International Journal of Research in Pharmacy and Pharmaceutical Sciences
www.pharmacyjournal.in
ISSN: 2455-698X, Impact Factor: RJIF 5.22
Received: 11-01-2021, Accepted: 12-02-2021, Published: 30-03-2021
Volume 6, Issue 2, 2021, Page No. 32-35

A research on formulation and evaluation of herbal anti-inflammatory cream

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Abstract
Boswellia serrata is one of the most popular auspicious and well known trees which are more extensively studied for its pharmaceutical and clinical properties. Formulation of Oil in Water (O/W) emulsion-based cream was formulated with Boswellia serrata extract. Extract of Boswellia was obtained by using Ethanol as a solvent. This cream formulation showed good consistency, good spreadibilty, homogeneity, pH, non-greasy and no evidence of phase separation. The chemical extracts prepared from Boswellia possess anti-neoplastic activity and also have been determined as potential anti-cancer expedients. The chemical extract shows different properties like anti-bacterial, anti-inflammatory, Hepatoprotective and therapeutic properties. This review is aimed to deliver an overview of current knowledge of extract of Boswellia. So I was prepared cosmetic cream in lab and evaluated and compared with marketed herbal cream of Boswellia serrata (Shallaki Cream of GUFIC) for standardization. All the results of evaluating parameter showed that lab made formulation is comparatively equal and it is better in terms of result than marketed formulation.

Keywords: cosmetics, boswellia, phase separation, emulsion based, anti-inflammatory, anti-cancer, formulation

Introduction

Cosmetic products are used to protect skin against exogenousand endogenous harmful agents and improve the beauty and attractiveness of skin. Cosmetics are not only developing an attractive external appearance, but towards achieving long life of good health by reducing skin disorders. The herbal ingredients present in skin care products that supports the strength to the skin, integrity of skin and texture, moisturizing, maintaining elasticity of skin by reduction of collagen and photo protection etc.This character of cosmetic is due to presence of ingredients in skin care formulation because it helps to reduce production of free radicals in skin and manage the skin properties for long time.

The Boswellia serrata (Salai Guggal) is the ancient plant used as an herbal medicine in Ayurveda that is local to India, primarily the states of Punjab. IN India, the main commercial sources of Boswellia serrate are Andhra Pradesh, Gujarat, and Madhya Pradesh,Jharkhand and Chhattisgarh. Regionally, it is also known by different names. The resin of Boswellia species has been used as incense in religious and cultural ceremonies and in medicines.

In Ayurveda, its extract is known to reduce pain in the joints and is useful in case of swollen joints ant anti-inflammatory join disorders. It rejuvenates the blood vessels damage by muscular contractions and also improves the blood supply to the joints.

Since time immemorial, plants and their products have been the primary resource of food, shelter, clothing, flavors, and fragrances as also valuable ingredients for medicines for mankind. In this context, natural resins have played an important role. These have also been used as adhesives, as ingredients for cosmetic preparations, as fragrances in daily rituals and in religious ceremonies, as coating materials and also for their different curative powers. In ancient times, Hindus, Babylonians, Persians, Romans, Chinese and Greeks as well as the people of old American civilizations used natural resins primarily for embalming and for its incense in cultural functions. They firmly believed that when these materials get in contact with fire, the smoke and the fragrances they souls but also soothe their souls but also please their gods. Burning of these natural resins had become an important component their cultural life. They burned these resins during sacrificial ceremonies and in their daily rituals to preventthe influence of evil spirits on their souls or to their souls or to honor the dead or living ones.

Topical cream formulation gives a proper drug delivery system at desired concentration of drug because they are less oily and can be simply removed from the skin. Topical drug delivery system is most convenient method for the delivery of drug via mucus membrane or skin because it can easily reach to organ or targeted tissue of human body to achieve better therapeutic effect.

Cultivation and Collection

Climate

Boswellia serrate grows in the tropical dry deciduous forests and occurs in very teak forestsor in dry mixed deciduous forests.

Soil

Prefers rich fertile soils but can tolerate dry soil conditions.

