

EVALUATION OF ANTIDANDRUFF ACTIVITY OF TWIG POWDER FROM *LAWSONIA INERMIS* L.

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ABSTRACT

Dandruff is the major problem in today's world. One of the causes is a fungus *Malassezia furfur*. Medicinal plants are used by many ethnic groups as a source of medicine for the treatment of various ailments in humans. *Lawsonia inermis* or henna is used as a medicinal plant because it is attributed with strong medicinal properties. To check the antidandruff activity, aqueous and methanol extract of twig powder of *Lawsonia inermis* L. (Kalyan and Jodhpur) were tested against *Malassezia furfur* using agar well method. Different concentrations of *Lawsonia inermis* L. were used to check the Minimum Inhibitory Concentration (MIC).

Key word: *Lawsonia inermis* L., *Malassezia furfur*, Antidandruff, MIC

INTRODUCTION

Dandruff is a common scalp condition that occurs when dead skin is shed, producing irritating white flakes. Dandruff is a result of drying of skin (Vyjayanthi *et al.*, 2004). It is usually caused by frequent exposure to extreme heat and cold. It is a common problem faced by all age groups of people. Yeast like lipophilic basidiomycetous fungus *Malassezia furfur* (*Pityrosporum ovale*) is the causative organism for dandruff (Arora *et al.*, 2011). The itching and flaking due to dandruff can be controlled. There are several medicated soaps and shampoos available in the market. They are mostly recommended to treat dandruff. These synthetic products have some limitations which may be due to poor efficacy or compliance issues. Sometimes they also show side effects like rashes, itching of skin, etc. Recent trends show an inclination to treat dandruff using natural products. Synthetic formulations are effective but herbal remedies are the most sought after alternative to combat this.

Attention has been paid to plant derived antifungal compounds based on the knowledge that plants have their own defense systems against fungal pathogens. *Lawsonia inermis* Linn., commonly known as henna (Lythraceae) is a traditional plant widely used over centuries for medication and cosmetics in some regions of the world especially in the Middle East, Africa and Asia (Al-Tufail *et al.*, 1999). Henna leaves are used as a remedy in skin diseases in the

form of a paste or decoction against bruns, bruises and skin inflammation (Bhuvaneswari *et al.*, 2002). Thus in the present study, antidandruff activity of different extracts of *Lawsonia inermis* was evaluated.

MATERIALS AND METHODS

Collection of plant material: Twigs of *Lawsonia inermis* L. were collected from Kalyan (Maharashtra) and Jodhpur (Rajasthan). Authentication of the plant (S.H.-1533) was done at Blatter Herbarium, St. Xavier's College, Mumbai.

Collection of micro-organism: *Malassezia furfur* (MTCC No. 1374) was procured from Microbial Type Culture Collection and Gene Bank (MTCC), Chandigarh.

Media: Sterile Sabouraud's dextrose broth and media supplemented with olive oil (1%) was used.

Preparation of crude extract: 3 gm twig powders of *Lawsonia inermis* L. (Kalyan and Jodhpur) was extracted in 50 ml of distilled-water and methanol overnight separately. The extracts were filtered through Whatman filter paper No. 1. The filtrate was evaporated in a boiling water bath until dry. The evaporated solvent so obtained was weighed. Both crude extracts were dissolved in sterile distilled water at a concentration of 100 mg/ml and extracts were stored at 4°C in airtight bottles until further use.

Minimum Inhibitory Concentration (MIC) assay: Various concentration of aqueous and methanol extract of twig powders from *Lawsonia inermis* L. (Kalyan and Jodhpur) ranging between 10 and 100 mg/ml were introduced into different test tubes. Each tube was inoculated with an overnight culture of *Malassezia furfur* diluted to give a final concentration of approximately 10^7 /ml. Tubes were incubated at 37°C for 24 h. The concentration of the plant extract that did not show any visible growth of the inoculated microorganism in the tube was recorded as the MIC.

Agar well diffusion method: Sterile Sabouraud's dextrose agar supplemented with olive oil plates were prepared for all extracts, 1 ml inoculum of *Malassezia furfur* was mixed in sterile Sabouraud's dextrose agar butts and pour it on sterile petri plates. After solidifying the plates four wells approximately 5 mm diameter were prepared with the help of sterile borer. 50µl of aqueous and methanol extract of twig powder (Kalyan and Jodhpur) were poured into the

wells. Sterile distilled water was used as a control. The plates were incubated at 37°C for 24 hrs and a zone of inhibition was observed.

RESULTS AND DISCUSSIONS

The aqueous of twig powder from field grown plant of *Lawsonia inermis* L. (Kalyan and Jodhpur) showed minimum inhibitory concentration (MIC) at 70 mg/ml whereas and methanol extract showed MIC at 60 mg/ml (Table 1).

