

ANTIBACTERIAL ACTIVITY OF NELUMBO NUCIFERA AGAINST PROPIONIBACTERIUM ACNES

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ABSTRACT

Nelumbo nucifera belongs to family Nelumbonaceae was used as medicinal herb in many Asian countries like China & India. This study was carried out with an objective to investigate the antibacterial potential of *Nelumbo nucifera* flower against *Propionibacterium acnes* (*P. acnes*) bacteria. The antibacterial activity was examined in aqueous extract, ethanol extract and ethyl acetate extract of *Nelumbo nucifera* using well diffusion method. The antibacterial activity of the extracts with concentrations 25, 50 & 100 mg/l was tested against *P.acnes* bacteria. The results showed the remarkable inhibition of the bacterial growth against the tested organism.

Keywords: Antibacterial activity, *Nelumbo nucifera*, *P. acnes*, well diffusion method, zone of inhibition.

1.INTRODUCTION

Plants have been used as source of medicine by mankind since ancient times [1]. Drugs derived from natural source play significant role to treat various ailments. Use of traditional medicines is one of the primary healthcare systems in most of the developing countries [2, 3]. Now a days, due to our faulty lifestyle and food habits, we are more prone to various types of bacterial infections and to treat them, we use medicines commonly termed as Antibiotics. Thus, Antibiotics are proved as a weapon to fight against bacterial infections and revive the quality of human health since their introduction [4]. But these synthetic drugs also associated with several side effects. Over the last few decades, many of the common antibiotics prove less effective against infections due to the emergence of drug resistivity in bacteria. Thus, it becomes essential to develop herbal drugs which can be used as an alternative of these synthetic drugs with no side effects. Thus, natural products either as pure compounds or as standardize plant extracts provide new opportunities for new drug development from herbal origin to fight against microbial infections [5].

Acne is a common but serious skin disease, which affects approximately 80% adolescents and young adults in 11–30 age groups [6]. Due to the irrational use of antibiotics, increasing bacterial resistance in acne causing bacteria i.e. *Propionibacterium acne* and *Staphylococcus epidermidis* is now at the alarming stage [7].



Propionibacterium acnes (P. acnes), a gram-positive, anaerobic pathogen, plays an important role in the pathogenesis of acne and thus, considered as the major skin bacteria that cause the formation of acne [8].

Nelumbo nucifera Gaertn. (Family: Nelumbonaceae) is one of the plant having medicinal versatility and used as an important raw material of ancient traditional medical practices like Ayurveda and folk medicine[9]. Pharmacological studies of the plant revealed that the whole plant possess antioxidative [10, 11, 12] antidiabetic, antipyretic, anti-inflammatory [13], antimicrobial, antiviral [14] and anti-obesity [15] properties. Present study is done to study the effect of Nelumbo nucifera flower extracts on acne causing P.acnes bacteria.

II.MATERIALS AND METHOD

2.1 Plant Material

Plant material (Flower) of *Nelumbo nucifera* was collected from rural area of Bhopal (M.P), India in the months of January 2015.

2.2 Extraction Procedure

Powdered flower material of *Nelumbo nucifera* was shade dried at room temperature. The shade dried plant material was coarsely powdered and subjected to extraction with petroleum ether (60-80°C) in a soxhlet apparatus. The extraction was continued till the defatting of the material had taken place [16].

2.3 Extraction by hot continuous percolation process

100 g of *Nelumbo nucifera*. dried plant material were exhaustively extracted with various solvents (Ethyl Acetate, Ethanol and Water). The extracts were evaporated above their boiling points. Finally the percentage yields were calculated of the dried extracts.

2.4 Antibacterial Assay

The pathogenic bacteria P.acnes used in the present study was obtained from National Centre for Cell Science, Pune, Maharashtra. The lyophilized bacterial strain was inoculated in sterile nutrient broth for 24 hours at 37 °C for its revival. After inoculation, the growth was observed in the form of turbidity. The broth culture was further inoculated on nutrient agar plates with loop full of microbes and incubated for next for 24 hours at 37 °C to get pure culture and stored as stock that is to be used in further research work.

Antibacterial activity was determined by using well diffusion method. Nutrient agar medium was poured onto sterile petri dishes and allowed to set at ambient temperature. Fresh bacterial culture was spread on the surface of nutrient agar plate with the help of sterile cotton swab. Wells were cut from nutrient agar plate using sterile cork borer (6 mm dia.). There were three different concentrations which were 25, 50 and 100 mg/ml of each extract were used to examine the antibacterial activity against selected bacteria. Wells were loaded with extracts using sterile micropipette and incubated the plates at 37 °C for 24 hours and then examined for clear zone of inhibition around the wells impregnated with particular concentration.

III.RESULT AND DISCUSSION

In present investigation, the antibacterial activity of aqueous extract, ethanol extract and ethyl acetate extract of *Nelumbo nucifera* flower of different concentrations (are 25, 50 and 100 mg/ml of each extract) was evaluated

against *P.acnes* bacteria by well diffusion method and the results of the experiment were summarized in the table1.

Aqueous extract, Ethanol extract and Ethyl Acetate extract of *Nelumbo nucifera* flower showed antibacterial activity against *Propionibacterium acnes* which is increases with the increase in concentration of the extracts.

The results of zone of inhibition of *P. acnes* as shown in the table the ethanol extract of *Nelumbo nucifera* shows significant anti bacterial activity followed by ethyl acetate extract which may be due to the active compounds present in these extracts. Lower zone of inhibition shown in aqueous extract shows less anti bacterial activity of aqueous extract against *P. acnes*.

Phytochemical analysis could be carried out further to isolate the bioactive compounds of this plant species, which acts as antibacterial agent so that the separated compounds then could be used to produce new drugs, which could prove to be effective against acne causing *P. acnes* bacteria.

Table 1: Antibacterial activity of *Nelumbo nucifera* on *P.acnes* bacteria

S. No.	Name of microbe	Zone of inhibition		
		Ethyl acetate extract		
		25mg/ml	50 mg/ml	100mg/ml
1.	<i>Propionibacterium acnes</i>	20±0.86	23±0.5	25±0.57
		Ethanol extract		
1.	<i>Propionibacterium acnes</i>	21±0.86	25±0.28	30±0.57
		Aqueous extract		
1.	<i>Propionibacterium acnes</i>	6±0.86	15±0.57	20±0.28

IV.CONCLUSION

The above results show that these extracts were sensitive toward bacterial activity and among them ethanol extract of *Nelumbo nucifera* have significant activity against *Propionibacterium acnes*. Thus, the present study will provide a base for further investigation in the potential discovery of new herbal bioactive drugs.

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