

Developing and Assessing a Cream Designed to Remove Stretch Marks from “*Prunus armeniaca*” and “*Centella asiatica*”

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Abstract:- Stretch marks (Striae distensae) are visible lines on the outer skin located usually on abdomen, breasts, thighs. Stretch marks which develop on pregnant women known as striae gravidarum. Almost 50-90% of pregnant women may develop striae distensae. It is caused due to sudden increase in weight during pregnancy, due to rapid weight gain the collagen fibres present between dermis and epidermis layer of skin gets break down and stretch marks appears. Because of various side effects of synthetic medications, the use of herbal medications has increased. To avoid side effect, oil obtained from the leaves of *Centella asiatica* linn i.e. Gotukola and the fruits of *Prunus armeniaca* i.e. Apricot was incorporated into the formulation stimulates collagen synthesis by energizing dermal fibroblast and regenerate the skin cells. The main active ingredient found in gotukola is triterpenoids (saponin) and Apricot is glycosides, it increases collagen production in body and regenerate the skin cells this may help to prevent new stretch marks from forming as well as help to heal any existing marks. The objective of the present study was to developing the cream for the removal of stretch marks. Creams was prepared by oil-in-water emulsion by changing the concentration of active ingredients. Total 3 formulation were prepared among these F3 batch. In this (1.5% and 2%) concentration of oil was added and some butters were added. The final formulation shows pH (8.9), No skin irritancy, better spreadability, consistency and antimicrobial testing.

Keywords:- *Centella Asiatica*, *Prunus Armeniaca*, *Apricot*, *Gotukola*, *Striae Distensae*.

I. INTRODUCTION

Striae (skin stretch marks) were first recognized by Roederer in 1773, and were later histologically described by Troisier and Ménétrier in 1889. In 1936, Nardelli made the first morphologically correct descriptions about stretch marks. Ayurved describes stretch marks as kikissa with meaning closer to the description of striae gravidarum; Acharaya Charak was the founder of kikissa and describe about formation and condition of foetus advised the Antenatal Care of Garbhini (pregnant women) and proper diet regimen with or without medication in 7th month of pregnancy and a disease called Kikkisa develops during this

period. Stretch marks (Striae distensae) are visible streaks on the outer skin located usually on abdomen, breast, thighs and usually fade or disappear naturally over a period of 6-12months. Almost 50-90% of pregnant women may develop striae distensae. Stretch marks which appear during pregnancy produce due to rapid weight gain and stretching between dermis and epidermis layer of skin. due to this stretching collagen fibres present between this two layer gets break down and stretch marks formed.^{[1][2]} Gotukola oil and apricot oil is the most important herbal drug considered to treat stretch marks. It is essential oil obtained from the leaves of *centella asiatica* linn, belonging to family Apiaceae, because it contains triterpenoids (asiaticosides) which increases the synthesis of collagen fibres. Apricot oil is obtained from the fruits of *Prunus armeniaca*, belonging to family Rosaceae, it contains alkaloids and fatty acids which regenerate the skin cells and both was selected as an active ingredient.^{[3][4]} Stretch marks affects the dermis by preventing the fibroblasts from organiing collagen fibres to keep up with the skin's stertching. The collagen bundles are altered, they loss their orientation and organized into a fibrotic sturcture while the elastic network is also disupted. The majority of topical products claim to improve the appearance of SD by the stimulation of collagen production in order to increase skin elasticity.^[5]

➤ *Types of Stretch Marks*

- Striae rubrae
- Striae gravidarum
- Striae nigra
- Striae albae
- Striae caerulea
- Striae atrophicans ^[6]

II. MATERIAL AND METHOD

➤ *Materials:*

Apricot oil and gotukola oil are active ingredients and other ingredients like Cetyl alcohol, Propylene glycol, Mango butter, Cocoa butter, Shea butter, Bees wax, Lavender oil, Almond oil, Potassium hydroxide, Distilled water, Stearic acid.

