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FORMULATION OF ANTIMALASSEZIC SHAMPOO FROM DATURA METEL AND PROSOPIS JULIFLORA

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ABSTRACT

Prosopis belongs to the family Leguminosae, is a native of Americas, Africa and Asia, Prosopis species grows fast, are drought-resistant, nitrogen fixing shrubs. Extracts of Prosopis juliflora seeds and leaves have several in vitro pharmacological effects such as antibacterial, antifungal, anti-inflammatory properties. Datura metel L., is a perennial herbaceous plant, belonging to the Solanaceae family. In Ayurvedic medicine, seeds of D. metel are used to treat Skin rashes, Ulcers, Bronchitis, Jaundice and Diabetes. The present study was to evaluate the antidandruff activity of datura metel and p.juliflora and thereby developing a shampoo using the simple standard protocol. The shampoo formulated was studied for their pH using a digital pH meter and the pH of 6.82, 7.24, 6.93 and 7.42 was obtained for the extracts of leaves and seed of P. Juliflora and D.metel respectively. We found that both the extracts possessed excellent antioxidant, antibacterial and antimalassezic activity. The formulated shampoo too was found to be effect. Incorporating the extracts of *Datura metel* and *P.juliflora* into shampoo as an antidandruff agent will be useful in treating people affected with excess dandruff. Further studies are also needed to enhance the properties of the prepared shampoo.

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INTRODUCTION

Prosopis belongs to the family Leguminosae, under the subfamily of Mimosoideae and is a native of Americas, Africa and Asia [1]. Prosopis species grows fast, are drought-resistant, nitrogen fixing shrubs which can survive in a soil with less nutrition and they grow well in arid and semi-arid zones [2],[3],[4]. The tropical species such as *P. juliflora* and *P. pallida*, have been distributed around the world over the last 200 years and are now seen abundantly in dry places of Pakistan, India, Brazil, south Africa and Australia (Pasicznik et al., 2001). *P. juliflora* is the most common naturalised species but they have now become invasive weeds. Many Prosopis species are valuable multipurpose resources in their native range, providing timber, firewood, livestock feed, human food, shade, shelter and soil improvement [5]. Steroids, tannins, leucoanthocyanidin and ellagic acid glycosides are predominantly found in *P. juliflora*. Extracts of Prosopis juliflora seeds and leaves have several in vitro pharmacological effects such as antibacterial, antifungal, anti-inflammatory properties [6],[7].

Datura metel L., is a perennial herbaceous plant, belonging to the Solanaceae family which reaches a height of 1.5m. Leaves are simple, alternate, dark green, broadly ovate, shallowly lobed and glabrous. Flowers are large, solitary, and trumpet-shaped with a sweet fragrance. *Datura* can tolerate average soil but prefers soil which is rich and moist or even very alkaline soil but hardly survives under shade and cold. [8] *D. metel* is used for skin inflammation and Psoriasis. In Ayurvedic medicine, seeds of *D. metel* are used to treat Skin rashes, Ulcers, Bronchitis, Jaundice and Diabetes [9]. The whole plant, but especially the leaves and seed, have anaesthetic, hallucinogenic, anti-asthmatic, anti-spasmodic, anti-tussive, narcotic, bronchodilator, anodyne, hypnotic and mydriatic effects. Leaves are used as a local application for rheumatic swellings of the joints, Lumbago, Sciatica, Neuralgia, painful Tumors, Scabies, Eczema, Allergy and glandular Inflammations. [10]

This research work was aimed to utilise the available medicinal properties of both the plant sample and thereby formulating a plant based shampoo and its basic evaluation.

MATERIALS AND METHODS

Collection of sample

Leaves and fruits of *P. Juliflora* and *D. Metel* were collected from Appanaikenpatti region of Sivakasi. Leaves and seeds were separated, washed in running water and shade dried. These were then powdered and used for further studies.

Extraction from the leaves

50g of leaf and seed powder were extracted with 150ml of water by cold maceration. The extracts were filtered, dried by lyophilization and re-suspended in the 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 [11] and Folin-Ciocalteu method [12] respectively. Hydroxyl scavenging activity of the extracts were determined at 30 min by Axelrod method [13].

Preparation of shampoo

The 10% w/w extract shampoo was prepared by standard protocol [14]. 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 studied.

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 plate. About 100 µl of the plant extracts and prepared shampoo were added into the wells and 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

Total protein, free phenolic and hydroxyl free radical scavenging activity of the prepared extracts of leaves and seed of *P. Juliflora* and *D. metel* were studied in order to determine the antioxidant and catalytic activity of the prepared extracts. 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
<i>P. Juliflora</i>			
Seed extract	1.734±0.348	6.857±0.171	42.4±5.42
Leaf extract	1.048±0.472	5.84±0.541	42.4±3.25
<i>D.metel</i>			
Seed extract	1.264±0.527	6.941±1.042	39.7±3.78
Leaf extract	1.127±0.386	6.782±0.565	40.54±4.21

The antioxidant activity of phenols is due to their redox properties and hydrogen donor, phenols in plant extracts possesses antioxidant properties. [15]. Poly phenols exhibits physiological activity. The compounds such as flavonoids; which contain hydroxyls are responsible for the radical scavenging activity in plant [16][17]. Scavenging of H₂O₂ by extracts may be attributed to their phenolic compounds, which can donate electrons to H₂O₂, thus neutralizing it to water [18].

The shampoo formulated was studied for their pH using a digital pH meter and the pH of 6.82, 7.24, 6.93 and 7.42 was obtained for the extracts of leaves and seed of *P. Juliflora* and *D.metel* respectively. Both the prepared product was translucent, produced good foams and had mild to 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 sp*. The results obtained are tabulated in Table 3.

Table 3: Antimicrobial Activity.

	ANTIMICROBIAL ACTIVITY (mm dia)				
	<i>P.aragenosa</i>	<i>B.cereus</i>	<i>E.coli</i>	<i>N.meningitis</i>	<i>malassezia</i>
<i>P. Juliflora</i>					
Seed extract	5.2	5.2	3.1	2.2	3.4
Leaf extract	4.5	6.2	3.1	2.4	3.1
Seed extract shampoo	7.2	6.1	3.8	4.3	5.7
Leaf extract shampoo	6.5	7.1	3.7	5.4	6.9
<i>D.metel</i>					
Seed extract	3.7	4.3	4.4	4.5	3.7
Leaf extract	3.1	3.9	3.2	2.8	2.2
Seed extract shampoo	7.2	8.4	4.1	7.6	6.5
Leaf extract shampoo	7.3	6.7	5.8	5.9	6.6

Anti-microbial activity of *D.metel* has already been studied. The leaf and seed extract of *D.metel* shows good activity against *P.aragenosa*, *k.pneumonia*, *S.typii*, *E.coli* and *S.aureus* [19][20][21]. Researchers have confirmed the antimicrobial activity of the extract of *P.juliflora*. We found the plant extracts were active against clinical strains of some pathogen.

Our study also confirmed the antioxidant, antibacterial and antifungal activity of *Daturametel* and *P.juliflora* against *malassezia* which commonly causes dandruff related problems in humans.

CONCLUSION

The study was done to determine the antioxidant and antimicrobial activity of leaf and seed extracts of *D.metel* and *P.juliflora*. 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 *Datura metal* and *P.juliflora* into shampoo as an antidandruff agent will be useful. Further studies can be performed to enhance the properties of the shampoo, which could be then be marketed.

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CONFLICT OF INTREST

None

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