Growing

The seeds should be soaked in water before they are sown, to separate out the sterile pyrenes, which float on the surface. Seed germination takes between 7 and 15 days. Boswellia serrata can survive and sprout from large branch or stem cuttings.

Harvesting

Oleo gum-resin is tapped from an incision made on the trunk of the tree and is then stored in bamboo baskets to remove the oil content and to get the resin solidified. After processing, the gum resin is then broken into smaller pieces with a mallet, graded according to its flavor, color, shape and size.

Preserving

Store in a cool, dry place away from heat and sunlight

Fig 1: (Gum Resin of Boswellia)

Phytochemistry

The composition of Boswellia Serrata gum resin differs from species to species, thus depending on resin quality and geographical conditions. Boswellia Serrata is mainly considered for its pharmacological effects consisting of about 200 phytochemicals including essential oil and mucus. The Boswellic acids define chemical feature of all Boswellia species. The Boswellic acid is present in Boswellia in different quantities, in which major ones are: α-Boswellic acid, β-Boswellic acid, Acetylated α-Boswellic acid, Acetylated β-Boswellicacid (ABA), 11-keto-β-boswellic acid(KBA) and 3-O-acetyl-11-keto-β-Boswellic acid(AKBA).Amount of Boswellic acid in monetarily available Boswellia Extract differ within the ranges 37.5 to 65%. AKBA and KBA, the two Boswellic acids are the most active and promising anti-inflammatory agenyts in Boswellia.

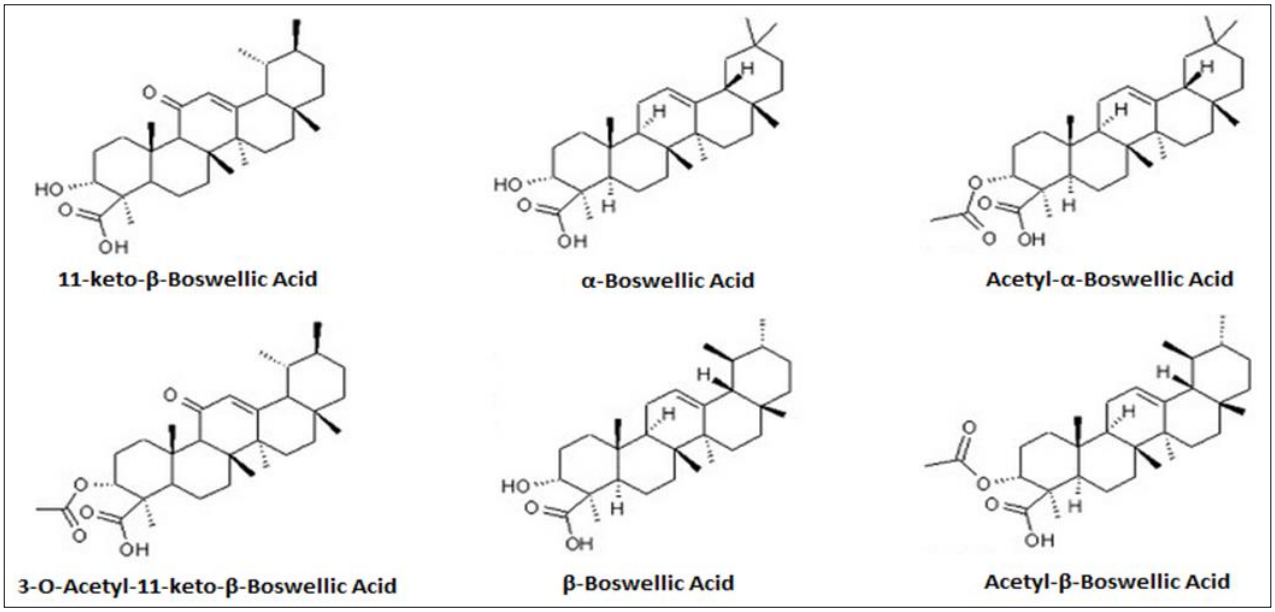

Fig 2: (Structures of Chemical Constituents)

Materials and Methods

Preparation of extracts

The shade dried and coarsely powdered (500g) of Boswellia Serrata in soxhlet apparatus using petroleum ether and then successively extracted with ethanol.

