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Antibacterial Potential Of Karanja *Pongamia pinnata* (Vent.)

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Abstract
The in vitro antibacterial activity of seed and root extracts of *Pongamia pinnata* has been investigated against *Escherichia coli*, *Staphylococcus aureus*, *Salmonella typhi*, *Klebsiella pneumoniae*, *Pseudomonas sp*. and *Hygrobacterium sp*. The plant shows strong activity against *E. coli*, *S. aureus*, *S. typhi* and no activity against *K. pneumoniae* in seed extract. The root extract was found to be effective against *E.coli*, *S. aureus*, *S. typhi*, *K. pneumoniae* and was not effective against *Pseudomonas sp.* and *Hygrobacterium sp* large as the one produced by one unit concentration of the antibiotic oxytetracycline. The ethylalcohol (95%) extract gave a light yellow colour and orange red colour in methanol (95%) extract. The ethyl alcoholic extract of seeds shows a higher inibitory effect on *S. aureus* followed by *E. coli*, and *S. typhi* (Jain and Aggarwal, 1978).

Keywords : *Antibacterial effect, Sensitivity, Effective inhibitory zone, Plant extract, Pongamia pinnata (vent.)*

Introduction
The evaluation of plant extract for their antibacterial activity have been known for more than seventy years (Machat and Kankel, 1920). The microorganism have developed resistance to many antibiotics. This has created an immense clinical problems in the treatment of disease, therefore, there is a need to develop an alternative to these drugs for the treatment of disease. The medicinal herbs represent a rich source of antibacterial activity. Keeping this in view an attempt has been made to study the antibacterial activity of alcoholic seeds and root extracts in alcohol of *Pongamia pinnata* (Dhar *et al*.,1968).

Method-I
100 gm of the roots (coarse form) were kept in ethyl alcohol in soxhlet extractor for 72 hrs. The extract in the form of orange-red colour was collected and fresh ethyl alcohol (95%) was again added and kept in the soxhlet extractor for next 72 hrs. The procedure was repeated till colour of decoction become light. All decoctions were mixed and ethyl alcohol (95%) was separated by vacuum distillation (Jain and Aggarwal, 1978).

Method-II
For the preparation of seed extract, the seeds were first washed 2-3 times with tap water and then with sterilized distilled water. 100 gm. seeds of *Pongamia pinnata* were crushed in blender resulting in the formation of a paste, which was mixed in 250 ml of absolute alcohol (Ghanaksha and Kaushik, 1999). Alcoholic extract so prepared was allowed to evaporate at room temperature until 80 ml of it was left. This extract was squeezed through double layer musline cloth and filtered through whattman filter paper No-42 and was centrifuged at 5000 r.p.m. for 20 minutes and then sterilized by passing through 0.2 micron disposable filter.
Maller Hinton Agar (Hi media No. M173) media was used to test antimicrobial activity against *E. coli*, *S. aureus*, *S. typhi* and *K. pneumoniae* by disc diffusion method (Ananthanarayana and Panikar, 1996). 5 mm diameter discs are charged with appropriate concentration of the extract and standard antibiotic oxytetracycline (one unit concentration), distilled water and absolute alcohol served as control. The plates were incubated at 37^0c for 24 hours . The antimicrobial activity was evaluated by measuring the diameter of inhibition zone in mm.

Results and Discussion

The data presented in Table-1 shows that alcoholic seed extract of *P. Pinnata* substantially inhibited the growth of *E.coli*, *S. aureus* and *S. typhi* but not inhibited the growth of *K. pneumoniae* as indicated by size of zone of inhibition. Thus the seed extract of the plant shows broad spectrum antibacterial activity. Similar results of biological activity of plant against fungi and bacteria were reported by Mehta *et al*., (1993) and Ahmad *et al*., (2001). The seed extract was more effective against Gram +ve

100%	-	Concentration of root extract
50%	-	Concentration of root extract
25%	-	Concentration of root extract
Antibiotic	-	(Oxytetracyline 1 unit conc.)

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Table-1 : The antibacterial effect of *P. pinnata* undiluted alcoholic seed extract

Organism	Inhibition zone in mm				Effective zone of inhibition (in mm)(A-B)
	Antibiotic zone	Undilute Extract zone	Control Alcohol Zone	Distilled water Zone	
Excherichia coli	15.0	14.0	5mm.	NIL	9.0
S. aureus	17.2	15.0	5mm.	NIL	10.0
Salmonella typhi	30.0	13.0	5mm.	NIL	8.0
K. pneumoniae	35.0	NIL	5mm.	NIL	NIL

Table-2 : The antibacterial effect of *P. pinnata* root extract

Organism	Inhibition zone in mm						Effective zone of inhibition (in mm)(A-B)		
	Antibiotic zone (Oxytetra cycline 1 unit conc.)	Undilute Extract zone (A)			Control Alcohol Zone (B)	Distilled water Zone (C)			
		100 %	50 %	25 %	mm	mm	100 %	50 %	25 %
Escherichia coli	35	17	15	15	5	Nil	12	10	10
Pseudomonas sp.	33	Nil	Nil	Nil	5	Nil	Nil	Nil	Nil
Hygrobacterium sp.	37	Nil	Nil	Nil	5	Nil	Nil	Nil	Nil
Salmonella typhi	21	12	10	Nil	5	Nil	7	5	Nil
K. pneumoniae	30	12	11	Nil	5	Nil	7	6	Nil