



## DEVELOPMENT AND EVALUATION OF POLYHERBAL OINTMENT FOR HAIR GROWTH ACTIVITY

RITU JAIN <sup>1\*</sup>, NEETESH K JAIN <sup>2</sup>, NAMRATA SINGH<sup>3</sup>, A K GNANACHANDRAN<sup>3</sup>, P.D.GOKULAN<sup>2</sup>

<sup>1</sup> Department of Pharmaceutical Chemistry, Pranav Institute of Pharmaceutical Science & Research, Sitholi, Gwalior, India, <sup>2</sup> Department of Pharmacology, Shri RNS Institute of Pharmaceutical Science & Technology, Gwalior, India, <sup>3</sup>Department of Pharmacognosy, Pranav Institute of Pharmaceutical Science & Research, Sitholi, Gwalior, India Email: ritus\_world21@yahoo.co.in

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### ABSTRACT

The present study is an effort to formulate and evaluate hair growth promoting activity of polyherbal ointment. Polyherbal formulation were prepared using extract of *Emblica officinalis* (Fruits) extract (5% w/w), *Centella asiatica* leaf, *Aloe vera* leaf extract (5% w/w), *Ocimum sanctum* leaf extract (5% w/w), *Eclipta alba* extract (5% w/w) in hydrophilic USP base in various ratios to obtained the best formulation. The extract incorporated into ointment were applied topically on shaved skin of rats and primary skin irritation test, hair length *hair density* and total protein estimation show significant hair growth as compare to single extract of *Emblica officinalis*, *Centella asiatica*, *Aloe vera*, *Ocimum sanctum* and *Eclipta alba*.

### INTRODUCTION

Alopecia is a universal problem, having affected both sexes of all races to different extents for as long as mankind has existed. It has been suggested that alopecia could have an adverse effect on physiological life and self esteem between both the genders. Though the side effect associated with this drug has limited its pharmacological benefits hence the drug of plant origin is necessary to replace the synthetic one. India is a repository of medicinal plants. Besides healthcare, herbs are also used for beautification of the body and for preparation of various cosmetics. In traditional system of medicine, many plants and herbal formulations are reported for hair growth promotion but lack of sound scientific backing and information limits their use<sup>1</sup>.

The main problems associated with hair such Fading, dandruff and Shedding. Synthetic drug, minoxidil is a potent vasodilator appears safe for long-term treatment. Approximately 85% of all hairs are in the growing phase (Anagen) at any one time. The Anagen phase or growth phase can vary from two to six years<sup>2</sup>. At the end of the Anagen phase the hairs enters into a Catagen phase which lasts about one or two weeks, during the Catagen phase the hair follicle shrinks to about 1/6 of the normal length<sup>3</sup>. The resting phase (Telogen) follows the catagen phase and normally lasts about 5-6 weeks. During this time the hair does not grow but stays attached to the follicle while the dermal papilla stays in a resting phase below. On the basis of market survey carried out on crude drugs used presently for herbal hair oils gives us clue for selection of drugs for formulation of ointment for hair growth promoting activity. Hence the present study was aimed to evaluate the hair growth activity of herbal formulations, which includes oil extract of all mentioned drugs in various concentrations<sup>2-7</sup>.

### MATERIAL AND METHOD

#### Plant material

Plant material of *Emblica officinalis* (Fruits), *Centella asiatica* (Leaves), *Aloe vera* (L), *Ocimum sanctum* (Leaves) and *Eclipta alba* (L.) (Leaves), were collected in the month of January- February from the region of Gwalior (M.P.)

#### Formulation

Formulation were prepared by fusion method, group one containing *Emblica officinalis* (Fruits) extract (5% w/w), group two *Centella asiatica* leaf, group third containing *Aloe vera* leaf extract (5% w/w), group fourth containing *Ocimum sanctum* leaf extract (5% w/w), group fifth containing *Eclipta alba* extract (5% w/w), group sixth containing leaf polyherbal (PE+CA+OT+EA+AV ratio 1:1) total 5% w/w in hydrophilic USP base.

