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DEVELOPMENT AND EVALUATION OF POLY HERBAL ANTIDANDRUFF GEL

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ABSTRACT

Herbal cosmetics are widely used in this modern era, besides synthetic cosmetics. Among hair cosmetics, the role of synthetic cosmetics is tedious, causing various side effects such as discoloration of hair, scalp dry leads to more flaking, loss of hair, toxicity to eye, over drying of hair, pimples. Dandruff is a common hair problem, Most common dandruff causing fungi are *Malassezia furfur*, *pityriasis simplex* and *pityriasis capitis*. The research work deals with the development and evaluation of poly herbal Antidandruff gel containing alcoholic extracts of *Azadirachta indica* as antifungal and anti-inflammatory agent, *Eclipta alba* as anti-inflammatory and antimicrobial agent and *Glycyrrhiza glabra* as antifungal and antimicrobial agent. Two Gel formulations F1 and F2 were compared for various parameters like Wash ability, pH, Spreadability, Homogeneity, Viscosity, Skin irritation test along with Antimicrobial study. The formulation F1, gel with *Azadirachta indica* showed optimum results of various parameters compared to standard, also the antifungal activity.

KEYWORDS: Dandruff, *Malassezia furfur*, *Azadirachta indica*, *Glycyrrhiza glabra*, antifungal activity.

INTRODUCTION

Dandruff is a very common non-contagious hair problem, nearly affecting person irrespective of age. Medically it is defined as pityriasis simplex capitis – shedding of dead skin from the scalp. It may be – dry or grease. Dry dandruff appears silvery and white while greasy flakes appear pale yellowish and may have an unpleasant smell.[1] Historically there have been multiple other descriptive names reflecting the fungal cause of this condition, such as pityriasis simplex and pityriasis capitis (referring to *Pityrosporum*) and furfuracea (referring to *Malassezia furfur*).[2,3] It is a common embarrassing disorder which effects 5% of the global population.[4,5] Dandruff affects the aesthetic value and causes the itching and keratinocytes play major role in the expressions and the generation of immunological reaction during dandruff formation.[6,7] The severity of dandruff may fluctuate with season as a often worsen in winter. Dandruff is common scalp condition that producing the irritating white flakes and itchy scalp. Excessive drying of skin and over-activity of oil gland known as seborrhea.[8,9]

In India, Number of synthetic medicines are available for the treatment of dandruff viz. Selsun, Lonil T, Nizoral, Neutrogena T/Gel. Selsun and Excel shows discoloration of hair blonde to gray color. Lonil T leaves the scalp dry leading to more flaking. Nizoral in over doses shows drawback of Nausea, Vomiting, Hepatitis, Loss of hair. Neutrogena T/Gel, shows drawback of an earthy smell, leads to light orange colored hair and treated skin may become more sensitive to sunlight.

To overcome all these side effects an attempt been made to formulate and evaluate Polyherbal antidandruff gel to minimize all these side effects and to show rapid action on Dandruff.[10]

The herbs selected for this work were *Azadirachta indica*, *Eclipta alba* and *Glycyrrhiza glabra* are reported to have significant antifungal and anti-inflammatory and antimicrobial activities. The growing popularity of natural and herbal medications, easy availability of raw materials, cost-effectiveness and paucity of reported adverse reaction, prompted us formulate a polyherbal preparation. The combination is used in order to enhance the Dandruff.[11-16]

MATERIALS AND METHODS

Azadirachta indica extract, *Eclipta alba* extract, *Glycyrrhiza glabra* extract, Carbopol, Poly ethylene glycol, Methyl paraben, Poly vinyl pyrrolidine, Triethanol amine, Glycerin, Water.

Collection of plant material

The leaves of *Azadirachta indica* and *Eclipta alba and roots of Glycyrrhiza glabra* collected from local area of tirupathi. The plant materials were taxonomically identified by plant taxonomist. Plant materials are shade dried and coarsely powdered for extraction.

