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Antibacterial efficacy of *Cissus quadrangularis* from different provinces

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***Cissus quadrangularis* is commonly known as *Bone setter*. It is known for its biological properties, with many phytochemical properties. The aim of the present study is to evaluate the antibacterial activity of *Cissus quadrangularis* collected from different regions like Andhrapradesh, Kerala and Tamil Nadu. The solvent chloroform was used for extraction and samples were tested against different group of microorganisms like *E. coli, Beta hemolytic staphylococcus, Pseudomonas putida* and *Staphylococcus aureus.* Variation in the antibacterial activity was observed among the microbial pathogens tried.**

Key words: *Cissus qudrangularis,* crude extract, chloroform, antibacterial activity, disc diffusion.

Plants have the major advantage of still being the most effective and cheaper alternative sources of drugs. The local use of natural plants as primary health remedies, due to their pharmacological properties is quite common in Asia, Latin America and Africa. To this phytochemicals derived from plants are the sole remedy. The effective plant constituents can combat human and plant pathogenic bacteria, fungi and virus without toxic side effect and environmental hazards. Due to this favorable reason, search for plant products with antimicrobial properties intensified in recent years.

Antimicrobial activity is the capacity of the substances to kill or inhibit the growth of microorganisms. A diverse arena of new antimicrobial agents is urgently needed to combat the diminishing efficacy of existing antibiotics. This derives the need to screen medicinal plants for novel bioactive compounds as plant based drugs are biodegradable, safe and have fewer side effects.

Cissus quadrangularis belongs to the family Vitaceae. It is one of the medicinal plants which are widely distributed in hotter parts of India. It is commonly called as 'Bone setter', used as common food item. The stem is used for the treatment of malaria, stomach ulcer, dyspepsia, eye, ear diseases, irregular mensuration, asthma, tumors, piles, cold, pains, fractures of bones, wounds and scurvy (Arbonier, 2000). Earlier, Uzel *et al.,* (2005) studied on Chemical compositions and antimicrobial activities of four different Anatolian propolis samples. In the present investigation, *Cissus quadrangularis* was selected to perform antibacterial activity. The plants were selected from three different states Andhra Pradesh, Kerala and Tamil Nadu with different climatic conditions to evaluate the antibacterial potential. Variation in phytochemicals and their activity on antimicrobials was analyzed to determine the elite plants.

Materials and Methods

Cissus quadrangularis plant samples were collected from three different provinces like Andhra Pradesh, Kerala and Tamil Nadu the southern region in India. Chloroform was used as a sole solvent system. The stem part of *Cissus quadrangularis* was washed, cut into small pieces separately and crushed with blender. About 40g of crushed plant material was taken and extracted with double the volume of chloroform and evaporated at room temperature to form slurry. Then the evaporated extract of the plant samples were stored at 4ºC for further use.

Culture Media Preparation

Nutrient Agar media was used for testing the antibacterial activity against different micro organisms. Four different bacterial strains namely *E. coli, Beta hemolytic staphylococcus, Pseudomonas putida* and *Staphylococcus aureus* were grown on nutrient broth separately. Disc diffusion method by Bauer *et al,*(1966) was adopted.

Disc Diffusion Method

Sterile empty discs with the size of 6 mm purchased from Erode Drug House, Erode, Tamil Nadu. The discs were used to test the antimicrobial activity of the *Cissus quadrangularis* extracts from different regions. The crude chloroform plant extracts collected from different provinces were used. In each disc, about 10µl of stem extracts was carefully impregnated and air dried. A set of control was maintained with chloroform alone against the selected four pathogens. The impregnated plates were carefully incubated at 37ºC for 24 hours and observed for the zone of incubation and measured.

Results and Discussion

Plants have for ever been a catalyst for our healing. Using plants as the inspiration for new drugs provides an infusion of novel compounds or substances of healing disease. *Cissus quadrangularis* is an important plant known its various medicinal properties. Plants with possible antimicrobial activity should be tested against an appropriate microbial model to confirm the activity and ascertain the parameters associated with it. The effects of plant extracts on bacteria have been studied by very large number of researchers in different parts of the world (Nair *et al.,* 2004). In the present study, antibacterial activity of *Cissus quadrangularis* was collected from three different provinces like Andhra Pradesh, Kerala and Tamil Nadu (Fig.1a, b and c) were investigated.

The difference in antimicrobial potency among the different honeys depending on its geographical, seasonal and botanical source as well as through harvesting, processing and storage conditions was reported by Mohesen Taghizadeh *et al.,* (2011). In the present study, the antibacterial activity of the plant extracts collected from Andhra Pradesh showed maximum activity against *E. coli* followed by *Pseudomonas putida, Staphylococcus aureus* and then for *Beta hemolytic staphylococcus* (Table 1). The Kerala plant extracts showed maximum zone of inhibition against *E.coli*. It was followed by *Pseudomonas putida, Staphylococcus aureus* and *Beta hemolytic staphylococcus*. *Cissus quadrangularis* grown in Tamil Nadu inhibited maximum activity against *E.coli* and it was followed by *Pseudomonas putida* and *Staphylococcus aureus* and then by *Beta hemolytic staphylococcus* (Fig. d). Earlier, number of reports on the antimicrobial activity of *Cissus quadrangularis* was reported (Chidambara murthy *et al.,* 2003; Garima Mishra *et al.* 2009).

