Short Communication

ANTIBACTERIAL AND ANTIFUNGAL ACTIVITY OF *CONOCARPUS LANCIFOLIUS* ENGL. (COMBRETACEAE)

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ABSTRACT

The aim of the study was to determine the antibacterial and antifungal activities of the methanolic extract of *Conocarpus lancifolius* Engl. aerial parts using disk diffusion method. The bacteria tested included *Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Bacillus cereus, Proteus mirabilis* and *Klebsella pneumonia* whereas the fungal strains tested included *Aspergillus flavus, Aspergillus niger, Candida albicans* and *Saccharomyces cerevisae*. Antibacterial activity was found to be present in four species being highest in *K. pneumonia* (11mm). Zones of inhibition for *B. cereus*, *E. coli* and *P. aeruginosa* were 9, 8 and 8 respectively. Antifungal activity was found only in *S. cerevisae* where the zone was recorded to be 7mm. Results show plants to possess antibacterial and antifungal activities.

***Keywords*:** Antibacterial; Antifungal; Activity; Methanolic; Extract; Clinical isolates; Disk diffusion; Zone of inhibition.

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RUNNING TITLE: Antimicrobial activity of *C. lancifolius*

INTRODUCTION

Natural products play an important role in the treatment of different diseases. The history of use of plants for different conditions is very old. The earliest records found show that plants have been used in Mesopotamia and Egypt thousands of years ago. Numerous phytochemicals have been isolated from different plants which are now being prescribed by medical practitioners all around the world [1].

Conocarpus lancifolius belongs to the family Combretaceae. It is extensively grown in Kuwait and some other Arab countries due to its ability to grow in extreme environments. The plant exists in the form of tree which can grow several meters in height [2]. Previously, the plant has been studied only for Anti-plasmodial, Anti-leishmanial and Anti-trypanosomal Activities [3]. The aim of the present work is to report the antimicrobial activity of the plant for the first time.

MATERIALS & METHODS

Plant material

The aerial parts of *Conocarpus lancifolius* were collected during the winter season from Pattoki, Pakistan. The plant material was identified by Dr. Ajaib Choudhary, Department of Botany, Government College University Lahore. The voucher number received for the plant was GC.Bot.Herb. 2205.

Preparation of extract

The plant material was shade dried and ground into coarse powder. It was extracted by cold maceration twice using methanol. The extract obtained was dried using rotary evaporator and stored in air tight container in a refrigerator until further use.

Chemicals

Culture media were purchased from Himedia, India. Dimethyl sulfoxide (DMSO) was purchased from Sigma Aldrich, USA. Methanol was obtained from Panreac, Spain.

Microorganisms tested

The clinical isolates of *Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Bacillus cereus, Proteus mirabilis* and *Klebsella pneumonia* were used for the antibacterial assay whereas the clinical isolates of *Aspergillus flavus, Aspergillus niger, Candida albicans* and *saccharomyces cerevisae* were used for carrying out the antifungal assay. All the microbial strains were supplied by Institute of Molecular Biology and Biotechnology, The University of Lahore.

Antimicrobial assays

Antibacterial activity of methanolic extract was determined using disk diffusion method of Mbata *et al*, [4] with some minor modifications. Stock solution was prepared by dissolving 20 mg of the extract in sufficient amount of DMSO to make the final volume equal to 1 ml. 20 µl of this stock solution was impregnated to sterile paper disks (6 mm diameter) and dried. Mueller-Hinton Agar (MHA) media was prepared and solidified in sterile Petri dishes. The surface of the agar in each plate was swabbed with a different bacterial strain cultured in nutrient broth. The extract loaded disks were then placed on the surface of the swabbed agar media and the diameter of the zone of inhibition was measured after 24 h of incubation at 37 ^{o}C.

