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Antibacterial Activity of Various Crude Extracts of *Justicia tranquebariensis*

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The *in vitro* antibacterial activity of different extracts obtained from roots and rhizomes of *Justicia tranquebariensis* against different organisms namely *Bacillus subtilis, Staphylococcus aureus, Escherichia coli* and *Klebsiella pneumonia* have been carried out. The prepared extracts from petroleum ether and hydro alcohol (50:50) were investigated with different concentrations. Our findings showed that both extracts have highest antibacterial activity in gram positive strains than gram negative strains. Also increase in concentration of each extract increases the antibacterial activity. Both the extracts showed significant broad spectrum anti-bacterial activity.

Key words: *Justicia tranquebariensis*, Petroleum ether extract, Hydro alcoholic extract, MIC.

Since animals, human and plants co-evolved together, many of their constituents are similar in nature and therefore, certain plant compounds have been used in managing diseases. Many extracts (saline, acidic and ether) and substances separated from those extracts posses anti-bacterial activity against bacteria and fungi[1,2]. The plant of genus *Justicia* belonging to the family Acanthaceae, consists of 2500 species and 250 genera, which are mainly herbs, shrubs, climbing tender varieties and xerophytes. Those species possess good medicinal properties mainly as a fever remedy (*Andrographis*), as a diuretic actions (*Hygrophila*) and as a skeletal muscle relaxant (*Adhatoda*). *Justicia tranquebariensis* (Tam: Sivanarvembu), a herbal species found in India belongs to the same family. It also possess good therapeutic efficacy in fever, vomition, etc. The juice of its leaves are cooling and apperient. It is given to children suffering from smallpox. The paste of the juice obtained from bruished leaves is applied to skin of patients who are suffering from contusions and inflammations [3-5]. The present study is intended to evaluate the anti-bacterial activity of various extracts obtained from the powdered roots and rhizomes of the plant and this is the first time of evaluating antibacterial efficacy of the roots and rhizomes part of this plant.

MATERIAL AND METHODS

The plant material was collected from Cauvery delta region (Thanjavur district), Tamil Nadu, India. The identification of the plants including the experimental using parts (roots and rhizomes) has been confirmed by using all official monographic specifications. Then the roots and rhizomes were isolated, washed with water and dried in shade. Then they were pulverized by using mechanical grinder and passed through a 40-mesh

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sieve to obtain fine powder. About one kilogram of the powdered rhizomes was subjected to hot soxhlet extraction for 24 hrs by using petroleum ether (40-60°C)[6]. Then the prepared extract was filtered through muslin cloth by using separating funnel. Then the filterate was concentrated in vacuum by using rotary evaporator to get a semisolid mass. The dried marc was subjected to cold maceration by using an equal mixture of methanol and water (1:1) to get a hydro alcoholic extract. Then the extract was concentrated to get a semisolid mass. Both the semisolid masses were redissolved in DMF (Dimethyl formamide) to get various concentrations for evaluating the anti-bacterial efficacy.

Bacterial strains namely *Bacillus subtilis* (NCIM 2063), *Staphylococcus aureus* (NCIM 2019), *Escherchia coli* (NCIM 2065) and *Klebsiella pneumoniae* (NCIM2036) had been procured from the National Chemical Laboratory, Pune, India for this evaluation. The stock culture was maintained on Mueller Hinton (MH) agar medium at 37°C.

EXPERIMENTAL

The anti-bacterial activity of the two extracts was performed by paper disc diffusion assay method[7]. The discs of uniform size (6mm) were prepared from Whatmann No.1 filter paper and were sterilized in hot air oven at 160°C for 1hr.Then the discs were impregnated with the MIC (minimum inhibitory concentration) of different concentrations (50mg/ml, 100mg/ml and 200mg/ml) of various extracts and standard ciprofloxacin. The solvent DMF is used as a control. The plates were prepared by using MH agar media and the extracts of various dilutions were allowed to solidify and dried. Different wells[8] were prepared in the solidified agar plates and were labelled. Then a loopful of bacterial cultures were inoculated at the labeled spots and the plates were inoculated at 37°C for 24hrs and the zone of inhibition was observed.

RESULTS

From the obtained results it is evident that the petroleum ether and hydro alcoholic extracts of *Justicia tranquebariensis* showed moderately significant antibacterial activity against gram+ve and gram-ve bacteria, when compared with standard ciprofloxacin. Also by increase in concentrations of both the extracts showed increase in the anti-bacterial activity (Fig. I). From the zone of inhibition, the used crude extracts showed a significant antibacterial activity (Table 1).

Table 1. Minimum inhibitory concentration (MIC in mg/ml) of various extracts of *J. tranquebariensis.*

Various crude extracts & various concentrations (mg/ml)	Zone of inhibition against bacterial strains (mm)			
	B. subtilis (NCIM 2063)	*S. aureus* (NCIM 2019)	*E. coli* (NCIM 2065)	*K. pneumoniae* (NCIM 2036)
Pet-ether extract (PE)				
50	7	13	8	6
100	11	20	10	9
200	14	24	12	11
Hydro alcoholic extract (HAE)				
50	10	9	6	9
100	13	12	10	12
200	18	22	14	16
Ciprofloxacin (CP)				
50	13	15	11	10
100	18	22	17	15
200	24	27	25	21
DMF	5	7	6	5

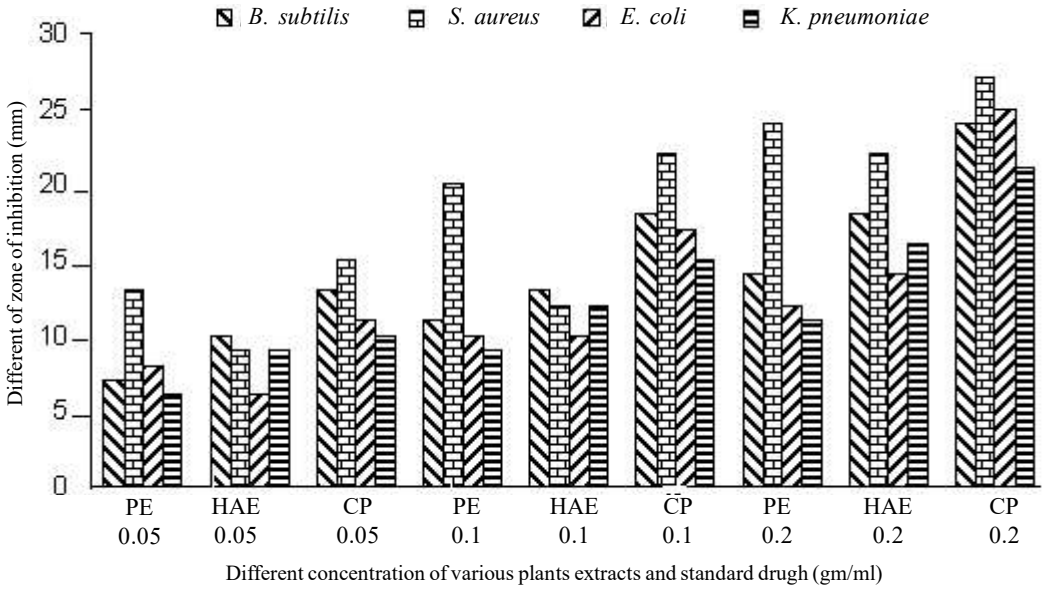

Fig. 1. Showing effects of various concentrations of different extracts against different bacterial strains

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