Preparation of extracts

Individual powders were weighed transferred into iodine flask and macerated with ethanol for 3 days by intermediate shaking. Filter the macerated powder and finally concentrate the solution to obtain extract.

Preparation of poly herbal Anti-dandruff gel 1(F1)

Measured quantity of methyl paraben, glycerin and weighed quantity of polyethylene glycol were dissolved in about 35 ml of water in beaker. Then it was stirred at high speed using mechanical stirrer. Carbopol 940 and Poly Vinyl Pyrolidine were added slowly to the beaker containing above liquid while stirring. Triethanolamine (Neutralising agent) was added slowly while stirring till to attain gel structure. Required proportions *of Azadirachta indica extract, Eclipta alba* extract, *Glycyrrhiza glabra* extracts were added to the prepared gel and stirred continousely to form proper gel. The details are shown in table 1.

Table 1: Composition of poly herbal Anti-dandruff gel 1(F1).

S.No	Ingredients	Quantity
1	*Azadirachta indica* extract	0.5g
2	*Eclipta alba* extract	0.5g
3	*Glycyrrhiza glabra* extract	0.5g
4	Carbopol	0.3g
5	Poly ethylene glycol	7g
6	Methyl paraben	0.075g
7	Poly vinyl pyrrolidine	0.05g
8	Triethanol amine	0.6ml
9	Glycerine	3ml
10	Water	Upto 50ml

Preparation of poly herbal Anti-dandruff gel 2 (F2)

Measured quantity of methyl paraben, glycerin and weighed quantity of polyethylene glycol were dissolved in about 35 ml of water in beaker. Then it was stirred at high speed using.

Table 2: Composition of poly herbal Anti-dandruff gel 2 (F2).

S.No	Ingredients	Quantity
1	*Eclipta alba* extract	0.5g
2	*Glycyrrhiza glabra* extract	0.5g
3	Carbopol	0.3g
4	Poly ethylene glycol	7g
5	Methyl paraben	0.075g
6	Poly vinyl pyrrolidine	0.05g
7	Triethanol amine	0.6ml
8	Glycerine	3ml
9	Water	Upto 50ml

mechanical stirrer. Carbopol 940 and Poly Vinyl Pyrolidine were added slowly to the beaker containing above liquid while stirring. Triethanolamine (Neutralising agent) was added slowly while stirring till to attain gel structure. Required Proportions of *Eclipta alba* extract, *Glycyrrhiza glabra* extracts were added to the prepared gel and stirred continuously to form proper gel. The details are shown in table 2 [17].

Evaluation methods of formulations

Physical evaluation

Physical parameters such as color, appearance and consistency were checked visually.

Washability

Formulations were applied on the skin and then ease and extent of washing with water were checked manually.

pH

pH of 1% aqueous solution of the formulations was measured by using a calibrated digital pH meter at constant temperature.

Spreadability

Spreadability of gels was measured with the glass slide apparatus, excess of cream was placed between two slides and 1 kg weight was placed on slide for 5 min to compress the sample to uniform thickness, time in seconds to separate two slides was taken as measure of spreadability.

$$S = w\,l / t$$

where,

S = spreadability (g cm/sec)

w = weight on upper slide (g)

l = length of Slide (cm)

t = time taken in sec (sec)

Homogeneity

The developed gels was tested for homogeneity by visual inspection, after the gel have been set in the container, spread on the glass slide for the appearance, tested for the presence of any lumps, flocculates or aggregates.

Viscosity

Brook field viscometer was used to determine viscosity. The sufficient quantity of gel was filled in wide mouth jar separately, the height of the gel was filled in the wide mouth jar should sufficiently allow to dip the spindle. The RPM of the spindle was adjusted to 2.5 RPM. The viscosities of the formulations were recorded.

Skin irritation test

The skin irritation was carried out on human volunteers. For formulated gel, five volunteers were selected and 1.0g of formulated gel was applied on an area of two square inch to the back of the hand. The volunteers were observed for lesions or irritation.

