch formulation (F4) was tested against *S.aureus* which is common associates of acne and cosmetic appliances. The results indicated that the optimized batch formulation (F4) displayed better antibacterial activity. Therefore, they could be tested further for their performance and quality control parameters.

Keywords: Herbal vanishing cream, antibacterial activity, ethanolic extract, anti-ageing, formulation, cosmetics.

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INTRODUCTION

Now-a-days herbal extracts are used in the cosmetic preparations for augmenting beauty and attractiveness. Herbal cosmetics are classified on the basis of dosage forms like creams, powders, soaps, solutions, etc. and according to part or organ of the body to be applied for like; cosmetics for skin, hair, nail, teeth and mouth etc. Creams are semisolid emulsions intended for application to the skin or mucous membrane. A low fat moisturizer that disappears into the skin is called as a vanishing cream.¹

The traditional systems of medicine, evolved over centuries had been responsible for safe guarding healthcare of the world until the advent of allopathic system of medicine. As the latter system used knowledge of modern biology and chemistry, for both discovery and treatment, it found fast acceptability among the users and now it occupies predominant space in the area of health care. In spite of this, the contribution of the traditional preparations, which are normally polyherbal, is increasing because of general impression that these products are safe; while single-molecule based modern drugs used in allopathic system can have severe adverse effects.²

Herbalisam have become a center of research and focus in pharmaceutical formulation drug discovery due to the advancements in analysis and quality along with enhanced clinical research in analysis and preventing disease.³

Vanishing creams get their name from the fact that they seemed to disappear when spread onto the skin. They are an oil-in-water emulsion consisting of stearic acid, an alkali, a polyol and water. Vanishing cream produces emollient and moisturizing effect. Ideal properties of vanishing creams are high melting point, pure whiteness, and very little odor and low iodine number, rubbed easily on the skin without roll-on effect. It reduces loss of moisture from dry skin, smoothens the skin and keeps it soft, prevents skin from roughening and chapping, used as adhesive for makeup powders.⁴

The herbs which are selected in the formulation are papaya, lemon, carrot, aloe Vera, neem, cucumber, tulsi, etc. Papaya is anti-ageing ingredient, remove dead skin, and keep skin hydrated. Lemon is antioxidant, contain vitamin C, it has also antibacterial activity. Carrot is exfoliating agent, aloe Vera moisturize the skin, also reduces infection and acne. Neem is antioxidant which has also strong antifungal activity. Cucumber gives soothing and cooling effect, reduces swelling. Tulsi lightens the skin and deeply cleans the skin.⁵



MATERIALS AND METHODS**Materials used****Table 1:** List of herbs and respective suppliers

SR. NO.	Herbs	Manufacturer/ Supplier
1	Neem powder	Waghdole Ayurvedic Shop
2	Aloe Vera powder	
3	Tulsi powder	
4	Lemon powder	
5	Carrot powder	From Local Market
6	Cucumber	
7	Papaya pulp	

Table 2: List of excipients and respective suppliers

SR. NO.	Excipients/ Chemicals	Manufacturer/ Supplier
1	Sodium carbonate	Research-lab fine chem. Industries, Mumbai
2	Potassium hydroxide	
3	Methyl paraben	
4	Stearic acid	S D lab chemical centre, Mumbai
5	Propyl paraben	
6	Glycerin	

Method of preparation**Preparation of alcoholic extract of crude drugs**

5 gm of each herb powder was taken into a conical flask; 100 ml of ethanol was added to it and sealed with aluminium foil. These mixtures were subjected to maceration for 5 days. After 5 days, the above mixtures were filtered and the filtrate was concentrated at 60°C for an hour and kept in an air tight container. ⁶

Preparation of alcoholic extract of papaya pulp

5gm of papaya pulp weighed accurately and dissolve in 50ml of alcohol. This solution is placed on water bath at 80-100°C. The heating solution was concentrated up to 20ml. The follow filtration process and collect the filter product. ⁷

Preparation of vanishing cream

Preparation of oil phase: Oil phase of formulation was prepared by melting stearic acid, potassium hydroxide and sodium carbonate at 70°C. ⁶

Preparation of aqueous phase: Aqueous phase of formulation was prepared by addition of ethanolic extract of each herb, glycerin, purified water and preservatives i.e. methyl paraben and propyl paraben heated at 70°C. ⁶

Addition of aqueous phase to oil phase: After heating both the phases i.e. oil phase and aqueous phase at 70°C, the oil phase mixed with aqueous phase with constant stirring. Once the transfer was done, it was cooled down to room temperature followed by the addition of perfume. The final product was then transferred to a suitable air-tight container. ⁶