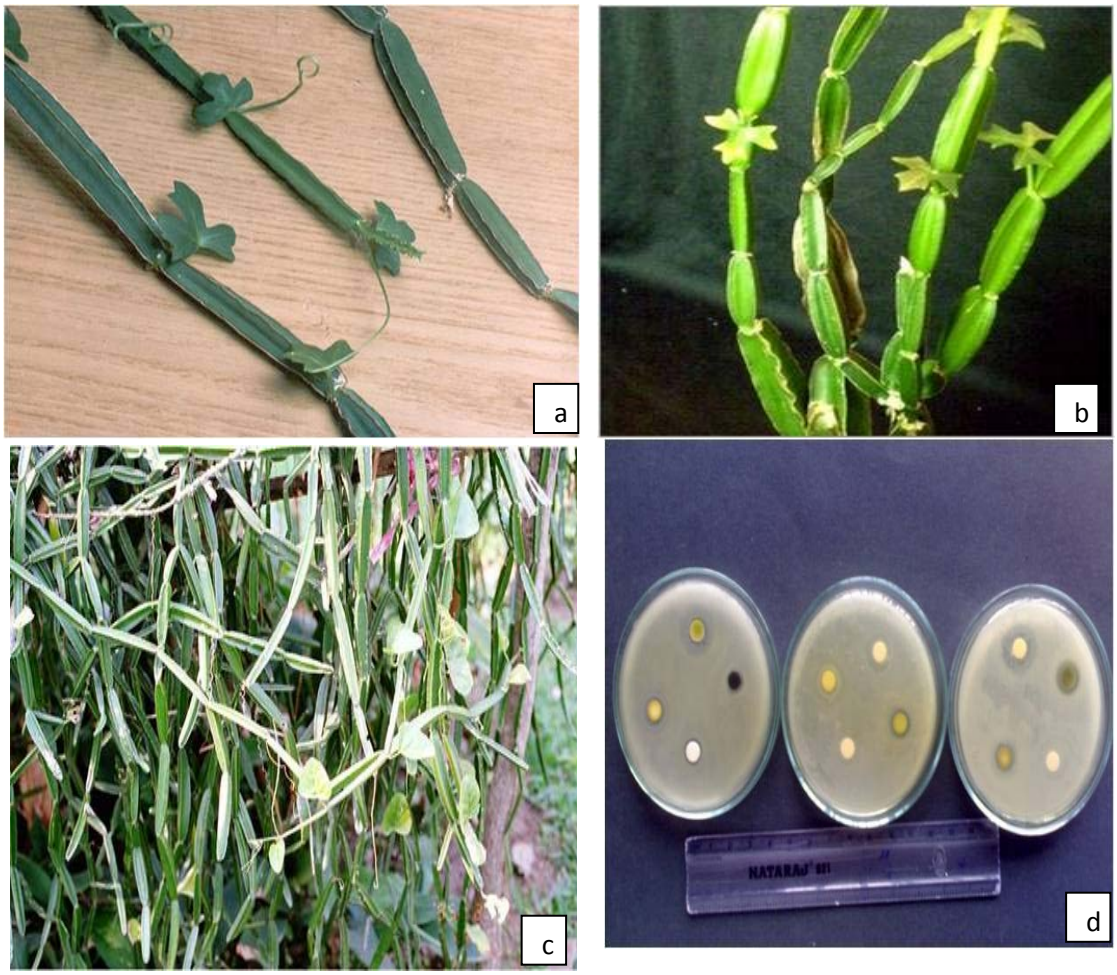

Fig. 1. *Cissus quadrangularis* collected from a. Andhra Pradesh b. Kerala c. Tamil Nadu. d. Zone of inhibition of *Escherichia coli, Staphylococcus aureus* and *Beta hemolytic staphylococcus.*

Table 1. Effect of chloroform extracts of *Cissus quadrangularis* against different pathogens

S. No.	Name of Microorganism	Chloroform	Zone of Inhibition (in mm)		
			Andhra Pradesh	Kerala	Tamil Nadu
1	*E. coli*	11	14	13	16
2	*Betahemolytic staphylococcus*	10	11	12	13
3	*Pseudomonas putida*	09	12	11	14
4	*Staphylococcus aureus*	10	12	11	14

In the present study, among the various organisms tried, the results were in series of *E.coli* > *Pseudomonas putida* > *Staphylococcus aureus* > *Beta hemolytic staphylococcus*. Interestingly, *Staphylococcus aureus* and *Pseudomonas putida* showing similar results with the different of zone of inhibition. The results showed that plants grown in Tamil Nadu proved to be best followed

by Andhra Pradesh and by Kerala. The factors that seemed to affect the antimicrobial activity of plant extract were the location and season in which the plant materials were collected (Lin *et al.,* 1999). Viljoen *et al.,* 2005 studied similar variation and its antimicrobial activity of *Lippia javonica*. Our result reveals that province variation influences the production of antibacterial property. From our study, it can be concluded that plants growing in different geographical localities were not alike in their phytochemical content as revealed. Environmental factor also affects the secondary metabolite of the plants. The elite herbs must be selected and secondary products can be extracted for curing various medicinal ailments.

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