The extracts were then concentrated to dryness under reduced pressure and controlled temperature respectively and then preserved in refrigerator for further utilization.

Cream Formulation

Oil in water (O/W) emulsion based cream 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 The preservative and other water soluble components (methyl paraben, propyl paraben, triethanolamine, propylene glycol, ethanol extract of Boswellia Serrata) was dissolved in aqueous phase After heating, the aqueous phase was added in portions to oil

phase continuous stirring until cooling of emulsifier take place.

Table 1: Composition of Cream

S.No	Ingredients	Quantity (%)	Uses
1.	Ethanol extract of Boswellia Serrata	20	Anti-inflammatory agent
2.	Stearic acid	30	Stabilizer
3.	Cetyl alcohol	20	Soothing agent
4.	Rose oil	5	Flavoring agent
5.	Methyl paraben	5	Preservative
6.	Propyl paraben	5	Preservative
7.	Propylene glycol	10	Emollient
8.	Triethanolamine	5	Moisturizers
9.	Water	Q.S	Vehicle

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.

Viscosity

Viscosity of the formulation was determined by Brookfield Viscometer at 100 rpm, using spindle no L4.

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 in the background colorless. The cream is o/w type. The reverse condition occurs in w/o type cream i.e. the disperse globules appear colorless in the redbackground.

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, pearl scence 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 weight 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

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.

Spreadability test

Sample was applied between two glass slides and was compressed to uniform thickness by placing 100gm weight for 5minutes. Weight was added to the pan. The time required to separate the two slides, i.e. the time in which the upper glass slide moved over the lower slide was taken as measure of spread ability.

Spread ability =m*l/t

m = Weight tide to upper slide

l = length moved on the glass slide

t = time taken.

Results & Discussion

pH of the Cream

The pH of the cream was found to be in range of 6.2 to 6.8 which is good for skin pH. The herbal formulation was shown pH nearer to skin required i.e. pH 6.3.

Viscosity

The viscosity of cream was in the range of 1730-1820 cps which indicates that the cream is easily spreadable by small amounts of shear. The cosmetic formulation was shows viscosity within the range.

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. The disperse globules appear colorless in the red background.It concludes that the formulated cream is W/O type.

Homogeneity

The formulation was tested for the homogeneity by visual appearance and by touch, appearance and touch was good.

Appearance

When formulation were kept for long time, it found that no Change in colour of cream.

After feel

Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was found.

Type of smear

After application of cream, the type of smear formed on the

skin were non-greasy.

Removal
The cream applied on skin was easily removed by washing with tap water.

Acid value
The acid value results of formulation was shown in table, and showed satisfactorily values.

Saponification value
The saponification value results of formulation was shown in table, and showed satisfactorily values.

Table 2: (Test applied for acid value and saponification value)

S. No.	Parameter	Formulation
1	Acid value	5.7
2	Saponification value	22.3

Irritancy test
The formulation shows no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin.

Spreadability test
The spreadability test showed that formulation has good spreadable properly.

Conclusion
From above discussion it is concluded that the prepared formulation showed good spreadability, no evidence of phase separation and good consistency during the study period. From the above study it can be concluded that it is possible to develop creams with herbal extracts. The ethanolic extract of BoswelliaSerratais used in formulation of creams successfully. The results of different tests of cream showed that the formation could be used topically in order to protect skin against damage. The lab made formulation complisewith marketed herbal formulation in degree of standardization and shows the evaluation test results better than the marketed ones. The lab made formulation passes all evaluation tests which gives the conformation about their administration. In little bit it is very better than other marketed formulation. Since this cream is multi-function. So, a cosmetic cream which is non-toxic, safe, and effective and improves patient compliance by the utilization of herbal extracts would be highly acceptable. Further research will carry out to check scientifically the synergistic action of formulation.

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