Table 3: Formulation table

Herbs and excipients	F1	F2	F3	F4	F5	F6
Aloe Vera extract	0.5 ml	1 ml	1.5 ml	2 ml	2.5 ml	3 ml
Neem extract	0.1 ml	0.3 ml	0.5 ml	0.7 ml	0.9 ml	1.1 ml
Tulsi extract	0.5 ml	1 ml	1.5 ml	2 ml	2.5 ml	3 ml
Carrot extract	0.4 ml	0.7 ml	1 ml	1.3 ml	1.6 ml	1.9 ml
Papaya extract	0.4 ml	0.7 ml	1 ml	1.3 ml	1.6 ml	1.9 ml
Cucumber extract	0.5 ml	1 ml	1.5 ml	2 ml	2.5 ml	3 ml
Lemon extract	0.2 ml	0.3 ml	0.4 ml	0.5 ml	0.6 ml	0.7 ml
Glycerin	6 ml	6 ml	6 ml	6 ml	6 ml	6 ml
Stearic acid	17 gm	17 gm	17 gm	17 gm	17 gm	17 gm
Potassium hydroxide	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm
Sodium carbonate	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm
Propyl paraben	0.01 gm	0.01 gm	0.01 gm	0.01 gm	0.01 gm	0.01 gm
Methyl paraben	0.1 gm	0.1 gm	0.1 gm	0.1 gm	0.1 gm	0.1 gm
Purified water	Q.S	Q.S	Q.S	Q.S	Q.S	Q.S

*Total weight of formulation - 50gm



Evaluation of herbal vanishing cream

As per the published protocol, the developed herbal vanishing cream formulations were assessed for pH, viscosity, spreadability, tube extrudability, dilution test, dye solubility test, antibacterial test and stability study.

pH of the cream

The cream formulation (F1-F6) was weighed accurately 5 g and dispersed with 45 ml of water taken in 100ml beaker. The pH of the herbal vanishing cream was determined using digital pH meter at 27°C temperature. ⁶

Viscosity

The viscosity determination of all formulations (F1-F6) was carried out at 25°C using a Brookfield Viscometer, spindle number S-64 at 20rpm speed. The determination was carried out in triplicate and the average of three readings was recorded. ⁶

Spreadability

The spreadability of herbal vanishing cream (F1-F6) was determined by placing 0.5gm cream within a circle of 1cm diameter pre-marked on a glass plate over which a second glass plate was placed. A weight of 500gm was allowed to rest on the upper glass plate for 5min. Spreadability refers to the area covered by a fixed amount of cream sample after the uniform spread of sample on the glass slide. The increase in the diameter due to spreading of the cream was noted. Average of three determinations was noted. ⁷

Tube extrudability

In this method, herbal vanishing cream formulation (F1–F6) was filled in standard capped collapsible aluminium tube and sealed by crimping to the end. The weight of tube was recorded. The tube was placed between two glass slides and was clamped. 500 gm weight was placed over the slides and the cap was removed. The amount of

the extruded cream was collected and weighted. The extruded cream was calculated.

$\% \text{ Extrudability} = \text{Weight of tube with sample} / \text{Weight of the tube after extrudability} \times 100.$ ⁶

Dilution test

In this test, the herbal vanishing cream (F1-F6) was diluted either with oil or water. If the emulsion is o/w type and it is diluted with water, it will remain stable as a water is dispersion medium but if it is diluted with oil, the emulsion will break as oil and water are not miscible with each other. Oil in water emulsion can easily be diluted with an aqueous solvent, where water in oil emulsion can be diluted with an oily liquid. ⁶

Dye solubility test

In these test, the herbal vanishing cream (F1-F6) is mixed with water soluble dye i.e. amaranth and observed under the microscope. If the continuous phase appears red, it means that emulsion is o/w type as the water is in the external phase and the dye will dissolve in it to give color. If the scattered globules appear red and continuous phase colorless, then it is w/o type. ⁶

Antibacterial test

Antibacterial activity optimized herbal vanishing cream (F4) and control ampicillin was done by agar cup- plate technique against the standard test microorganism (*Staphylococcus aureus*). ⁶

Stability study

The stability studies for a drug component are performed according to the ICH guidelines. Stability testing of drug molecule starts with the drug discovery and finishes with the death of compound. The optimized herbal vanishing cream (F4) was filled in a tube and placed in the stability chamber maintained at 40±2°C and 75±5% RH for one month. At the end of the study, samples were investigated for the physical properties, pH and viscosity. ⁶

RESULTS AND DISCUSSION

Table 4: Physical parameters of herbal vanishing cream formulations

Formulation batch	Ph	Viscosity Cp	Spreadability Cm	Tube extrudability %	Dilution test	Dye solubility test
F1	6.89±0.01	1496±1.5	5.4±0.01	97.12±0.02	O/W type	O/W type
F2	6.90±0.005	1330±1.5	7.8±0.05	97.03±0.02	O/W type	O/W type
F3	6.81±0.005	1403±2	7.7±0.1	97.33±0.02	O/W type	O/W type
F4	6.80±0.01	1234±2	8.4±0.05	96.30±0.02	O/W type	O/W type
F5	6.80±0.005	1360±2	7.7±0.1	97.85±0.02	O/W type	O/W type
F6	6.79±0.01	1490±2	7.3±0.05	96.07±0.02	O/W type	O/W type

pH

The pH of the prepared herbal vanishing cream (F1-F6) was found to be range of 6.7 to 6.9, which is near to the pH of the skin.

