Formulation and Evaluation of Herbal Cold Cream Using *Bombax Ceiba* Fruit Pulp

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Abstract: **In day to day practice the medicinal plants or herbs are widely used by the traditional practitioners for curing various diseases. There is an increase in demand for plant based medicines, cosmetics, health products, food supplements and various pharmaceutical products. The aim of present study is to formulate and evaluate cold cream using *Bombax ceiba* fruit pulp. Traditionally, *Bombax ceiba* is a well-known plant used in treatment of many diseases, with its therapeutic activity partly due to the presence of flavonoids, phenolics, sesquiterpenoids, shamimicin, bombamalosides, bombamalones, bombasin, bombasin 4-o-glucoside, and bombalin. The literature stated the plant having various pharmacological activities such as antioxidant, antimicrobial, anticarcinogenic, anti-inflammatory, immunemodulatory, hypotensive, hypolipidemic, antihyperglycemic, and analgesic**

***Keywords: Bombax ceiba*, cold cream, fruit pulp.**

I. INTRODUCTION

Bombax ceiba is important medicinal plant of tropical and subtropical India. It is commonly known as silk cotton tree and semal which belongs to family Bombacaceae. Traditional medicicinal uses of this plant are reported in Ayurveda Sidhha & Unani. It is a lofty, deciduous tree upto 45 m tall and 6 m or more in girth with horizontally spreading branches and young stems covered with stout, hard prickles[1]. The bark is pale ash to silver grey in color. Flowers are large in diameter, red in color and numerous with copious nectar.

The fruits are brown capsule-like upto 15 mm long, filled with numerous black seeds which are irregular obovoid in shape, smooth and oily with dense silky hair[2]. The fruit pulp is sweet and edible. According to ayurveda, it has stimulant, aphrodiasic, diuretic, cardiotonic, antidiarrheal, haemostatic, antidysentric[3-4]etc. Young fruits are useful in calculus affections, chronic inflammations,anti microbial, and ulceration of the bladder and kidney[5]. Flowers of *B. ceiba* (25–50 g as feedstuff) were fed to the animal as anthelmintics[6]. Ethnomedicinal uses of *B. ceiba* bark externally for cattle wounds[7].

Cream consist of medicament dissolved or suspended in water removable or emollient bases, classified as water-in-oil or oil-in-water and intended for application on the skin or accesible mucous membrane to provide localized and sometimes systemic effects at the site of application. The function of a skin cream is to protect the skin against harshness from the environment and any dry conditions of the skin. A skin cream should aid the skin in carrying out its normal functions that is, restoring moisture to dry skin, allowing the elimination of waste matter through the pores, and the cooling of the body by evaporation of water (perspiration) and radiation, thus aiding in the maintenance of the normal body temperature[8]. Topical skin infections commonly occur and often present therapeutic challenges to practitioners, despite the numerous existing antimicrobial agents available today. The necessity for developing new antimicrobial means has increased significantly due to growing concerns regarding multi drug resistant bacterial, viral, and fungal strains[8]. Consequently, attention has been devoted to safe, new, and/or alternative antimicrobial materials in the field of antimicrobial chemotherapy. Common examples for topical skin infections include diaper rash, cold sores, and tinea (also called pityriasis) versicolor.

II. EXPERIMENTAL AND RESULTS

Collection of plant Material:

The Bombax ceiba Linn fruits collected from Kamla Nehru college of pharmacy, Butibori campus, Nagpur, Maharashtra, India. The plant was identified and authenticated by Post Graduate Teaching Department of Botany, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

Solvent extraction

Crude plant extract was prepared by Maceration process. About 10gm of crude Fruit pulp of Bombax ceiba were processed to remove earthy matter and residual materials carefully from fruit, clean and shade dried. Fruit pulp of Bombax ceiba was extracted with ethanol and water by cold maceration process for 24 hour. This extract then filter and concentrated under sundried and stored at 4-8 C for further used.

Preparation of Cream Base:

Dissolved the Borax in hot water. separately melt all the waxy materials and oil are added to it. Heat the molten mass as about 70^0 c. Pour the borax solution at the same temperature and add herbal extract constant stirring until cold. When the temperature id dropped to about 45-50^o C.

Formulation of Cold Cream:

Table 1: Formulation of cold cream

Sr no.	Name of ingredient	Quantity taken
1	Fruit extract	2ml
2	White mineral oil	11.2 ml

3	White bees wax	4 gm
4	Borax	2 gm
5	Glyceryl monosterate	0.9 gm
6	Propyl paraben	0.5 gm
7	Water	4.74ml
8	Perfume	qs

Evaluation Of Cream

Physical Properties

The Cream was observed for color, odour and appearance[9].

Spreadability

The Spreadability was expressed in terms of time in seconds taken by two slides to slip off from the cream, placed in between the slides, under certain load. Lesser the time taken for separation of the two slides, better the Spreadability. Two sets of glass slides of standard dimensions were taken. The herbal cream formulation was placed over one of the slides. The other slide was placed on the top of the formulation, such that the cream was sandwiched between the two slides weight was placed upon the upper slides so that the cream between the two slides was pressed uniformly to form a thin layer. The weight was removed and the excess of formulation adhering to the slides was scrapped off. The upper slide allowed slipping off freely by the force of weight tied to it. The time taken for the upper slide was noted

Spreadability= m × l /t

m = weight tied to the upper

l =length of glass slide

t =time taken in seconds[10].

