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Formulation of shampoo from *Eclipta alba* based on their antioxidant and antimicrobial activity

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ABSTRACT

Eclipta alba (L.) also called as Bhringraj is used in the treatment of gall bladder problems, liver cirrhosis, jaundice and hepatitis. The leaves of the plant have since a long time been used as hair rejuvenation in Ayurveda.The aqueous and ethanolic extracts of the leaves were studied for their total protein, free phenolic and hydroxyl free radical scavenging activity. Based on the results,was formulated. The shampoo formulated was found to have a pH of 6.8 and 7.42 for water and ethanolic extract respectively. Both the prepared product was clear, produced good foams and had no characteristic smell.We found the plant extracts to be active against clinical pathogen. Our study also confirmed the antifungal activity of E.alba against Malassezia which commonly causes dandruff related problems in humans. Incorporating extracts of E.albainto shampoo can be effecting not only in hair growth but also as an antidandruff agent.

Keywords: *Eclipta alba*, shampoo, antimicrobial, antioxidant, *Malassezia*

INTRODUCTION

Eclipta alba (L.) belongs to Asteraceae family and is an annual herb commonly found as weed along roadside in India. The plant is called as Bhringraj in Indian medicine.it is used in the treatment of gall bladder problems, liver cirrhosis, jaundice and hepatitis. Several components such as coumestans, flavonoids, polyacetylenes, alkaloids, thiophenes and triterpenes have been extracted from this plant. The leaves of the plant have since a long time been used as hair rejuvenation in Ayurveda. The plant also possesses anti-venom, antimicrobial and antiinflamatory activity [1]. Recent researches have shown that extract of *Eclipta alba* enhanced hair growth in albino rats [2].

The present study was to study the basic properties of *E.alba* leaf extracts and to formulate *E.alba* extract based simple shampoo and studying its activity on pathogens and dandruff causing malassezia isolated from patient.

MATERIALS AND METHODS

Collection of sample

Organically grown *E.alba*plants were collected from local market and leaves were separated and washed in running water and shade dried. These were then powdered and used for further studies.

Extraction from the leaves

50g of leaf powder was extracted with 50ml of solvent (water and ethanol) in a soxchlet apparatus. The extracts were dried in a desiccator and re-suspended in the respective solvent. 5mg/ml was used as stock solution.

Antioxidant assay

The total protein and free phenol in the sample was determined by lowry's method [3] and Folin-Ciocalteu method [4] respectively. Hydroxyl scavenging activity of the extracts were determined at 30 min by Axelrod method [5].

Preparation of shampoo

The 10% w/w extract shampoo was prepared by standard protocol [6]. Coconut oil was saponified with potassium hydroxide using condenser. After which glycerine, Ethyl alcohol, methyl paraben and extracts were added under stirring condition. The pH and physical properties of the shampoo were studies.

Table 1: formulation of shampoo

Component	Quantity (% w/w)
Coconut oil	16
Potassium hydroxide	3
Glycerine	2
Ethyl alcohol	4
Methyl paraben	0.001
Extract	10
The total volume was made up to 100ml using distilled water.	

Antimicrobial activity:

Antimicrobial activity of the extracts was determined by well diffusion method. 8 hour old cultures were swabbed on nutrient agar plates and using sterile borer, wells of 3 mm diameter and about 2 cm apart were made on each plates. About 100 µl of the plant extracts and prepared shampoo were added into the wells was incubated at 37°C for 24 hours. The development of the zone was noticed, whose diameter was measured. The experiment was repeated thrice to confirm the accuracy of the result.

RESULTS AND DISCUSSION

The aqueous and ethanolic extracts of the leaves were studied for their total protein, free phenolic and hydroxyl free radical scavenging activity. The results obtained are tabulated in table 2.

Table 2: Antioxidant activity

	Total protein (mg BSAE)	**Total free phenol (mg GAE)**	**% inhibition of Hydroxyl free radical**
Aqueous extract	1.734±0.348	6.837±0.941	42.4±5.42
Ethanolic extract	1.264±0.527	6.941±1.042	39.7±3.78

The shampoo formulated was found to have a pH of 6.8 and 7.42 for water and ethanolic extract respectively. Both the prepared product was clear, produced good foams and had no characteristic smell.