➤ *Methods:*

- Beeswax is melted in a container on a water bath maintained at 70°C temperature and added with the apricot oil, gotukola oil, cetyl alcohol, propylene glycol, mango butter, shea butter, Cocoa butter and almond oil; this is mixture A (oily phase).
- Water is heated in another container at the same temperature and added with potassium hydroxide and stearic acid; this is mixture B (aqueous phase).
- Mixture B is slowly added to the mixture A with continuous stirring until creamy emulsion to be form.
- In the last step, the preparation is brought down to 40°C temperature and added with a suitable perfume (lavender oil). [7]

➤ *Formulation of cream:*

Table 1 Formulation of Cream

Sr. No.	API/Additive	Formula1(30gm)
1	Apricot oil	1.5ml
2	Gotukola oil	2ml
3	Cetyl alcohol	2gm
4	Propylene glycol	2ml
5	Mango butter	2.5gm
6	Cocoa butter	2.5gm
7	Shea butter	2.5gm
8	Bees wax	1.12gm
9	Lavender oil	1-2drops
10	Potassium hydroxide	1.5gm
11	Almond oil	1.5ml
12	Distilled water	6.88ml
13	Stearic acid	4gm



Fig. 1 Preparation of Cream

➤ *Evolution of Cream:*

• *Physical Appearance*

The looks of the cream was judged by its colour, pearlescence, and roughness and graded. [8]

• *Determination of Ph*

The pH meter was calibrated employing a customary solution. About 0.5 g of the cream was weighed and dissolved in 50ml of water and its pH was measured. [8]

• *Homogeneity*

The formulation was tested for homogeneity by visual appearance and touch. [8]

• *Washability*

The ease of removal of the cream applied was examined by washing the applied dispense with water.

• *Spread Ability*

Spread ability may be expressed by the extent of the area to which the topical application spread when applied to the affected parts on the skin. [9]

• *Antimicrobial Activity*

Steps involved in cup plate method are given below:

- ✓ A liquefied assay medium (43-45°C) is inoculated by the suspension of test microorganism.
- ✓ This inoculated test culture medium poured and spread on sterile petri or prepared agar plates.
- ✓ Standard and test antibiotic solution of known concentration are prepared in appropriate solutions, which are then added to sterile cavities prepared on solid medium.
- ✓ Uniform volume of sodium should be added to each cavity to fill them sufficiently if papers discs are used. They should sterilize first, then dipped in standard or test solution and finally placed on medium surface.
- ✓ The plates are allowed to stand at room temperature or at 4°C for 1-2 hours. This is the period of pre incubation diffusion which minimizes the effect of variation time between the application of different solutions.
- ✓ All plates are then incubated at temperature 32-35°C for 18-24 hours.
- ✓ The diameters or areas of circular inhibition zone produced by standard and test anti biotic solution are accurately measured. [9]

III. RESULT

Table. 2 Observation of Phytochemical Test

Sr. No.	Identification test	Observation	Inference
1.	Detection of steroids and triterpenoid • Libermann-Burchard test • Salkowski test	Reddish-brown ring form Reddish-brown ring	Present Present
2.	Detection of fats and oils • Solubility test	Clear solution	Present
3.	Detection of vitamins • Test for vitamin C	Yellow colour turns blue	Absent
4.	Detection of alkaloids • Dragndroff’s test	Yellow precipitate	Absent

Table no. 3 Evaluation of final cream

Sr. No	Characteristics	Experimental Finding of Cream
General Description and Organoleptic Properties		
1.	Appearance	Semi-solid
2.	Colour	White
3.	Odour	Characteristic
4.	Texture	Smooth
Physicochemical Properties		
5.	pH	8.9
6.	Homogeneity	Homogenous
7.	Washability	Good
8.	Spread ability	Easily spread
9.	Antimicrobial testing	3.38cm zone of inhibition
10.	Viscosity	13458
11.	Emulsion type	o/w