Hydrophilic ointment USP contains methyl paraben 0.25, propyl paraben 0.15, propylene glycol 120.0, stearyl alcohol 250.0; white petrolatum 250.0, SLS 10.00, purified water 370.0 and different drug extracts to make about 1000g. The stearyl alcohol and white petrolatum were melted together at above 75°C, the other agent with drug extract dissolved in the purified water, were added with stirring until the mixture congealed. SLS was the emulsifying agent, with the stearyl alcohol and white petrolatum constituting the oleaginous phase of emulsion and other ingredients of aq. phase. Methyl and propyl paraben were antimicrobial preservative<sup>8</sup>.

### EVALUATION PARAMETER FOR OINTMENT

#### Skin irritation test

Preliminary skin irritation test on albino rats, the skin from the back of six rats was shaved on both sides of the back using hair clipper and electric shaver to exposed test areas. On cleaned test sites, the prepared formulations were applied and visual observations were made for the appearance of any irritation or erythema for a total period of 72 hr. after the application of test preparations<sup>9</sup>.

#### Hair length

Hair was plucked randomly from the depilated area with the help of electric clipper and measured the hair length with the help vernier caliper and calculated the mean of hair length.<sup>10</sup>

#### Hair density

A hole of 1c.m.<sup>2</sup> was made on card board. Then the card board set on the desired depilated area (where hair fall patches observed) on the back of rat after 45 days of depilation. The hair was trimmed of desired depilated area and the hair was cut with the seizure. The hair was count manually.<sup>11</sup>

#### Total protein estimation

Total serum protein in blood estimated by Modified Biuret method. Biuret is a compound formed by heating urea to 180 degree concentration. When biuret treated with diluted copper sulfate in medium, a purple colure is obtained.<sup>12</sup>

### RESULTS AND DISCUSSION

#### Hair length

In hair growth activity the hair length of all groups shown in Table1. In group-1, group-2, group-3 and group-4, group-5, group-6, group-7 and group-8 hair length was found to be 2.04 mm., 5.15 mm, 3.73 mm and 3.86 mm, 3.89, 3.75, and 4.92 respectively. In this Table the group-8 have significant hair length as compared to control.<sup>13</sup>

**Table 1: Effect of different ointment formulation on hair length of albino rats in hair growth activity**

S.No.	Groups	Drug	Formulation	Hair length mm (mean±s.d.)
1.	Group 1	Vehicle	Ointment Base	2.04±0.081
2.	Group 2	Minoxidil	Ointment	5.15±0.314
3.	Group 3	Hydroalcoholic Extract of <i>Emblica officinalis</i>	Ointment (5% w/w)	3.73±0.314
4.	Group 4	Hydroalcoholic Extract of <i>Centella asiatica</i>	Ointment (5% w/w)	3.86±0.362
5.	Group 5	Hydroalcoholic Extract of <i>Ocimum sanctum</i>	Ointment (5% w/w)	3.49±0.318
6.	Group 6	Hydroalcoholic Extract of <i>Eclipta alba</i>	Ointment (5% w/w)	3.89±0.376
7.	Group 7	Hydroalcoholic Extract of Aloe vera	Ointment (5% w/w)	3.75 ±0.320
8.	Group 8	Polyherbal hydroalcoholic Extract of (EO+CA+OS+EA+AV)	Ointment (5% w/w)	4.92±0.400

Grp-1: Control, Grp-2: minoxidil, Grp-3: EO, Grp-4: CA, Grp-5:OS, Grp-6:EA, Grp-7: AV, Grp-8: Polyherbal. \*Significance (P value < 0.01) as compared of control group to all 8 test group.

**Hair Density**

The hair density of all groups shown in Table 2. In group-1, group-2, group-3 and group-4, group-5, group-6, group-7 and group-8 hair

density was found to be 1254, 2537, 1548, 1640, 1937, 1800, 1986, 2098 per cm<sup>2</sup> respectively. (group-8 have significant hair density as compared to control.)<sup>14</sup>

