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Formulation and Evaluation of Herbal Gel containing Extracts of *Albezia Lebbeck* linn

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ABSTRACT

The present research has been undertaken with the aim to formulate and evaluate the herbal gel containing *A. lebbeck* Linn. bark extract. The gel formulation was designed by using aqueous, ethanolic and petroleum ether extracts in varied concentrations along with different polymer. The physiochemical parameters of formulations (pH, viscosity, spreadability etc.) were determined. The results showed that formulation containing 2.5 gm of ethanolic extract of *Albezia lebbeck* bark have promising effect than other formulations.

Keywords: *Albezia lebbeck*, Bark, Gel, Evaluation

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INTRODUCTION

The use of medicinal plants as raw materials in the production of new drugs is ever increasing because of their potentials in combating the problem of drug resistance in micro-organisms. Demand for medicinal plants is increasing in both developing and developed countries. Research on medicinal plants is one of the leading areas of research globally. The research into plants with alleged folkloric use in skin disorders should therefore be viewed as a fruitful and logical research strategy in the search for new drugs[1].

Albezia lebbeck Linn. commonly known as Siris (H), belongs to family Leguminaceae is a medicinally important plant. It is a large, deciduous, unarmed tree, attaining a height of 12 meters or more. Leaves are about 25 centimeters long, with 4 to 8 pinnae, each 15 cm long. Leaflets are obliquely oblong, 6 to 8, and 2 to 5 centimeters long. Flower heads are numerous, white, fragrant, 3 to 4 centimeters in diameter, on long peduncles up to 6 centimeters long. Corolla is greenish-yellow. Calyx is half as long as the corolla. Pods are oblong, 15 to 20 centimeters long, 2 to 3 centimeters wide, flat, shining, straw-colored and containing 6 to 10 seeds[2]. The various part of plant is used medicinally to treat the diseases as mentioned in traditional therapy. Powder of the bark used to strengthen spongy and ulcerative gums. Juice of leaves used in ophthalmia. Decoction of leaves used internally as a remedy for night-blindness. Bark and seeds are astringent; used for diarrhea, dysentery and hemorrhoids. Powdered bark used for ulcers and snake bite wounds. Used for coughs, flu, abdominal tumors. Flowers are emollient, applied as cataplasm on furuncles, boils. Flowers believed to cause retention of seminal fluid. Seeds used for ophthalmic diseases. Seed oil used for leprosy. Seeds are crushed and made into paste and applied to enlarged cervical glands. In Ayurveda, bark decoction used for asthma and eczema[3-4].

For topical treatment of dermatological disease as well as skin care, a wide variety of vehicles ranging from solids to semisolids and liquid preparations is available to clinicians and patients. Within the major group of semisolid preparations, the use of transparent gels has expanded both in cosmetics and in pharmaceutical preparations. A gel is colloid that is typically 99% wt liquid, which is immobilized by surface tension between it and a macromolecular network of fibers built from a small amount of a gelating substance present. Topical drug administration is a localized drug delivery system anywhere in the body through ophthalmic, rectal, vaginal and skin as topical routes. Skin is one of the most readily accessible organs of human body for topical administration and main route of topical drug delivery system. Numbers of medicated products

are applied to the skin or mucous membrane that either enhance or restore a fundamental function of a skin or pharmacologically alter an action in the underlined tissues. Such products are referred as topical or dermatological product[5]. Literature review[6-14] revealed that work on morphological, anatomical, phytochemical, antimicrobial and antidepressant activity were carried out in different extract, but till date no any work was done on formulation of topical gel, therefore the present work was undertaken by us in order to formulate the effective formulation in the treatment of some skin disease like psorosis, body sores etc.

MATERIAL AND METHODS

Collection and authentication of plant material

Plant material (Bark) was collected from Forest Department of Trivani, Ujjain, M.P. in the months of August, 2011 and was identified and authenticated by Department of Pharmacognosy, UIPS, Ujjain, (M.P.) and Voucher specimen No. Pcog/AL/23 was deposited in our department.

Preparation of plant powder

The bark was dried under shade and then powdered coarsely with a mechanical grinder. The powder was passed through sieve No. 40 and stored in an airtight container for further use.

Physico-chemical evaluation

The dried powdered bark was subjected to standard procedure for the determination of various physicochemical parameters such as Ash value, LOD (Loss on drying), Swelling index and FOM (Foreign Organic Matters).[15]

Preparation of extracts [16]

Aqueous extract

The coarsely powdered plant material (250 gm) was extracted with chloroform water (2.5ml in one liter I.P) by cold maceration process in a narrow mouth bottle for 3 days. After completion of the extraction, it was filtered and the solvent was removed by evaporation to dryness on a water bath and it was stored in desiccator.

Ethanolic extract

The shade dried coarsely powdered part 250gms was loaded in Soxhlet apparatus and was extracted with ethanol. The solvent was removed by distillation. The residue was then stored in dessicator.

Petroleum ether extract

The shade dried coarsely powdered part 250gms was loaded in Soxhlet apparatus and was extracted with petroleum ether. The solvent was removed by distillation. The residue was then stored in dessicator.