Antifungal activity was evaluated by a method quite similar to the one used to determine the antibacterial activity [5]. Sabouraud Dextrose Agar (SDA) media was used instead of Mueller-Hinton Agar media and a fungal suspension prepared in normal saline was used for swabbing the surface of the solidified agar media. The diameters of zone of inhibition were calculated after incubation at room temperature for 24h.

RESULTS & DISCUSSION

The results of antibacterial activity are given in table 1. The methanolic extract of *C. lancifolius* was tested against 6 bacterial strains. Against any microbial specie, the activity of the extract was considered to be present if the diameter of the zone of inhibition was equal to or greater than 7 mm. The antibacterial activity was found to be highest for *K. pneumonia* where the zone of inhibition was recorded to be 11mm. The clinical isolate of *B. cereus* was also found to be sensitive against the extract showing a zone of 9mm. Low activity (8mm) was found in case of *E. coli* and *P. aeruginosa* whereas no activity was found against *S. aureus* and *P. mirabilis*. Results show the presence of antibacterial activity in the plant thus indicating plant to be of medicinal value.

Antifungal activity of the methanolic extract was also studied. The results from the assay showed the presence of low antifungal activity in the plant extract. The only fungal specie which showed sensitivity towards the extract was *S. cerevisae*. A zone of inhibition of 7mm was recorded for this strain (see table 2). Standard drugs were also tested against the microbial strains and their results have also been tabulated (see table 1 and 2).

Table 1: Antibacterial activity of methanolic extract of *C. lancifolius* on various clinical strains.

Bacterial strains	*K. pneumonia*	*B. cereus*	*S. aureus*	*E. coli*	*P. aeruginosa*	*P. mirabilis*
Zone of inhibition by CME (mm)	11	9	-	8	8	-
Zone of inhibition by standard drug (mm)	28	15	19.5	20	9	15

CME, *Conocarpus lancifolius* methanolic extract; Standard drug, Chloramphenicol 30µg disk.

Table 2: Antifungal activity of methanolic extract of *C. lancifolius* on various clinical strains.

Fungal strains	*A. flavus*	*A. niger*	*C.albicans*	*S.cerevisae*
Zone of inhibition by CME (mm)	-	-	-	7
Zone of inhibition by standard drug (mm)	23.5	26	28	20

CME, *Conocarpus lancifolius* methanolic extract; Standard drug, Amphotericin B 10µg disk.

CONCLUSION

The increasing resistance of pathogenic microbes against various marketed drugs is highly problematic and increases the need for the discovery of new antimicrobials. The present study was aimed to investigate the antimicrobial potential of a plant species known as *Conocarpus lancifolius*. From the results obtained, it may be concluded that the plant possess moderate antibacterial activity and low antifungal activity. Further studies on standard microbial strains may be expected to give more fruitful results.

REFERENCES:

1. Newman DJ., Cragg GM., and Snader KM. (2000). The influence of natural products upon drug discovery. Natural product reports, *17*(3), 215-234.
2. Redha A., Al-Mansour N., Suleman P., Afzal M., and Al-Hasan R. (2011). Leaf Traits and Histochemistry of Trichomes of Conocarpus lancifolius a Combretaceae in Semi-Arid Conditions. American Journal of Plant Sciences, *2*, 165-174.
3. Al-Musayeib NM., Mothana RA., Al-Massarani S., Matheeussen A., Cos P., and Maes L. (2012). Study of the in Vitro Antiplasmodial, Antileishmanial and Antitrypanosomal Activities of Medicinal Plants from Saudi Arabia. Molecules, *17*(10), 11379-11390.
4. Mbata TI., Debiao LU., and Saikia A. (2008). Antibacterial activity of the crude extract of Chinese green tea (Camellia sinensis) on Listeria monocytogenes. African journal of Biotechnology, *7*(10), 1571-1573.
5. Saratha V and Subramanian SP. (2010). Evaluation of antifungal activity of Calotropis Gigantea latex extract: An in vitro study. International Journal of Pharmaceutical Sciences and Research, *1*(9), 88-96.