The extracts and prepared shampoos were tested for their antimicrobial activity against *P.aragenosa, B.cereus, E.coli, N.meningitis* and *malassezia*. The results obtained are tabulated in Table 3.

Table 3: Antimicrobial Activity

	ANTIMICROBIAL ACTIVITY (mm dia)				
	P.aragenosa	***B.cereus***	***E.coli***	***N.meningitis***	***malassezia***
Aqueous extract	3.7	0.34	2.4	2.5	2.7
Ethanolic extract	5.2	5.2	3.1	2.2	3.4
Aqueous extract shampoo	6.5	3.7	3.7	8.4	6.9
Ethanolic extract shampoo	7.2	8.4	4.1	7.6	7.5

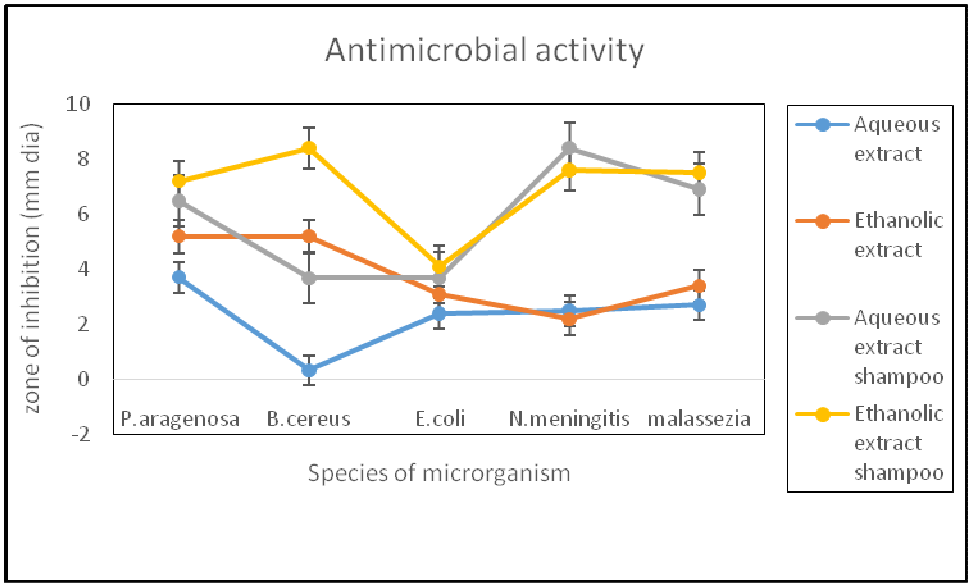

Figure 1: Antimicrobial Activity

Eclipta Alba (L.) contains a range of components including coumestans, alkaloids, flavonoids, glycosides and triterpenoids. The leaves contain a-terthienylmethanol, wedelolactone,Demethylwedelolactone, stigmasteroland demethylwedelolactone-7-glucoside [7]. The polypeptidesfrom the plant yield cystine, tyrosine, glutamic acid, phenyl alanine, and methionine on hydrolysis. The plant is reported to contain even Nicotine and nicotinic acid are reported to occur in this plant [8]

Anti-microbial activity of *Eclipta* plants has already been studied. The alcoholic and water extract of *E. alba* have shown to possesses antiviral, antibacterial and antifungal activity [9-14]. Ethanolic extracts of *E. alba* has already been studied fortheir activity against *K.pneumonia*, *S.dysenteriae*, *E.coli*, *P.aeruginosa*, *B.subtilis*and *S.aureus* [15]. It is also reported that boiling *Eclipta* with other medicinal plants like *Emblicaofficinalis*, *Terminalia chebula*,, *Terminalia belerica*, *Caltropis gigantean* and *Smilax officinalis*with sesame oil acts as a remedy for skin diseases [16].

We found the plant extracts were active against clinical pathogen. Our study also confirmed the antifungal activity of *E.alba* against malassezia which commonly causes dandruff related problems in humans

CONCLUSION

The study was done to determine the antioxidant and antimicrobial activity of aqueous and ethanolic extract of *E.alba*. we found that both the extracts possessed excellent antioxidant, antibacterial and antimalassezic activity. The formulated shampoo too was found to be effect. Incorporating extracts of *E.alba*into shampoo can be effecting not only in hair growth but also as an antidandruff agent.

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