

# Antibacterial Activity of Medicinal Plant Extracts Against Different Animal Pathogens

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## ABSTRACT

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## INTRODUCTION

Majority of veterinarians in remote areas prescribe antibiotics without antibiotic susceptibility testing due to lack of proper laboratory facilities. Hence antibiotics are used abruptly for long term which increases bacterial resistance. In the last three decades, due to rapid increases in antibiotic resistance in bacteria, they have become serious threat to human as well as animal health, especially for the patients with weak immune system. In current scenario of medicinal and pharmaceutical advancements microbes develop changes in their genetic structure and metabolism to acquire resistance against the drugs used in the treatment of common infectious diseases. The drug resistance in these microbes have made them more pathogenic and become great challenge in health care industry. This situation has created challenges for practitioners.

In Pakistan main source of medicinal plants are rangelands and forests. In this regard, Mianwali district is famous as field museum of Pakistan because it is full of plant species which are medicinally important. The district is located in south-west of province Punjab. It includes salt-ranges and Indus River which is passing throughout the length of district. Important medicinal plants are found in different areas of district. Local communities use these plants for curing their animals usually. These medicinal plants are gaining attractiveness, now a days, to cope with the issue of antibacterial resistance in treatment of bacterial infections. Although hundreds of plant species have been assessed for their antimicrobial activity, the vast majority have not been well evaluated.

Three medicinally important plants *Calotropis procera* (Aak/ Aakra), *Ziziphus nummularia* (Jangli beri) and *Prosopis juliflora* (Jangli kikar), which are commonly found in Mianwali, were used in present study. These plants have been assessed by various scientists for their potential to restrict bacterial growth. *Calotropis procera* cures leprosy, ulcers, spleen and liver diseases. Its leaves have been found effective to treat jaundice, scabies, ring worm of scalps and dropsy. It is also used in digestive disorders including constipation, diarrhea, stomach ulcers and in painful conditions like cramps, toothache and joints pain. *Ziziphus nummularia* is basically used in treatment of inflammation, relief of pain and to reduce bacterial infections. This plant has

mild sedative activity therefore, is being used in treatment of insomnia. *Prosopis juliflora* leaves extract is known to show very high antimicrobial, antifungal and anti-inflammatory activities.

## OBJECTIVES

To find the use of natural resources (plants) in curing bacterial diseases and to combat antimicrobial resistance.

## METHODOLOGY

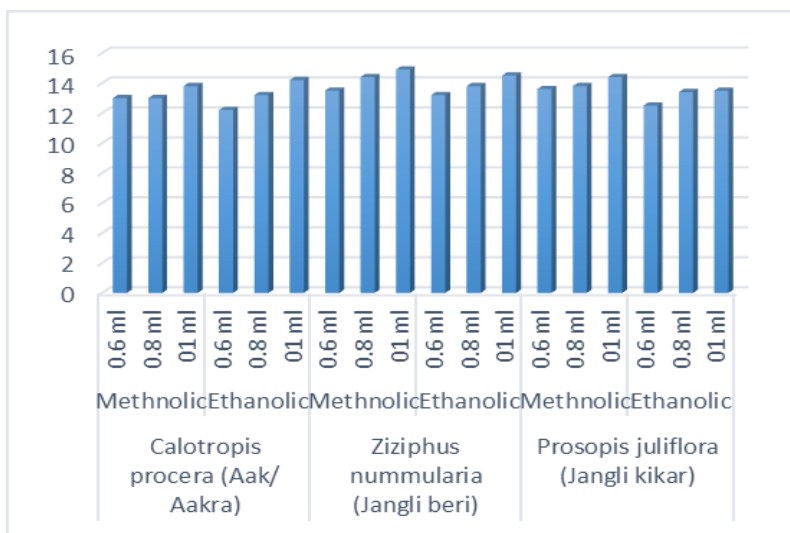
An attempt was made, in present study, to analyze antibacterial effects of leave extracts of all these three plants through agar well diffusion method by using Methanol and Ethanol as solvents. Important pathogens of livestock (*Escherichia coli* and *Salmonella*) collected from sewage water, were isolated through different identification and biochemical tests. *E. coli* & *Salmonella* have ability to cause a variety of diseases like diarrhea, urinary tract infections, abdominal infections, meningitis, osteomyelitis, sepsis, wound infections, cellulitis, and colibacillosis in humans and animals.