A. pH



Fig 2 pH

B. Spreadability

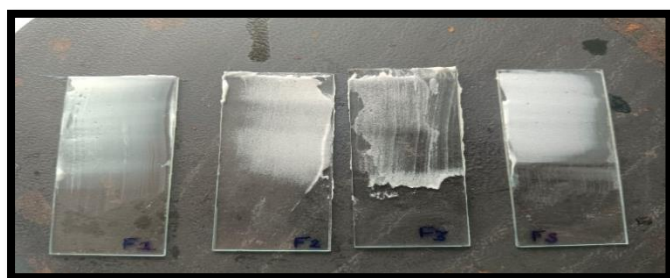


Fig 3 Spreadability

C. Antimicrobial Testing

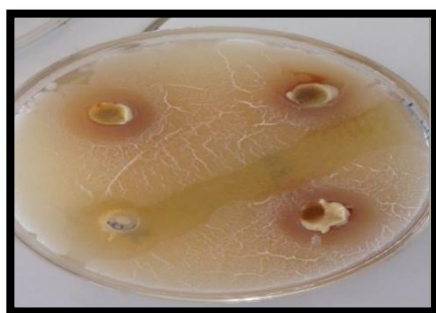


Fig 4 Effect of *C. Asiatica* and *P. Armeniaca* on *Streptococcus Aureus*

IV. DISCUSSION

Striae (skin stretch marks) reducing cream was formulated by “*PRUNUS ARMENIACA*” and “*CENTELLA ASIATICA*”, stretch marks also called striae are form of tissue damage on the skin due to an excessive stretching of the dermis. Stretch marks are commonly associated with pregnancy stretch marks cream formulated by ‘GOTUKOLA’ which have anti-inflammatory, anti-bacterial, synthesis of collagen fibres, anti-oxidant property. ‘APRICOT’ which have anti-microbial, anti-Inflammatory, anti-oxidant & which have Skin - Rejuvenative property.

Ingredients which was used in formulation is Gotu kola oil, Apricot oil, Distilled water, Almond oil, Bees wax, potassium hydroxide, shea butter, cocoa butter, mango butter, cetyl alcohol, propylene glycol, stearic acid & Lavender oil.

Aqueous & oil phase was prepared in which Butter's & oil were added to oil phase & potassium hydroxide, stearic acid and water in aqueous phase & then oil phase is added to aqueous phase with continuous stirring.

When cream was prepared some evaluation parameters spreadability, Homogeneity, Viscosity, Appearance, washability, Antimicrobial activity, colour, texture, pH was observed & known.

V. CONCLUSION AND FUTURE PROSPECTIVE

In the current study, stretch marks removal cream was formulated and evaluated for various parameters, this result indicated that the formulation passed the test. The prepared cream shows better strength, stability, spreadability, no surface defects and gives moisturizing effect on stretch marks due to use of different butters in formulation. From the above result it concludes that new formulation of cream can be safe to use. The herbal ingredients with a hope to minimize the side effect as produced by the available synthetic ones. It can be used during pregnancy and can also reduce body marks by great extent. Patch test is recommended to check irritation, redness or other side effect.

➤ Future Prospective

Stretch marks reducing cream can get for further studies like;

- The cream can be preclinically tested on animals to detect the efficacy of the cream.
- Gotu kola can be study as brain tonic for its neuroprotective activity.
- Apricot can be study for the intoxication of thyroid and nervous system.

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REFERENCES

- [1]. Harper's textbook of pediatric dermatology, volume 1, 4th edition, pg.no.1172-1174.
- [2]. B. Farahnik, K. Park, G. Kroumpouzos, J. Murase, Striae gravidarum: Risk factors, prevention, and management, International Journal of Women's Dermatology, Volume 3, Issue 2, 2017, Pg.no.77-85.
- [3]. Gohil KJ, Patel JA, Gajjar AK. Pharmacological Review on *Centella asiatica*: A Potential Herbal Cure-all. Indian J Pharm Sci. 2010 Sep;72(5):546-56.
- [4]. Flora of North America, *Prunus armeniaca* Linnaeus, 1753. Apricot *Australia, Atlas of Living.* "*Prunus armeniaca* Apricot – Atlas of Living Australia".
- [5]. Veronese, S. et al. The pathology under stretch marks? An elastosonography study. J of Cosmetic Dermatology 21, 859–864 (2022).
- [6]. Piérard-Franchimont C, Hermans, et.al Striae distensae in darker skin types: the influence of melanocyte mechanobiology. J Cosmet Dermatol. 2005 Sep;4(3).
- [7]. Dr. Satya Prakash Singh and Dr. Vijay, et.al Nigam, Cosmetology book.
- [8]. Text book of Pharmaceutical Microbiology Experiments and Techniques by Dr. Chandrakant Kokare, (2010), 3rd edition, career Publication.
- [9]. Lurie S, Matas Z, et.al Association of serum relaxin with striae gravidarum in pregnant women. Arch Gynecol Obstet. 2011 Feb;283(2):219-22.
- [10]. Sheu HM, Yu HS, et.al Mast cell degranulation and elastolysis in the early stage of striae distensae. J Cutan Pathol. 1991 Dec. 18(6):410-6.
- [11]. "*Prunus armeniaca*". Germplasm Resources Information Network. Agricultural Research Service, United States Department of Agriculture. Retrieved 2012-06-22.
- [12]. "*Centella asiatica* (Asiatic pennywort)". Invasive Species Compendium, CABI. 22 November 2017.
- [13]. Koriem KMM (2022) Phytochemical screening, chemical constituents traditional medicine usage pharmacological effect metabolism and pharmacokinetics of semen armeniacae. Biointerface Research in Applied Chemistry 12(3): 3186-3197