Table 1: Minimum inhibitory concentration (MIC) of twig powder of *Lawsonia inermis* L. against *Malassezia furfur*

Sr. No.	Samples	Concentration (mg/ml)
Aqueous extract		
1.	Twig powder (Kalyan)	70 mg/ml
2.	Twig powder (Jodhpur)	70 mg/ml
Methanol extract		
3.	Twig powder (Kalyan)	60 mg/ml
4.	Twig powder (Jodhpur)	60 mg/ml

Values are mean of three replicates

The zone of inhibition for aqueous extracts of twig powder from *Lawsonia inermis* L. (Kalyan and Jodhpur) was found to be 13.33 mm and 14.67 mm respectively, however for methanol extract 14.67 mm and 17.66 mm against *Malassezia furfur* respectively (Table 2, Figure 1 and Plate 1). Lemon juice and henna extract; lemon and amla in combination showed best activity against *Malassezia furfur* (Pingili *et al.*, 2016). Aqueous and methanol extract of twig powder of *Lawsonia inermis* L. (Kalyan and Jodhpur) at different concentrations suppressed the growth of the tested bacteria. Methanol extract of these samples showed more inhibition towards *Malassezia furfur* as compared to that of water.

CONCLUSION

Aqueous and methanol extracts of twig powder of *Lawsonia inermis* L. (Kalyan and Jodhpur) showed antidandruff activity (*Malassezia furfur*) when screened using agar well method. The antidandruff activity was found to be more in methanol extract as compared to aqueous extract

Table 2: Antidandruff activity for aqueous and methanol extracts of twig powder from *Lawsonia inermis* L. (Kalyan and Jodhpur) against *Malassezia furfur* by agar well method

Sr. No.	Samples	Concentration (mg/ml)
Aqueous extract		
1.	Twig powder (Kalyan)	13.33 ± 0.55
2.	Twig powder (Jodhpur)	14.67 ± 0.40
Methanol extract		
3.	Twig powder (Kalyan)	14.67 ± 0.10
4.	Twig powder (Jodhpur)	17.66 ± 0.55

Values are mean of three replicates. Mean ± SE

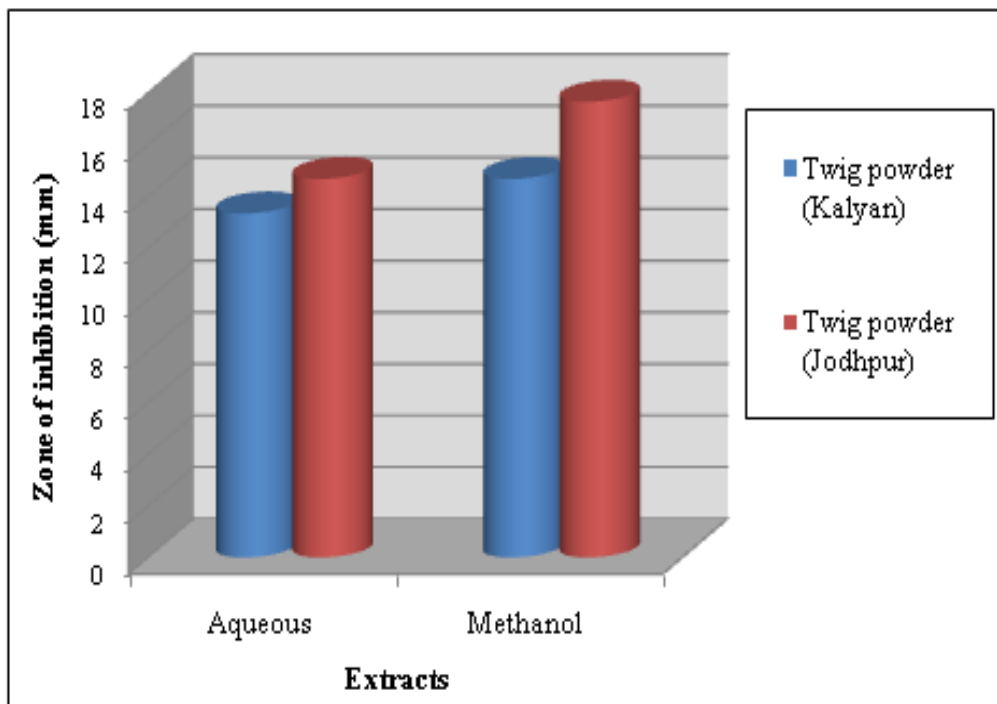


Figure 1: Antidandruff activity for aqueous and methanol extracts of twig powder from *Lawsonia inermis* L. (Kalyan and Jodhpur) against *Malassezia furfur*



Plate 1: Zone of inhibition of against *Malassezia furfur*

- a) Methanol extract of twig (Kalyan) of *Lawsonia inermis* L.
- b) Methanol extract of twig (Jodhpur) of *Lawsonia inermis* L.

Lawsonia inermis L. (Kalyan and Jodhpur). Dandruff is a common scalp disease caused by three factors: fungal infection, sebaceous secretions and individual sensitivity. Dandruff is one of the leading causes of hair fall and alopecia in the world. Thus pharmaceutical industries are searching for new products of herbal origin which showed less toxic effect as compared to synthetic products available in the market. The use of plant extracts with known anti dandruff properties can be of great advantage in therapeutic treatments.

ACKNOWLEDGMENTS

Authors are thankful to the Botany Department, VPM's B. N. Bandodkar College of Science, Thane for providing the laboratory facilities.

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