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NOTE

Antimicrobial Activity of Some of the Locally Available Vegetables

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In the present work, *in vitro* antimicrobial properties of different vegetables which are used in day to day life is studied. The vegetable extracts were tested against pathogenic bacteria *E. coli*, *Staphylococcus aureus*, *Salmonella typhimurium*, *Pseudomonas aeruginosa*, *Clostridium tetanii* and *Streptococcus bacilli* following spread plate method. The aqueous extracts of the different parts of vegetables are having antimicrobial properties. In the present investigation it was found that the epicarp of Ash gourd has greater inhibitory activity among the tested extracts on all the test strains.

Key Words: Vegetables, Antimicrobial activity.

During the last century, the practice of herbalism became mainstream throughout the world. In spite of great advances observed in modern medicine, plants still make an important contribution to health care. This is due to the recognition of the value of traditional medical systems, particularly of Asian origin and identification of the medicinal plants from indigenous pharmacopoeias, which have significant healing power. Many plants are used in the form of crude extracts, infusions or plasters to treat common infections without any scientific evidence of efficacy.

Plants with possible antimicrobial activity are tested against an appropriate microbial model to confirm the activity and to ascertain the parameters associated with it. Interest in a large number of traditional natural products has increased. It has been suggested that aqueous and methanolic extract from plants used in allopathic medicine are potential sources of antiviral, antitumoral and antimicrobial agents. The selection of crude plant extracts for screening programs has the potential of being more successful in initial steps than the screening of pure compounds isolated from natural products. Plants which have been used as medicines over hundreds of years constitute an obvious choice for study. It is interesting to determine whether their traditional uses are supported by actual pharmacological effects or merely based on folklore[1].

In the present study, five different locally available vegetables were selected and used in the treatment of infectious disease, so that the *in vitro* antimicrobial activity was investigated.

The different parts of the plants were collected, dried and then powdered. The vegetables used are tabulated in Table-1.

TABLE-1
TRADITIONAL USE OF SPECIES SELECTED FOR ANTIMICROBIAL INVESTIGATION

Common name	Botanical name	Part tested	Popular use
Beet root	*Beta vulgaris*	Swollen roots	Sweet expectorant, tonic, inflammations and general debility
Ash gourd	*Benincasa hispida*	Fruit	Promotes good sleep and also improves memory, Vermifuge laxative, diuretic, tonic, aphrodisiac, urinary discharges and calculi, thirst, biliousness, blood diseases, removes foul taste from mouth. It is good heart tonic.
Tamarind	*Tamarindus indica*	Leaves	Anti inflammatory, used in bilious fever and analgesic
Red gourd pumpkin	*Cucurbita maxima*	Fruit	Haematinic,analgesic
Colacasia	*Colacasia esculenta*	Underground modified stems	Contains thiamine (vitamin B1), riboflavin (vitamin B2), niacin, oxalic acid

The aqueous extract was prepared by macerating 100 mg of each powdered material in 1 mL of sterile distilled water and the solvent extract was prepared by macerating 2 g of each material in 5 mL of methanol. The above extracts were allowed to remain for 48 h at room temperature.

The test organisms include the quality control strains of *E. coli, Staphylococcus aureus, Salmonella typhi, Pseudomonas aeruginosa*, *Clostridium tetani* and *Streptococcus bacilli* were obtained from local clinical microbiological laboratory. The bacteria were grown in nutrient broth at 37 ºC and maintained on nutrient agar slants at 4 ºC.

The antibacterial activity of the methanol and aqueous extracts of each sample was evaluated by disc diffusion method[2,3]. 5 mL of nutrient broth was inoculated with a loop of bacteria and incubated at 37 ºC for 6 h. 0.1 mL of broth was taken at 0.6 O.D (at log phase, having 108 cells) and spread over 180 mm × 20 mm nutrient agar petridishes.

Three sterile paper discs (5 mm diameter) were placed in each agar plate and on two discs aqueous, methanol extract of 20 µL volume and on the third disc 20 µL of absolute methanol was placed as a control. The bacterial cultures were incubated at 37 ºC for 24 h. The microbes were plated in duplicate and average zone diameter was noted.

Various parts of plants were evaluated for their antimicrobial potential against five different microorganisms using microbroth dilution assay. The results were summarized in Table-2. In the present study, it was concluded that when compared to the methanol extract, aqueous plant extracts were able to inhibit different microorganisms forming large zone of inhibition. Among the various plant extracts, the epicarp of ash gourd was found to have greater antibacterial activity indicating the presence of active constituents in the outer pulp. The methanolic extracts of the different parts of the plant were showing less antimicrobial activity as compared to aqueous extract.

TABLE-2
RESULTS OF ANTIMICROBIAL ACTIVITY OF THE SELECTED VEGETABLES

Plant name	Solvent used	Diameter of inhibition zone (mm)					
		EC	SA	ST	PA	CT	SB
Beet root	Methanol	1.3	–	–	–	–	–
	Water	0.1	–	0.2	0.1	0.2	0.5
Sweet Pumpkin	Methanol	–	–	0.3	–	–	–
	Water	–	–	–	–	0.2	–
Tamarind	Methanol	–	–	–	–	–	–
	Water	0.1	1	0.2	0.3	2	0.2
White gourd pumpkin	Methanol	–	–	–	–	0.4	–
	Water	0.2	3.3	1.0	1.0	2.5	5
Colacassia endo carp	Methanol	0.2	–	–	–	–	–
	Water	0.7	–	0.5	1	–	0.2
Colacassia epicarp	Methanol	–	–	0.5	–	0.1	–
	Water	–	–	–	3.5	–	0.1

EC = *E. coli*; SA = *S. aureus*; ST = *S. typhimurium*; PA = *P. aeruginosa*; CT = *C. tetanii*; SB = *S. bacilli*.

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