



ANTIMICROBIAL ACTIVITY OF ROOTS OF *COCCULUS HIRSUTUS* BY AGAR PLATE DIFFUSION METHOD

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ABSTRACT

The present study envisaged evaluating the roots of *Cocculus hirsutus* for its antimicrobial activity. Methanolic Extract of *Cocculus hirsutus* was screened for its in vitro antimicrobial activity by agar diffusion method. The antimicrobial activity of methanolic extract of the roots of *C. hirsutus* was studied using *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Escherichia coli*, and *Bacillus subtilis* as test organisms. Methanolic extract was found to be more effective against *Escherichia coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Phytochemical screening of the methanolic extract of roots of *C. hirsutus* revealed the presence of alkaloids, sterols and resins which suggests that these phytoconstituents may be responsible for their antimicrobial activity.

Key words: Agar diffusion method, antimicrobial activity, *Cocculus hirsutus*.

INTRODUCTION

India is regarded as the treasure trove of herbs in the world. The proper and judicious use of herb is often successful in the treatment of illness when other conventional medicines and methods fail. Herbs demonstrate great versatility for the treatment of a broad variety of health needs (Chopra RN *et al.*, 1996). Medicinal plants are of great value in the field of treatment and cure of diseases. It has now been universally accepted that the herbal medicines are far safer than that of synthetic medicines for curing of many of complex diseases. The traditional system of medicine is so engrained in our culture that, even now 75% of the Indian population depend on this indigenous system for relief and they employ herbs as their primary medicines. Plants form a reservoir of potential useful untapped source of drugs that have been serving mankind since the dawn of civilization.

It is used traditionally as alterative, laxative, demulcent, prurigo, eczema, dyspepsia tonic, diuretic,

antiperiodic in fever, in malaria, joint pains and in skin diseases (Kritikar KR *et al.*, 1995; Gamble Fl, 1910). Several phytoconstituents have been isolated like alkaloids, sterols and resins and identified from different parts of plant. Many studies have been conducted to prove its potential as diuretic, laxative, anti-inflammatory and antidiabetic from its leaves.

Antimicrobial Activity

Antimicrobial activity of *C. hirsutus* is reporting against *Staphylococcus aureus*, *Pseudomonas aureus*, *Klebsiella pneumoniae*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Bacillus* using agar disc diffusion methods (Gamble, Fl.). *C. hirsutus* exhibited antibacterial activity by the agar disc diffusion method. It showed a remarkable antibacterial activity.

MATERIALS AND METHODS

Micro-organisms used

Staphylococcus aureus, *Pseudomonas aureus*, *Klebsiella pneumoniae*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Bacillus*.

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These micro-organisms are collected from the biotechnology department of Osmania University, Hyderabad.

Scheme of work

Collection of Plant material

The roots of *C.hirsutus* were collected from the Kudur village, Bangalore Rural district, during December 2013 identified by senior Plant Taxonomist and authenticated at the herbarium of the Regional Research Institute, Bangalore (RRCBI) Voucher herbarium specimen (roots) were air-dried separately for 1 month and the respective material was powdered.

Preparation of Extract

Apparatus used

Soxhlet extractor is a piece of laboratory apparatus invented in 1879 by Franz von Soxhlet. The roots powder of the plant *Cocculus hirsutus* was collected.

- Then the powdered material was subjected to soxhlet extraction using solvent, methanol at a temperature of 40-70°C.
- The obtained extract was dried under vacuum using rotary evaporator and stored in an air tight container at room temperature.
- The methanolic extract yielded semisolid, viscous, dark coloured mass.

The antimicrobial activities of the roots of *Cocculus hirsutus* indicate that the methanolic extract have antimicrobial activity against the test microorganisms (Brain KR and Turner JD, 1975; Evans WC, 1999). The zones of inhibition in diameter (mm) were recorded. Methanolic extract was found to be more effective against *Escherichia coli*, *staphylococcus aureus*, *Pseudomonas aureus* respectively when compared to the other extracts of the plants. The activity is found to be concentration dependent (Nadkarni KM et al., 1995; Nayak SK & Singhai AK, 1993; Satyanarayana K et al., 2001).

Fig 1. Agar Plate Diffusion Method



Fig 2. Zone of inhibitions of different bacterial cultures

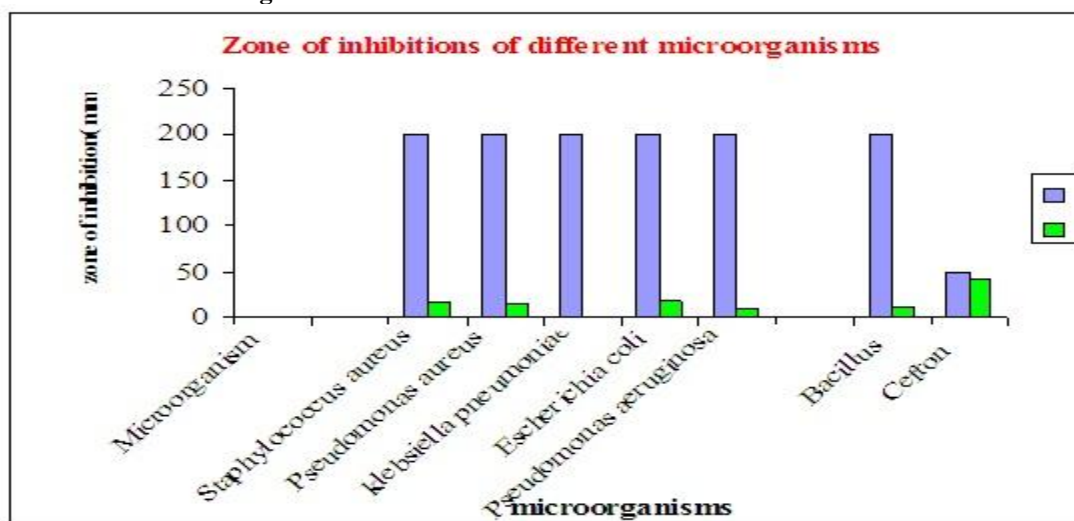


Table 1. Antimicrobial activity of methanol extract of *Cocculus hirsutus*

Drugs	Microorganism	Zone of inhibition (mm)
Methanol extract of <i>Cocculus hirsutus</i> 200µg/ml	<i>Staphylococcus aureus</i>	16
	<i>Pseudomonas aureus</i>	15
	<i>Klebsiella pneumoniae</i>	NIL
	<i>Escherichia coli</i>	18
	<i>Pseudomonas aeruginosa</i>	10
	<i>Bacillus</i>	12
Cefron 50 µg/ml	<i>Staphylococcus aureus</i>	42
	<i>Pseudomonas aureus</i>	
	<i>Klebsiella pneumoniae</i>	
	<i>Escherichia coli</i>	
	<i>Pseudomonas aeruginosa</i>	
	<i>Bacillus</i>	

CONCLUSION

Present findings support the applicability of *Cocculus hirsutus* in traditional systems for its claimed uses like fever, inflammation, urinary and vaginal infectious diseases.

Now-a-day microorganisms acquiring resistance to many commonly used antibiotics. Hence there is a need to search for new antibiotics. Plants continue to be a rich source of therapeutic agents and present study reveals the potential value of *Cocculus hirsutus*.

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