Preparation of gel containing extract

Different proportions of HPMC and Sodium CMC were dispersed in 50 ml of distilled water with continuous stirring. 5 ml of distilled water was taken and required quantity of methyl paraben and propyl paraben were dissolved by heating on water bath. Cool the solution, then to that added glycerin and mixed it with fist solution. Further required quantity of plant extract was mixed to the above mixture and volume made up to 100 ml by adding remaining distilled water. Finally full mixed ingredients were mixed properly with continuous stirring and triethanolamine was added drop wise to the formulation for adjustment of required skin pH (6.8-7) and to obtain the gel at required consistency (Table 1).[5-7]

Table 1: Composition of topical gel of different extract of *A. lebbeck* Linn.

Ingredient	F1(Aqueous extract)	F2 (Ethanolic extract)	F3 (Petroleum ether extract)
HPMC	3gm	3gm	3gm
Sodium CMC	1gm	1gm	1gm
Extract	2.5gm	2.5gm	2.5gm
Glycerin	2gm	2gm	2gm
Methyl Paraben	0.2gm	0.2gm	0.2gm
Propyl Paraben	5gm	5gm	5gm
Triethalamine	qs	qs	qs
Distilled water	qs	qs	qs

Each formulation contains distilled water up to 100 ml

EVALUATION OF TOPICAL GEL FORMULATION[5-7]

Physical evaluation

Physical parameters such as color and appearance were checked.

Measurement of pH

pH of the gel was measured by using pH meter.

Spreadibility

Spreadibility was determined by the apparatus which consists of a wooden block, which was provided by a pulley at one end. By this method spreadibility was measured on the basis of slip and drag characteristics of gels. An excess of gel (about 2g) under study was placed on this ground slide. The gel was then sandwiched between this slide and another glass slide having the dimension of fixed ground slide and provided with the hook. A. 1 kg weighted was placed on the top of the two slides for 5 minutes to expel air and to provide a uniform film of the gel between the slides. Excess of the gel was scrapped off from the edges. The top plate was then subjected to pull of 80gms. With the help of string attached to the hook & the time (seconds) required by the top slide to cover a distance of 7.5 cm be noted. A shorter interval indicates better spreadibility.

Spreadibility was calculated using the following formula:

$$S = M \times L / T$$

Where, S = Spreadibility, M = Weight in the pan (tied to the upper slide), L = Length moved by the glass slide and T = Time (in sec.) taken to separate the slide completely each other.

Homogeneity

All developed gels were tested for homogeneity by visual inspection after the gels have been set in the container. They were tested for their appearance and presence of any aggregates.

Viscosity

Viscosity of gel was measured by using Brookfield viscometer with spindle.

Skin irritation test

The sample was applied on the skin of hand and was waited for 5 mts to chek the irritation effect.

RESULTS AND DISCUSSION

The physicochemical evaluation of powdered bark of *Albezia lebbeck* Linn. was carried out. In this study ash values (total ash, acid insoluble ash and water soluble ash), swelling index, LOD, foaming index was determined and the results are presented in table 2.

Table 2: Physicochemical evaluation of *Albezia lebbeck* L.

S./No.	Parameters	Values obtained(% w/w)
1.	Total ash	3.6
2.	Acid insoluble ash	2.1
3.	Water insoluble ash	0.9
4.	Swelling index	12
5.	LOD	1.9
6.	Foreign organic matter	0.8

The dried and coarse powdered bark was extracted with different solvents and the percentage yields of extract are mentioned in table 3.

Table 3: Percentage yield of different extract of *Albezia lebbeck* L.

S/No.	Solvents	Estimated percentage (w/w)	Colour of extracts	Nature
1.	Petroleum ether	12.5%	Light brown	Solid Powder
2.	Ethanol	17.5%	Dark brown	Solid Powder
3.	Water	6.5%	Dark brown	Solid Powder

During the trial, the excipients concentrations of HPMC and Sodium CMC are gradually increasing and decreasing as a result several problems are coming like homogeneity, spreadibility and viscosity. That's problems were occurs in some of the batches of polymer based gel containing extract. Hence, these batches were discarded and optimized formula containing extract were formulated. The developed herbal gel was greenish in color, translucent in

appearance and showed good homogeneity with absence of lumps. The formulated F2 preparation was much clear and transparent as compared to F1 and F3 formulation. The values of spreadability indicate that the gel is easily spreadable by small amount of shear. The viscosities of developed gels were measured using Brookfield viscometer with spindle and the result are presented in table 4.

Table 4: Evaluation of formulated topical herbal gel using different extracts of *A. lebbeck* Linn.

S/No.	Evaluation Parameter	Result		
		F1	**F2**	**F3**
1.	Color	Light Greenish	Greenish	Greenish Brown
2.	Odour	Characteristics	Characteristics	Characteristics
3.	Appearance	Homogeneous with some particles	Homogeneous	Homogeneous
4.	Spearidibility (gm.cm/sec)	12.50	15.05	14.25
5.	Viscosity(cps)	1.3×10^3	1.6×10^3	1.5×10^3
6.	pH	7.1	7.0	6.9
7.	Skin irritation	No	No	No

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Herbal formulations have growing demand in the world market. It is a very good attempt to establish the herbal gel containing *A. lebbeck* extract. The studies revealed that the developed single herbal formulation consisting of ethanolic extract is comparatively better than later other formulations. Hence, it was concluded from the present investigation that the formulated gel will be useful in the treatment of several skin diseases, though a detailed animal toxicity studies and screening is still needed to validate the efficacy of the prepared formulation.

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