Viscosity

The viscosity of herbal vanishing cream (F1-F6) was in the range of 1300 to 1500 cps which indicates that the cream



was easily spreadable by small amounts of shear. F4 showed good spreadable property than other formulations.

Spreadability

The therapeutic efficiency of the formulation depends on its spreading value. Hence, determination of spreadability is very important in evaluating topical application characteristics in terms of the extent of area to which the topical application spreads on application to skin on the affected parts. From the evaluation test results presented in Table 2. F4 formulation demonstrated more spreadability than other formulations due to higher viscosity of other formulation, spreadability of other formulation is reduced.

Tube extrudability

All formulations, F1 to F6 have more than 90% of the content extrudable, indicating excellent extrudability. (> 90% extrudability: excellent, > 80% extrudability: good, > 70% extrudability: fair).

Dilution test

The type of emulsion of the prepared herbal vanishing cream (F1-F6) was determined by dilution test and dye solubility test. In the dilution test, the emulsion on dilution with water, was stable as water is the dispersion medium indicating O/W type of emulsion.

Dye solubility test

In the dye solubility test the herbal vanishing cream (F1-F6) was mixed with a water soluble dye i.e. Amaranth and observed under the microscope. The continuous phase appeared red, indicating O/W type emulsion as water is in the external phase and the dye will dissolve in it to give color.

Antibacterial activity

The result of antibacterial activity of herbal vanishing cream (F4) was investigated against *Staphylococcus aureus* by agar cup method. The diameter of zone of inhibition of cream are shown in table 3 and Fig no. 1.

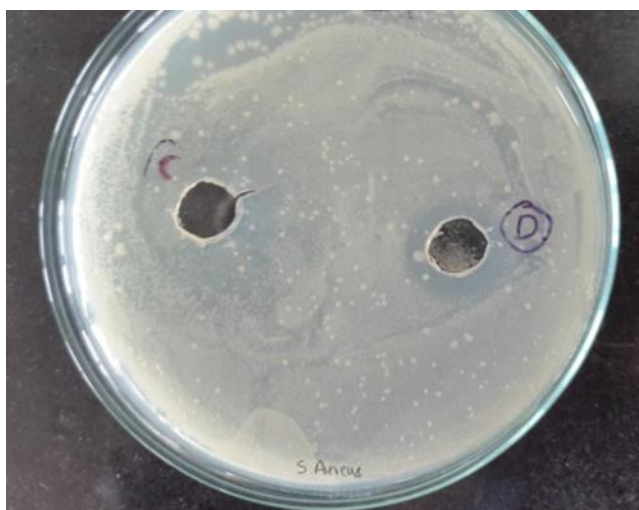


Figure 1: Result of antibacterial activity

Table 5: Antibacterial activity of optimized herbal vanishing cream (F4) and control ampicillin against *S.aureus*

Microorganisms used	Test sample	Zone of inhibition
<i>Staphylococcus aureus</i>	F4	15
	Control Ampicillin	16

Optimized herbal vanishing cream (F4) exhibited the highest zone of inhibition against *Staphylococcus aureus* (15mm). This formulation (F4) showed effectiveness against *Staphylococcus aureus*; hence it can be used as an antibacterial herbal vanishing cream.

Stability studies

Stability study result of the optimized herbal vanishing cream showed that the cream was stable by the point of view of pH, viscosity after one month storage at temperature $40\pm 2^\circ\text{C}$ and $75\pm 5\%$ RH.

Table 6: Stability study result

Optimized batch formulation	pH	Viscosity
F4	6.82 ± 0.01	1495 ± 1.5

CONCLUSION

In the current study herbal vanishing cream were formulated and evaluated for physical parameters and antibacterial activity. The natural herbs used in the preparation of herbal vanishing cream was previously reported to have anti-fungal, anti-microbial, anti-inflammatory, skin-soothing activities for which it retards aging signs and pimple formation reduces wrinkles and protects from sunlight. The results indicated that the formulations passed the tests for pharmaceutical physical parameters and exhibited better antibacterial activity. The prepared herbal vanishing cream nourish, moisturize, protect the skin against premature ageing, irradiation and acne. From above results, it is concluded that on combining the extracts of neem, tulsi, cucumber, carrot, aloe vera, lemon, papaya in a different ratio to get multipurpose effect such as anti-wrinkle, anti-ageing, and sunscreen effect on the skin. The research work suggests that the herbal vanishing cream formulations and its ingredients were studied to be consistent in quality and purity and can be easily used as a vanishing cream. The validation of the cream was done and was found in limits. From above discussion formulation F4 was safe usable for the skin. This study can be helpful for upcoming researchers to select these herbs for the formulation and evaluation of other cosmetic applications which can be claimed for their efficacy with scientific data.

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