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ANTIMICROBIAL ACTIVITY OF METHANOLIC BARK EXTRACT OF Crataeva nurvala

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Abstract

Medicinal plants have a prolong treatment for the benefit of humankind. World Health Organization reported that eighty percentages of the world's populations are mainly used traditional therapies because which involve mainly plant substances and no side effects. The main objectives of the present study to assess the antimicrobial activity of methanolic bark extract of Crataeva nurvala. The methanolic bark extract of Crataeva nurvala showed significantly increased activity against all the tested microorganisms when compared to control was respectively. Therefore, Crataeva nurvala bark containing many bioactive compounds may be responsible to protects against oxidative stress suggest that it can be used as an alternative therapeutic strategy to prevent the oxidative stress in other diseases like cancer, Alzheimer's disease.

Keywords: Medicinal plants, Crataeva nurvala, Oxidative stress and Alzheimer's disease.

1. Introduction

Medicinal Plants are a major source of medicine with a variety of biological deliberations, including phytochemicals and antioxidant activities. All most 25% of conventional drugs and primary health care of majority of world population relies essentially on plants. Natural antioxidants are broad-spectrum, safe and effective in regulating destructive processes triggered by oxidative stress, induced by free radical's overproduction [1].

Antimicrobial is an agent that can be killed all types of microorganisms. Gram positive and Gram negative microorganisms are responsible for various diseases like pneumonia, food poisoning and urinary tract infection. Plant sources are naturally God gifted for the synthesis and identified of bioactive compounds that can be used treat the infectious diseases.

Antibiotics are medicines that fight with all types of microorganisms. Antimicrobial drugs are obtained from bacteria, fungi, molds and parasites. MDR bacteria are evolving rapidly spreading our capability to treat common infectious diseases. Antibiotics is chemical substances produced by living organism mainly microorganisms. All Microorganisms are produce antibiotics that useful in preventing various diseases. Antibiotics can be divided in to two categories such narrow and broad spectrum agents. The narrow spectrum are mainly affected to Gram Positive bacteria but broad spectrum are affected both Gram positive and Gram negative bacteria [2].

Crataeva nurvala belongs to Capparidacea family commonly known as Varuna, Crataeva nurvala have rice source of nutrients and bioactive constituents that can use to various diseases like blood flow, breathing problem fever, metabolic disorders, joint lubrication and wound healing."Crataeva nurvala small sized branched wild or cultivated deciduous plant distributed throughout the southern India and other countries around in the world". "The Crataeva nurvala of flower and fruit are growing in the months of December-May and June-August [3]."

2. Experimental Design

2. 1. Collection and Extraction of bark material

Fresh bark of Crataeva nurvala was collected from local Tirupattur district. The bark was cleaned properly and sun dried. After complete drying, the bark was powder and stored in an airtight container finally used for analysis. Take 10 grams of Crataeva nurvala bark powder + 100 ml of methanol was placed in a thimble and extracted for 8 cycles in a Soxhlet apparatus separately. After 8 cycles, extract was filtered by whatman no.1 filter paper and these extract was used for the further analysis. The Fig.1 shows the Crataeva nurvala bark.

Fig.1. Crataeva nurvala of bark

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2.2. Antimicrobial Activity

Principle

The antimicrobials present in the plant extract are allowed to diffuse out into the medium and interact in a plate freshly seeded with the test organisms. The resulting zones of inhibition will be uniformly circular as there will be a confluent lawn of growth. The diameter of zone of inhibition can be measured in millimeters [4].

Reagents

Muller Hinton Agar Medium (1L)

The medium was prepared by dissolving 33.9 g of the commercially available Muller Hinton Agar Medium (HiMedia) in 1000ml of distilled water. The dissolved medium was autoclaved at 15 lbs pressure at 121°C for 15 minutes. The autoclaved medium was mixed well and poured onto 100mm petriplates (25-30ml/plate) while still molten.

Nutrient broth (1L)

One litre of nutrient broth was prepared by dissolving 13 g of commercially available nutrient medium (HiMedia) in 1000ml of distilled water and boiled to dissolve the medium completely. The medium was dispensed as desired and sterilized by autoclaving at 15 lbs pressure (121ºC) for 15 minutes.

Procedure

Petriplates containing 20ml of Muller Hinton medium were seeded with 24hr culture of bacterial strains. Wells
were cut and 20µl of the plant extracts were added. The plates were then incubated at 37°C for 24 hours. The antibacterial activity was assayed by measuring the diameter of the inhibition zone formed around the well.

3. Results and Discussion

3.1. The Antimicrobial activity of methanolic bark extract of *Crataeva nurvala*

Antimicrobial are commonly practice at least 2000 yrs ago used for Egyptians and Greeks specific mold in plant extract to treating various infections. The antimicrobial is an agent may be killed the microorganism called microbicide and stops the growth means bacteriostatic agent [5]. The antimicrobial medicine to cure infection means antimicrobial chemotherapy while to prevent infection known as antimicrobial prophylaxiss [6]. The Table 1 shows the Antimicrobial activity of methanolic bark extract of *Crataeva nurvala* as follows,

The antimicrobial activity of methanolic bark extract of *Crataeva nurvala* against both Gram positive and Gram negative bacteria such as *Bacillus subtilis*, *Escherichia coli*, *Staphylococcus aureus* and *Pseudomonas fluorescens* tested by disc diffusion method .