Bacterial cultures were obtained by growth on nutrient agar and further isolated through Macconkey agar. Isolated bacteria were further subjected to different identification tests including indole, citrate, oxidase, motility, catalase and urease tests. To attain more clarity in identification, different staining techniques were used like gram staining, capsule, flagella and endospore staining.

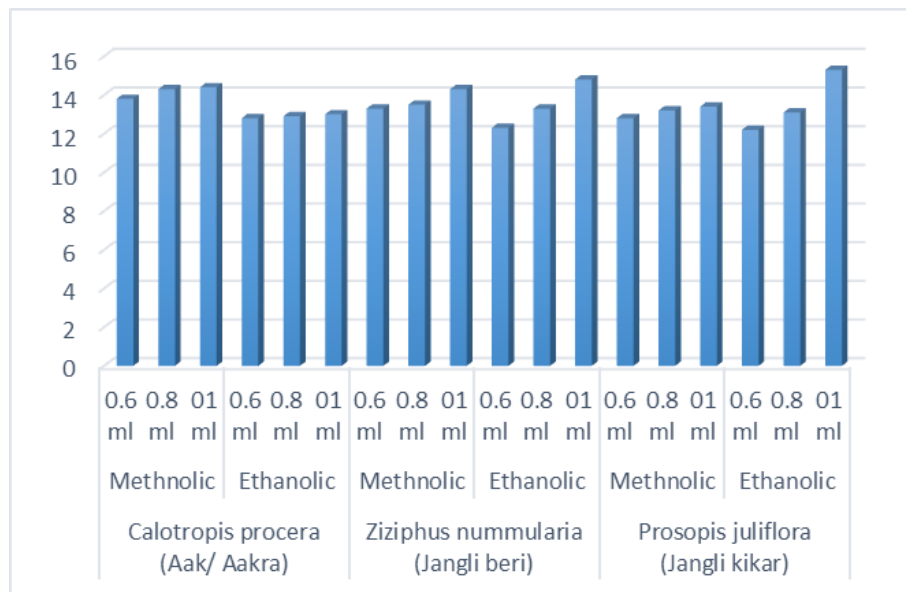
10.0 g of leaves powder of each plant (*Calotropis procera*, *Ziziphus nummularia*, *Prosopis juliflora*) was added in 70% methanol and ethanol and subjected to orbital shaker for five days. After filtration, organic extracts were placed in fume hood at 60°C for fast evaporation of methanol and ethanol. Final dried extracts were weighed and stored at 40°C. DMSO (Dimethylsulphoxide) was added for preparation of three dilutions of each plant i.e 50 mg/ml, 40 mg/ml and 30 mg/ml.

## RESULTS

Overall results demonstrated highly significant antimicrobial activity of *Ziziphus nummularia* against *E.coli* while *Prosopis juliflora* against *Salmonella* species. Of three dilutions used, 1.0 ml (50.0 mg/ml), 0.8ml (40.0 mg/ml) and 0.6ml (30.0 mg/ml), only 1.0 ml dilution of methanolic extract of *Ziziphus nummularia* and ethanolic extract *Prosopis juliflora* was found effective against *E. coli* and *Salmonella* species respectively. However *Calotropis procera* leaves extract was found least effective against tested organisms.



**Figure 1.** Comparison of different plant extracts and dilutions for inhibitory zones against *E.coli* species.



**Figure 2.** Comparison of different plant extracts and dilutions for inhibitory zones against *Salmonella* species.

## CONCLUSION

This study confirms the folklore use of these medicinal plants and provides preliminary information about their antibacterial potency. Since *Ziziphus nummularia*, *Calotropis procera* and *Prosopis juliflora* are usually used in combination with other medicinal plants in villages, so their synergism can be evaluated with other herbal formulations.

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