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Antimicrobial activity of alkaloids extract from *Adhatoda vasica* plant of Ranchi District, Jharkhand, India

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Abstract : *Adhatoda vasica*, a popular Indian medicinal plant, the present paper gives an account of the antimicrobial activity of alcoholic extracts and alkaloids extracted extensively. The cold methanolic extracts of *Adhatoda vasica* and alkaloids isolated from the methanolic extract, were evaluated for antimicrobial activity against bacteria such as, *Staphylococcus aureus*, *Escherichia coli*, *Salmonella typhimurium*, *Pseudomonas aeruginosa*. Antimicrobial activity was performed using agar cup diffusion method. Methanolic extracts of *Adhatoda vasica* were found to be active only against *S. aureus* and *P. aeruginosa*, but alkaloids isolated from these extracts exhibited excellent antimicrobial activity against organism investigated.

Keywords : *Adhatoda vasica*, Alkaloids, Antimicrobial activity.

INTRODUCTION

Plant derived medicines have made large contributions to human health. Plants are rich in a wide variety of secondary metabolites. However, literature survey carried out during the present study did not reveal systematic studies on antimicrobial activity of alkaloids extracted from *Adhatoda vasica*. Hence, an investigation was under taken to screen hot methanolic and cold methanolic extracts of leaves of *Adhatoda vasica* and alkaloids isolated from there extracts, for their antimicrobial activity.

MATERIALS AND METHODS

Plant material - The air-dried leaves of *Adhatoda vasica* were taken.

Preparation of extract - Hot methanolic extraction (HME).

Hot Methanolic Extracts were prepared using Soxhlet apparatus. Cold Methanolic Extraction (CME). Cold Methanolic Extracts were prepared on a mechanical shaker,

set at 200 RPM at 300 ± 2 C. These extracts were dried and residues were used to extract alkaloids and also to determine its antimicrobial activity.

Extraction of Alkaloids from *Adhatoda vasica*

The alkaloids were extracted from the dry residue of the HME, according to the method 1 gram of dried residue from hot methanolic extract, 4ml diluted HCl (not more than 1.0 M and not less than 0.1 M, pH 0-1), was added. Activated charcoal was added to this mixture (0.1 gram of activated charcoal per 10 grams dried residue or 10 ml of extract). The mixture was boiled for 10 minutes and filtered. Residue obtained was washed with fresh diluted HCl before discarding. The HCl extract was basified with 5 M NaOH to adjust pH well above 7. The extracted phytochemical was confirmed as alkaloids. The dried plant extracts and isolated phytochemicals were reconstituted in methanol up to a concentration of 50mg/ml.

ANTIMICROBIAL ASSAY

The agar cup diffusion method was employed to study the antimicrobial activity. The bacteria was swabbed on solidified agar media. Since methanol was used as a solvent for reconstituting the plant extract, control wells were

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maintained, to test the antimicrobial activity in each plate. Results were rated after the appropriate incubation period by measuring the diameter of zone of inhibition in millimeter (mm) scale.

RESULTS AND DISCUSSION

Extractive Value- Percentage yield of alkaloids from *Adhatoda vasica* is repeated to between 0.25-1.0 % by

various researchers. During the present study, the observed value of alkaloid yield from the HME of *Adhatoda vasica* was 0.768% which is in comparison with the reported alkaloid content. It was clearly observed that, all crude extracts of *Adhatoda vasica*, and alkaloids obtained during the present study, were having antibacterial property against the test organisms.

CME and HME of *Adhatoda vasica* and alkaloids isolated from *Adhatoda vasica*, to detect antimicrobial activity.

Name of the organism	Zone of inhibition (mm) Mean $\pm$ 5.0			Alkaloids
	Control	CME	HME	
S. aureus	Nil	14.5 $\pm$ 0.5	17.67 $\pm$ 0.29	27.16 $\pm$ 0.76
E. coli	Nil	11.67 $\pm$ 0.29	13.66 $\pm$ 0.29	20.50 $\pm$ 1.32
P. aeruginosa	Nil	11.83 $\pm$ 0.76	13.17 $\pm$ 1.26	15.83 $\pm$ 0.58

CONCLUSION

From the results obtained during the present study. We can conclude that the alkaloids from *Adhatoda vasica* have excellent antibacterial activity against the most resistant bacteria like *S. aureus*, *P. aeruginosa* and the highly pathogenic bacteria like *S. typhi*. As mentioned earlier, there is a need for special attention in research strategies to look into phytochemicals which are active against such resistant and pathogenic bacteria. These substances further can be subjected to carry out pharmacological evaluation.

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