Microbial assay

The antifungal activities of different formulations was determined by modified agar well diffusion method.

METHOD

Add 0. 1 ml of the inocculum/10 ml of previously molten sabouraud dextrose agar media, shake well to disperse equally and immediately pour in sterile plates, allow to solidify taking care that the thickness of layer is uniform and incubated for 24 hours at 22-27°C.

Procedure for activity

0.1 ml of the *Malassezia furfur* inoculum / 10 ml of previously molten sabouraud dextrose agar media, shake well to disperse equally and immediately pour in sterile plates, allow to solidify taking care that the thickness of layer is uniform. Two wells were prepared in each agar plate. Pour the standard solution in one plate with 50ug/ml concentrations. In another plate prepared formulations 1 and 2 are transferred into the wells with 50ug/ml concentrations. and perform the above process to gel base also. Plates are kept for incubation for 24 hrs at 22-27°C. [18-21].

RESULTS AND DISCUSSION

The evaluation parameters are performed and the results are listed in Table 3, 4 and 5. Formulations of F1 and F2 were pale brown in Color with semisolid consistency, formulations were found homogenous, easily washable. Formulations had very slightly alkaline pH which were compatible with normal skin physiology. Anti fungal activities were performed for the formulations F1, F2 and Marketed. From the results it is clearly evident that the formulation with *Azadirachta indica* extract (F1) has shown good anti fungal activity to the dandruff causing organism Malassezia furfur when compared to the formulation without *Azadirachta indica* extract (F2) and F1 shown nearer results when compared to the marketed product.

Table 3: Evaluation of poly herbal Anti-dandruff gels (F1 and F2).

Samples (Formulations & Extracts)	Color	Consistency	Washability	pH
Marketed	Colorless	-	Good	7.04
Azadirachta indica extract	Brown	-	Good	-
Eclipta alba extract	Brown	-	Good	-
Glycyrrhiza glabra extract	Brown	-	Good	-
F1	Pale brown	Semi-solid	Good	7.02
F2	Pale brown	Semi-solid	Good	7.01

Table 4: Evaluation of poly herbal Anti-dandruff gels (F1 and F2).

Samples (Formulations & Extracts)	Spreadability (gm-cm/sec)	Homogeneity	Viscosity (cps)	Skin irritation test
Marketed	11.136	-	-	No irritation
Azadirachta indica extract	-	-	-	No irritation
Eclipta alba extract	-	-	-	No irritation
Glycyrrhiza glabra extract	-	-	-	No irritation
F1	8.762	No lump	3971	No irritation
F2	7.130	No lump	3742	No irritation

Table 5: Evaluation of poly herbal Anti-dandruff gels (F1 and F2).

S. No	Samples (Formulations & Extracts)	Zone of inhibition (mm)
1	Marketed	11
2	Gel base	Nil
3	*Azadirachta indica* extract	8
4	*Eclipta alba* extract	6
5	*Glycyrrhiza glabra* extract	7
6	F1	9
7	F2	7

CONCLUSION

Now the world market is moving towards the herbal medicines for health care and beauty care. An Indian traditional literature and ethanopharmacological study shows a number of plants have the medicinal use. In this study using *Azadirachta indica*, *Eclipta alba* and *Glycyrrhiza glabra* are already reported as antifungal and anti-inflammatory and antimicrobial activities. Present investigation was carried out to formulate Poly herbal anti dandruff gel based on traditional knowledge and evaluate parameters. From this investigation it is clearly concluded that the prepared polyherbal formulation has shown good antifungal activity, clearly evident by observing results of the antifungal studies. Formulation F1 showed good antifungal activity compared to formulation F2 and the results of formulation F1 are very nearer compared to standard drug which clearly indicates that the prepared formulation is best suits for anti – dandruff activity as it is acting against *Melassezia furfur*.

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