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POTENTIAL ANTIBACTERIAL ACTIVITY OF *CANTHIUM DICOCCUM* (GAERTN.) AGAINST CERTAIN BACTERIAL SPECIES

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Abstract

Canthium dicoccum (Gaertn.) the Ceylon boxwood also known as Bellachi in Kannada belongs to the family *Rubiaceae*. The crushed leaves were subjected to the hot method of extraction using soxhlet extractor. The extraction method was carried out using numerous solvents viz., pet ether, ethyl acetate and ethanol per their increasing polarity. All the extracts were tested against *Escherichia coli* and *Staphylococcus aureus* by disc diffusion method. In all the extracts *Escherichia coli* exhibited maximum inhibition zone when compared to *Staphylococcus aureus*.

Key words : Antimicrobial activity, *Amischophacelus axillaris (*L.*)*, Bacterial species.

Introduction

Canthium dicoccum (Gaertn.) the Ceylon boxwood also known as Bellachi in Kannada belongs to the family *Rubiaceae* (Raja Rajeswari N *et al.,* 2011). In India its bark is used for fever and decoction of the root is used internally for diarrhea. Bark powder with sesame oil is used in rheumatic pain (Neelima M *et al.,* 2011; Santhan S *et al.,* 2013). The plant is proved for its antidiabetic and nephroprotective activity (Vidyarthi RD *et al.,* 2005).

The use of plant extracts and phytochemicals, both are very important properties for antimicrobial activity and great significance in therapeutic treatments. A number of studies have been conducted to show such efficiency (Abtele and Erdourul 2003; Reddy *et al.,* 2001; Syed Nyamath and Karthikeyan 2018 and Pinkusatnami *et al.,* 2016).

Materials and Methods

Collection and identification plant material

The *Canthium dicoccum* (Gaertn.) leaves were collected in the month of June-July in Hosnagar (T), Shimoga district, Karnataka. The plant were authenticated and deposited in the department of Botany Kuvempu University, Shanakaragatta, with voucher number KUAB4688. A voucher specimen has been preserved in our laboratory for future reference.

Processing and extraction

The collected leaves were dried under shade and then powdered with a mechanical grinder and stored in airtight container. The dried powder material of the leaves was subjected to the hot method of extraction using soxhlet extractor with petroleum ether, ethyl acetate and ethanol per their increasing polarity. The obtained extract was filtered and evaporated to dryness under reduced pressure in a rotary vacuum evaporator.

Screening for antibacterial activity

Agar well diffusion method

Agar well radial diffusion technique was used for the evaluation of antibacterial activity of the test samples. The sterilized nutrient agar medium was poured into fresh petri dishes. Nutrient broth containing 100 µl of 24 h old cultures of respective bacterial strains was spread separately on the agar medium. Wells was made using a stainless steel sterilized cork borer under aseptic conditions. 25, 50, 100 µg/ml of petroleum ether, ethyl acetate and ethanol crude extracts were loaded into corresponding wells. The antibiotic Ciprofloxacin was used as standard (1µg/ml of sterile water). The plates were incubated for 24 h at 37 °C and the diameter of the zone of bacterial growth inhibition was measured and the readings were recorded in millimeter (Thippeswamy *et al.,* 2011).

Results and Discussion

The antibacterial activity was determined by measuring the diameter of the zone of inhibition. The different extracts of the plant *Canthium dicoccum* leaves were found to have maximum antibacterial activity. The results of the antibacterial activity of different extracts against some bacterial strains are depicted in (Table 1). Petroleum ether, ethanol and ethyl acetate extracts of *Canthium dicoccum* showed significant activity against *Escherichia coli* and moderate activity against *Staphylococcus aureus* microorganisms. Ethanol extract of *Canthium dicoccum* were found to be more effective against *Escherichia coli*. When compared to other extracts leaves extracts of ethanol have maximum inhibition zone against *Escherichia coli* (19.00 mm) followed by *Staphylococcus aureus* (14.00 mm) at 100 (µg/ml) concentration. The different solvents leaves extract of *Rubiaceae* family shown a better antimicrobial activity, in according with the results obtained by (Kandikattu Karthik *et al.,* 2015). Similarly plant *Canthium dicoccum* belongs to *Rubiaceae* family also showing potent antimicrobial activity when compared with standard drug.

Fig. 1: *Canthium dicoccum* leaves.

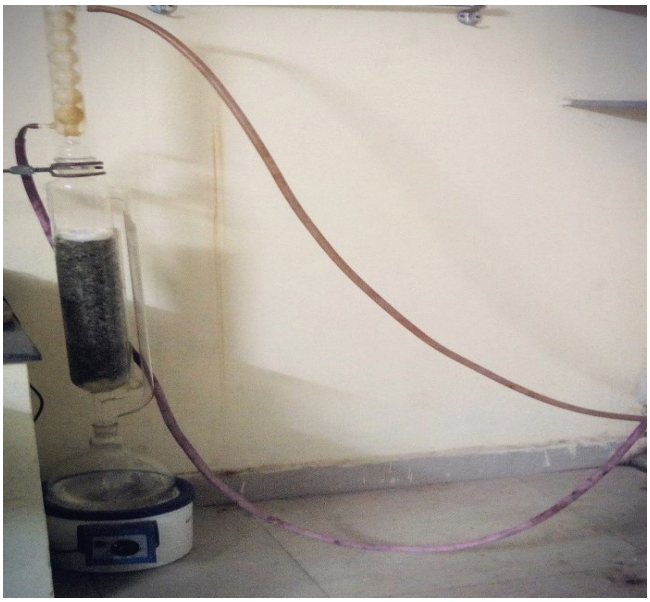

Fig. 2: Overall view of extraction using Soxhlet apparatus.

Conclusion

The present study reveals that the crude extracts show important antimicrobial properties, which support its folk medicine. Therefore, there is no doubt that this plant is a reservoir of potentially useful chemical compounds, which serve as drugs and provide modern drug discovery.

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Table 1: It shows antibacterial activity of different solvents extract of *Canthium dicoccum* (Gaertn.) leaves with standard.

Sl.No.	*Amischophacelus axillaris*	Bacterial strains	Inhibition zone in mm			Ciprofloxacin(standard) 1(µg/ml)
			25(µg/ml)	50(µg/ml)	100(µg/ml)	
1	Pet. ether	*E. coli*	9	11	15	20
		S. aureus	4	6	8	18
2	Ethyl acetate	*E. coli*	5	8	10	20
		S. aureus	NI	5	9	18
3	Ethanol	*E. coli*	10	13	19	20
		S. aureus	11	12	14	18

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