Homogenecity:-

Container by applying of normal force at 27±20 C. In addition, bulk of contents shall extrude from the crimp of container and then rolled it gradually

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[11].

Washability

A small amount of cream applied on hand & washed under running tap water.

Viscosity

Viscosity of formulated cream was determined by book field viscometer at 100 rpm using spindle No 7.

pH of the cream

The pH of various formulations was determined by using digital pH meter. About 1 g of the cream was weighed and dissolved in 100 ml of distilled water and stored for two hours. The measurement of pH of each formulation was done in triplicate and average values were calculated[12].

Stability:

The cream shall be stable, but not to be deteriorating, ferment and segregate during normal storage conditions and usage. Stability of cream can be tested when it exposes to 45±20C for a period of 28 days. After storage, no phase separation, fermentation and gassing can be observed. Also exposed to cool conditions such as 50C for 1 hour, no obstruction of extrudable form from the container is observed agar disc diffusion method.

Table 2: Evaluation parameters of Cold cream

Sr No.	Test Parameters	Observation	Inference
1	Color	Pale yellow	
2	Odour	Charecteristics	
3	Appearance and Homogenicity	Homogenious	Passes the test
4	Viscosity	4445m2/s (poise)	Passes the test
5	Spredability	5.2 g cm/ s	Passed the test
6	pH meter	PH- 7.05	Passed the test
7	Stability	Stable	-
8	Skin irritation test	No skin reaction	Passed the test
9	Antimicrobial activity	Microbial Inhibition	Passed the test

Antimicrobial Assay

Preparation of agar plate:

Weigh nutrient agar and mix in water. Autoclave the mixture to 121 ^{o} C for 30 minutes at 15 lp pressure. Molten agar is poured in petri dish. After solidification, spread the inoculums on the surface using spreader or loop. Dig well of 6 mm using sterile boar. Place the test solution in the well. Keep for 4-5 hrs to diffuse. Place in incubator at inverted position for 24 hrs. The zone of inhibition was measured.

The bacterial strains Escherichia coli (Gram -ve) and *Staphylococcus aureus* (Gram +ve) were used. The agar disc diffusion method was used for determining the selective effectiveness of the anti-bacterial activity and ciprofloxacin as standard.

Preparation of sub-culture[7]

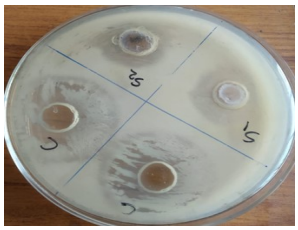
One day prior to this testing, inoculation of the above bacterial cultures were made in the nutrient agar and incubated at 37oC for 18-24 hrs.

Procedure

Weigh nutrient agar and mix in water. Autoclave the mixture to 121oC for 30 minutes at 15 lp pressure. Molten agar is poured in petri dish. After solidification, spread the inoculum on the surface using spreader or loop. Dig well of 6 mm using sterile boar. Place the test solution in the well. Keep for 4-5 hrs to diffuse. Place in incubator at inverted position for 24 hrs. The zone of inhibition was measured.

Reading plates and interpreting results:

After 14 to 16 hours of incubation, each plate was examined. If the plate was satisfactorily streaked, and the inoculums were correct, the resulting zones of inhibition should be uniformly circular and a confluent lawn of growth. The diameters of the zones of complete inhibition (as judged by the unaided eye) were measured, including the diameter of the disc. Zones were measured to the nearest whole millimeter with the help of a ruler, which was held on the back of the inverted Petri plates. The Petri plate was held a few inches above a black, non reflecting background and illuminated with reflected light. The zone margin should be taken as the area showing no apparent, visible growth that can be detected with the unaided eye. Faded growth of tiny colonies, which can be detected only with a magnifying lens at the edge of the zone of inhibited growth, should be ignored. After measured the diameter of zone of inhibition the data was noted and interpreting the result.



III. RESULTS AND DISCUSSION

Results obtained for quantitative determination of proximate analysis and qualitative screening of phytochemicals in fruit of B. Ceiba. The composition of the prepared cream formulations is shown in Table 1. The physical property of tablet was determined and the results of the physical properties, thermal stability, pH determination, spreadability study, viscosity of the cream are given in Table 2. All the samples of the test product complied with the official requirements of uniformity of weight. The drug content was found to be close to 100% in all formulations. The results are reproducible, even on Cream that had been stored for 3 months at 25 ºC and 60% relative humidity. In formulations containing dried *bombax ceiba* extract of fruit pulp, as the herbal drug was converted to cream formulation, resulting in absence of any chemical interaction between the drug and the excipients used in cream formulations. Hence, the drug was found to be compatible with all the excipients used. The optimized formulated herbal cream was kept for thermal stability studies at temperature and the results were reproducible, even on cream.

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