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Antibacterial activity of ethanolic leaf extract of *Kalanchoe pinnata* and its application in the treatment of abscess caused by staphylococcus aureus

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ABSTRACT

In this study we have found anti-bacterial activity of ethanolic extract of leaves of *Kalanchoe pinnata* against microbial flora organism staphylococcus aureus which was measured as parameter of activity which was compared against std. drug amoxicillin antibiotic. The plant extract shows potent zone of inhibition than the std. compound. Leaf extract of chloroform & water showed mild zone of inhibition compared to that of ethanolic extract. Aim of study was to extract the constituents from leaves of *Kalanchoe pinnata* & to explore anti-bacterial activity against staphylococcus aureus using disc diffusion method & with the obtained results we have concluded that the ethanolic extract can be used in treatment of abscesses because of its potency against staphylococcus aureus.

Keywords: *Kalanchoe pinnata*, Staphylococcus aureus, Anti-Bacterial activity.

INTRODUCTION

Kalanchoe pinnata is also known as bryophyllum pinnatum miracle leaf, life leaf, life plant. Distinctive for the plantlets that form on margin of its leaves, Chemical constituent found in this plant are alkaloids, arachidonic acid, bufadienolides and astragaloside, cinnamic acid and clevoesterol and bryophyllin, bryophyllol. Etc. Leaf extracts of *Kalanchoe pinnata* are used along with coconut oil in the treatment of burns and skin ulcer. ethanolic, methanolic extracts of leaves were used in the treatment of diabetic skin diseases and aqueous extracts were used as anti-inflammatory, anti-diabetic and anti-tumour agents. As a part of our study, we studied anti-bacterial activity of ethanolic extract of leaves of *Kalanchoe pinnata* and applied in the treatment of abscess in albino rat.

MATERIAL AND METHOD

Plant collection - local area nursery, Hyderabad

Plant part used - leaves

Chemical used - Aqueous, Chloroform, & Ethanol

Apparatus used - Soxhlet apparatus & reflux condenser.

PLANT MATERIAL

We have collected the plant from rural area and then washed the plant with water.

EXTRACTION

Extraction with aqueous water

The fresh leaves were cut to reduce size and dried in sun light which is subjected to soxhlation & is extracted with water for 6 hours. Extract is collected and dried in hot air oven at 60°C in order to obtain solvent free extract & dried content which is stored in closed container.

Extraction with chloroform

The fresh leaves were cut to reduce size and dried in sun light which is subjected to soxhlation is extracted with chloroform for 6 hours. The extract is collected in a china dish & dried in hot air oven at 40-500c in order to obtain solvent free extract. Stand the dried extract in closed container.

Extraction with ethanol

The fresh leaves were cut to reduce size and is subjected to soxhlation is extracted with ethanol for 1 hours. Collect the extract in a watch glass and evaporate the solvent in hot-air oven at 40-500C to obtained dried content. Stand the dried extract in closed container.

PHYTOCHEMICAL EVALUATION

Phytochemical test for the quantitative presence of alkaloids, tannins, glycosides, carboxylic acids groups were measured by methods described below

Test for alkaloids

Wagner's test - Alkaloids give a reddish brown precipitate with Wagner's reagent solution of iodine in potassium iodide.

Test for tannins

Ferric chloride test - test solution gives blue green colour with ferric chloride.

Test for carboxylic acid

Sprinkle small amount of leaf extract on an aqueous solution of sodium bicarbonate shows the effervescence which indicates of presence of acids.

ANTIBACTERIAL ACTIVITY

Disc diffusion method

Preparation of nutrient medium, wells are created. Transfer of microbial suspension by pour plate method. Using a flame-sterilized forceps, gently press each disc to the agar to ensure that the disc is attached to the agar. Plates should be incubated overnight at incubation at temperature of 37 °C. After a day the plates are removed and measured for zone of inhibition Chloroform extract.



IN-VIVO TEST

Application of ethanolic extract on albino rat for activity on abscess

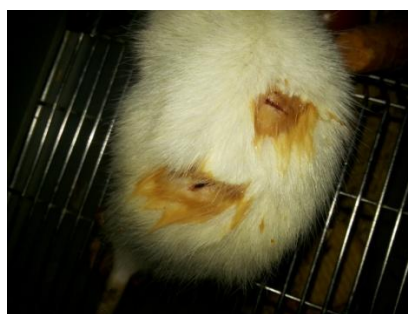
Organism sample was introduced through intrathecal route to create an abscess. After 24 hours, the ethanolic extract was applied topically on the skin of

the rat which prevented the formation of abscess internally and. This ethanolic extract of *Kalanchoe pinnata* was able to prevent the formation of abscess. When applied on the surface with incision which was already infected with staphylococcus aureus organism.

Pics for prevention against formation of abscess i.e., ethanolic extract activity



Prevention of internal abscess



Prevention of abscess in incision infected with organism staphylococcus aureus

RESULTS

Microbial assay

In-vivo test

S.no.	Organism	Zone of inhibition			
1	Staphylococcus aureus	standard	Chloroform extract	Aqueous extract	Ethanolic extract
		7.5mm	2mm	Nil	18mm

Ethanolic extract of *Kalanchoe pinnata* was able to prevent the formation of abscess, both internal & external when applied topically to Albino rat.

DISCUSSION

Following the standard extraction was performed in leaves of *Kalanchoe pinnata* using various solvents from which ethanol was tested against staphylococcus aureus sample which was compared with standard drug and was proved to be more potent antibacterial agent. All the plant constituents were tested using reagents, and for its activity against treatment of abscess were tested on an albino rat.

CONCLUSION

Present study on the leaves of *Kalanchoe pinnata* i.e. ethanolic extract showed maximum inhibitory effect on organism staphylococcus aureus and was also applied for the treatment of abscess both internal and external and further studies should be conducted in order to perform the clinical trials.

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