**Table 2: Effect of different ointment formulation on Hair Density of albino rats in hair growth activity**

S.No.	Groups	Drug	Formulation	Hair length mm (mean±s.d.)
1.	Group 1	Vehicle	Ointment Base	1254±37.96
2.	Group 2	Minoxidil	Ointment	2537± 35.08
3.	Group 3	Hydroalcoholic Extract of <i>Emblica officinalis</i>	Ointment (5% w/w)	1548±38.07
4.	Group 4	Hydroalcoholic Extract of <i>Centella asiatica</i>	Ointment (5% w/w)	1640±37.01
5.	Group 5	Hydroalcoholic Extract of <i>Ocimum sanctum</i>	Ointment (5% w/w)	1937±37.84
6.	Group 6	Hydroalcoholic Extract of <i>Eclipta alba</i> (L.)	Ointment (5% w/w)	1800±36.11
7.	Group 7	Hydroalcoholic Extract of e <i>Aloe Vera</i>	Ointment (5% w/w)	1986±36.36
8	Group 8	Polyherbal hydroalcoholic Extract of (EO+CA+OS+EA+AV)	Ointment (5% w/w)	2098±56.12

Grp-1: Control, Grp-2: minoxidil, Grp-3: EO, Grp-4: CA, Grp-5:OS, Grp-6:EA, Grp-7: AV, Grp-8: Polyherbal. \*Significance (P value < 0.01) as compared of control group to all 8 test group.

**Total Serum Protein**

The total serum protein of all groups shown in Table 3. In group-1, group-2, group-3 and group-4, group-5, group-6, group-7 and group-

8 total serum protein was found to be 5.43, 7.21, 4.46, 3.73, 3.86, 4.62, 4.80, 6.91, g/dl respectively. In this table the group-8 have significant total serum protein as compared to control. In this Table the group-8 have significant hair length as compared to control.<sup>15</sup>

**Table 3: Effect of different ointment formulation on Total serum protein of albino rats in hair growth activity**

S.No.	Groups	Drug	Formulation	Hair length mm (mean±s.d.)
1.	Group 1	Vehicle	Ointment Base	5.43±0.22
	Group 2	Minoxidil	Ointment	7.21±0.17
2.	Group 3	Hydroalcoholic Extract of <i>Emblica officinalis</i>	Ointment (5% w/w)	4.46±0.31
3.	Group 4	Hydroalcoholic Extract of <i>Centella asiatica</i>	Ointment (5% w/w)	3.73±0.36
4.	Group 5	Hydroalcoholic Extract of <i>Ocimum sanctum</i>	Ointment (5% w/w)	3.86±0.34
5.	Group 6	Hydroalcoholic Extract of <i>Eclipta alba</i>	Ointment (5% w/w)	4.62±0.26
6.	Group 7	Hydroalcoholic Extract of Aloe vera	Ointment (5% w/w)	4.80±0.38
7	Group 8	Polyherbal hydroalcoholic Extract of (EO+CA+OS+EA+AV)	Ointment (5% w/w)	6.91±0.081

Grp-1: Control, Grp-2: minoxidil, Grp-3: EO, Grp-4: CA, Grp-5:OS, Grp-6:EA, Grp-7: AV, Grp-8: Polyherbal. \*Significance (P value < 0.01) as compared of control group to all 8 test group.

**CONCLUSION**

The present hair growth study on various parameters like hair length, hair density, total serum protein, were performed. To conclude it can be affirmed that hydroalcoholic extract of *Emblica officinalis*, *Centella asiatica*, *Aloe vera*, *Ocimum sanctum* and *Eclipta alba* and Polyherbal formulation showed reflective results.

The hydroalcoholic extract of Polyherbal formulation show significant hair growth as compare to single drug extract of *Emblica officinalis*, *Centella asiatica*, *Aloe vera*, *Ocimum sanctum* and *Eclipta alba*. Further study will be carry out to find out chemical active constituents of these plants which promoted hair growth. Presence of active constituents like flavonoids, tannins, may be responsible for hair growth activity.

As we get incredibly encouraging results, that provides the way for future researches in this field to understand the mode of action and other parameters. We can say that it would be profoundly beneficial to the humanity as a whole.

Deep and profound investigations are need of the time and future will see the favorable consequence of the genuine efforts of the enthusiastic researchers. Lastly we can predict with the above findings that the formulation is promising and even better results are expected with variation in the proportion of these drugs.

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