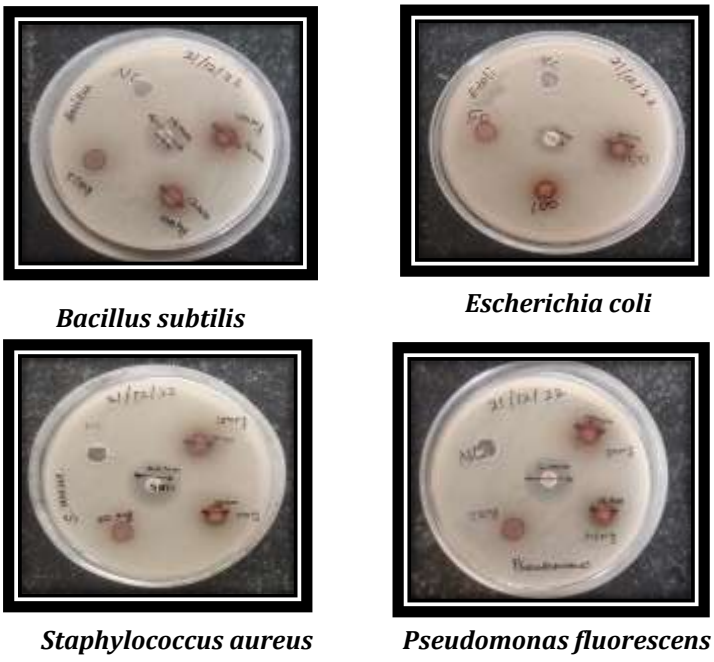
The methanolic bark extract of *Crataeva nurvala* showed significantly increased activity against all the tested microorganisms when compared to Gentamicin (Positive control) and Dimethyl sulfoxide (DMSO, Negative control) was respectively. The methanolic bark extract of *Crataeva nurvala* showed maximum zone of inhibition namely *Pseudomonas fluorescens* (15mm and 12mm), *Bacillus subtilis* (14mm and 12mm), *Staphylococcus* (12mm and10mm) followed by *Escherichia coli,* (8mm and 4mm).

When compared to positive control ranges between *Staphylococcus* (22mm), *Pseudomonas fluorescens* (21mm), *Bacillus subtilis* (19mm) and *Escherichia coli* (16mm) and No zone of inhibition for negative control in all the microorganisms. The Fig.2. shows the Zone of inhibition of *Crataeva nurvala* using different microorganism as follows, The antimicrobial activity of methanol extract of *Ficus religiosa* bark revealed that the *S. aureus* and *P. fluorescens* maximum sensitivity followed by *E. coli* and *B.subtilis* when compared to positive and negative control [7].

Table 1: The Antimicrobial activity of *Crataeva nurvala* of bark

List of Microorganisms	Concentration (µg/ml)	Zone of Inhibition (mm)
Bacillus subtilis	50	-
	100	12
	150	14
	PC	19
	NC	-
Escherichia coli	50	-
	100	4
	150	8
	PC	16
	NC	-
Staphylococcus aureus	50	-
	100	10
	150	12
	PC	22
	NC	-
Pseudomonas fluorescens	50	-
	100	12
	150	15
	PC	21
	NC	-

The methanolic bark extract of Quercus leucotrichophora showed the antimicrobial activity against all Gram positive [Bacillus subtilis and Staphylococcus aureus] Gram negative [Escherichia coli and Pseudomonas fluorescens] pathogens[8]. The maximum zone of inhibition B. subtilis and E.coli when compared to positive control ampicillin and DMSO was used as negative control showed no zone of inhibition was respectively[9]. The in vitro antimicro-bial activities of methanolic extract of bark Zanthoxylum armatum revealed that the highest zone of inhibition S. aureusi [20mm], E. coli [18mm] and P. fluorescens [14mm] when compared to control gentamicin [10]..



Bacillus subtilis ***Escherichia coli***

Staphylococcus aureus ***Pseudomonas fluorescens***

Fig.2. Zone of inhibition of Crataeva nurvala

4. Conclusion

It can be concluded that the“ antimicrobial activity of methanolic bark extract of Crataeva nurvala against both Gram positive and Gram negative bacteria such as Bacillus subtilis, Escherichia coli, Staphylococcus aureus and Pseudomonas fluorescens tested by disc diffusion method. The methanolic bark extract of Crataeva nurvala showed significantly increased activity against all the tested microorganisms when compared to Gentamicin (Positive control) and Dimethyl sulfoxide (DMSO, Negative control) was respectively”. The methanolic bark extract of Crataeva nurvala showed maximum zone of inhibition namely Pseudomonas fluorescens (15mm and 12mm), Bacillus subtilis (14mm and 12mm), Staphylococcus aureus (12mm and10mm) followed by Escherichia coli, (8mm and 4mm)”.When compared to positive control ranges between Staphylococcus aureus (22mm), Pseudomonas fluorescens (21mm), Bacillus subtilis (19mm) and Escherichia coli (16mm) and No zone of inhibition for negative control in all the microorganisms”.

Therefore, Crataeva nurval bark containing many bioactive compounds may be responsible to protects against oxidative stress suggest that it can be used as an alternative therapeutic strategy to prevent the oxidative stress in the heart and other diseases like cancer, Alzheimer's disease etc”. “However, further studies are needed to evaluate the in vivo potential of these extract in animal models using antitumor activity and also isolation, characterization of the bioactive compounds by GC MS, HPTLC and In silico studies”.

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