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Leaf extract of *Azadirachta indica* (neem) as herbal cure of dandruff

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Abstract

The leaf extract of *Azadirachta indica*, neem plant was examined for anti-dandruff activity using microbiological tests such as MIC determination by well, disc and spread method and methylene blue reductase test at Botany Department, Nusrat Jahan College Rabwah Chenab Nagar. Leaves were grinded and filtered. The filtered extract (3ml and 5ml) was mixed with Sabouraud's medium. After solidification of medium dandruff isolated from students hairs was spread over and petri plates were incubated for 5 days at 35°C. Neem leaf extract (5ml) showed effective control on dandruff growth.

Keywords: Leaf extract, *Azadirachta indica*, anti-dandruff, Sabouraud's medium

Full length article **Corresponding Author*, e-mail: maleeha.umber@njc.edu.pk

1. Introduction

Pityriasis capitis is medical terminology of dandruff. During this dermal condition tiny pieces of skin scales get separated from scalp and fall off. Dandruff effected people in most cases face self-esteem issues [1]. Reddening, itching and flaking with over production of sebum are among most common symptoms of dandruff. Scalps with dandruff are more susceptible to hair loss as compared to dandruff free scalps. According to previous studies more than fifty percent of adult population is victimized by dandruff. Among different types of scalp disorders, 25% are dandruff issues [2]. A survey reports that about fifty million people suffer from dandruff annually and more than three hundred million dollar is spent on various types of treatments of dandruff [3]. *Malassezia* is the causal fungi of dandruff. Besides *Malassezia*, *Candida albicans* and *Pityrosporum* also cause dandruff. Among various species of this fungi, most prominent on human scalp are *M. furfur*, *M. restricta* and *M. globosa*. These are lipophillic fungi [4]. Colonies of this fungus are cream colored, yellowish and orange depending on species. At young age these colonies are smooth and bulged but with maturity become dry and squeezed. This fungi grows very fast and within five days of incubation at 30-37°C gets mature [5].

Herbal treatment of dandruff is more beneficial as compared to chemical treatments as there are chances of side effects. In view of above mentioned dandruff condition a study was planned to examine if leaf extract of neem plant can be used as herbal remedy of dandruff. It is very much renowned plant due to its medicinal and anti-microbial properties. Neem leaves can be used to clean air born bacterial contaminations in residential areas [6]. Neem seeds are used to cure various eye and ear infections. Aqueous extracts of neem are very much beneficial in viral diseases [7]. Fruit of neem causes infertility.

2. Materials and Methods

Dandruff was isolated from 12 volunteer students and was maintained at Sabouraud's agar medium. Neem leaves were rinsed and surface sterilized using HgCl. They were grounded in distilled water using mortar pestle. Extract was filtered using wattman filter paper. Two concentrations of neem leaf extract were used 3ml and 5ml.

Minimum inhibitory concentration determination (MIC)

Minimum inhibitory concentration was determined using three methods, spread, disc and well method.

SPREAD METHOD

MIC in spread method was determined by mixing 3ml and 5ml neem leaf extract respectively in petriplates having Sabouraud's medium [8]. After mixing of leaf extracts and media tween 20 was used for emulsification. After emulsification, media with leaf extracts was placed for solidification. When media was solidified, dandruff at the rate of 10^{3} CFU was inoculated on each petri plate. While plates without leaf extracts and just with dandruff on media were taken as control group. At the end of inoculation plates were incubated for 5 days at 37°C. After 5 days zone of inhibition was calculated.

WELL METHOD

A well of 10 mm diameter was made in solidified Sabouraud's medium with cork borer. In wells neem leaf extracts of 3ml and 5ml concentrations were poured respectively. Than dandruff was inoculated at same rate as for spread method. Plates were incubated at 37°C for 5 days. After incubation period zone of inhibition was calculated.

DISC METHOD

In disc method small circular discs were first dipped in 3ml and 5ml leaf extracts and were then placed on solidified Sabouraud's medium. Dandruff was inoculated and plates were incubated as in case of well method.

Methylene Blue Reductase Test

Dandruff grown on spread method was taken after 5 days and was stained with methylene blue [9] and observed under microscope. Dead cells retained blue color while living cells did not retain blue color.

3. Results and Discussions

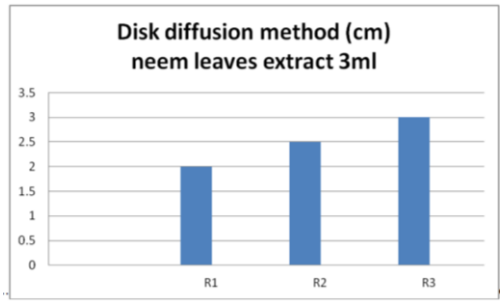

Figure1: Effect of 3ml neem leaves extract on dandruff through disk diffusion method

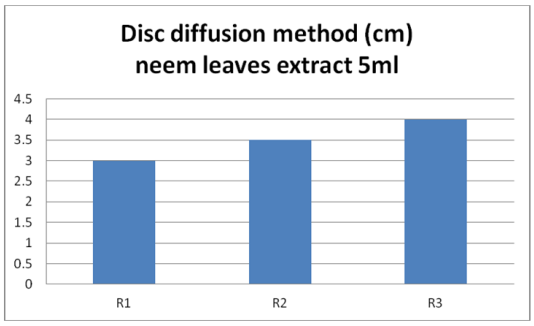

Figure 2: Effect of 5ml neem leaves extract on dandruff through disk diffusion method

Table 1: Effect of 3ml neem leaves extract on dandruff through well diffusion method

WELL DIFFUSION METHOD (cm) OF NEEM LEAVES EXTRACT 3ml	
R1	2
R2	2.9
R3	3.5

Table 2: Effect of 5ml neem leaves extract on dandruff through well diffusion method

WELL DIFFUSION METHOD (cm) NEEM LEAVES EXTRACT 5ml	
R1	3.5
R2	4
R3	3

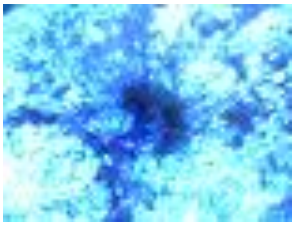

Figure 3: Microscopic image of dead dandruff at 5ml Neem leaves extract spread method

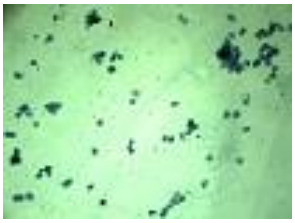

Figure 4: Microscopic image of dead dandruff at 3ml Neem leaves extract spread method

Figure 5: Microscopic image of live dandruff cells from control group

Neem leaves extract at 5ml showed more inhibition of dandruff through well diffusion and disk diffusion method as compared to 3ml concentration of neem extract, however dandruff inhibition was also observed at 3 ml concentration but most promising results of dandruff inhibition were seen at 5ml concentration. This suggests that more the concentration of neem leaves extract more will de dandruff inhibition. Results of MIC test revealed complete death of dandruff cells at 5 ml concentration as compared to 3 ml concentration (Figure 3,4). While control group showed live dandruff cells as no methylene stain was absorbed by them (Figure 5).

Our present study reports that neem leaves extract is very effective herbal remedy against dandruff cure. Also our work supports previous findings regarding neem's anti fungal properties. Also it is cheap and easily assesible means of treatment because neem trees are availabale in almost all areas. Using neam leaves for dandruff treatment,side effects of chemicals can be avoided.

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