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Research Article

Anti-bacterial activity of root bark of *Nyctanthes arbor-tristis* Linn.

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Abstract

Nyctanthes arbor-tristis Linn. (Oleaceae) is a well known medicinal plant in traditional system of medicine. The root bark extracts of the plant were screened for anti-bacterial activity. The test organisms were *Escherichia coli, Bacillus subtilis, Pseudomonas aeruginosa, Staphylococcus aureus* and *Streptococcus facecalis*. The zone of inhibition were determined and compared with the standard drugs cefixatime.

Keywords: *Nyctanthes arbor-tristis,* Anti-bacterial activity, Extracts.

Introduction

Medicinal plants are an important therapeutic aid for various ailments. Scientific experiments on the antimicrobial properties of plant components were first documented in the late 19th century.[1] In India, from ancient times, different parts of medicinal plants have been used to cure specific ailments. Today, there is widespread interest in drugs derived from plants. This interest primarily stems from the belief that green medicine is safe and dependable, compared with costly synthetic drugs that have adverse effects. Natural antimicrobials can be derived from plants, animal tissues, or microorganisms.[2] The shortcomings of the drugs available today, propel the discovery of new pharmacotherapeutic agents in medicinal plants.[3] To determine the potential and promote the use of herbal medicine, it is essential to intensify the study of medicinal plants that find place in folklore.[4-5]

Nyctanthes arbortristis Linn. commonly known as harsinghar, parijat or night jasmine is one of the well known medicinal plants used in traditional system of medicine. Different parts of *N. arbortristis* are known to possess various ailments by rural and tribal people of India. Juice of the leaves is used as digestives, antidote to reptile venoms, mild bitter tonic, laxative, diaphoretic and diuretic[6-8] .Leaves are also used in the enlargement of spleen. Traditionally the powdered bark is given in rheumatic joint pain, in treatment of malaria and also used as an expectorant[6] . The plant have been screened for antihistaminic activity, CNS activities (viz. hypnotic, tranquillizing, local anesthetics), analgesic, anti-inflamatory, antipyretic, antiulcer, amoebicidal, anthelmintic, antitrypanosomal to antidepressant, antiviral and immunomodulatory[9] .Leaves extracts was found to have antimicrobial activity[10] but no proper work was carried on the antimicrobial activity on the root bark part therefore, the present work was conceived.

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Material and Methods

Plant materials

Root Barks of *Nyctanthes arbortristis* were collected from Bhopal, Madhya Pradesh in the month of Jan, 2011 and were identified by the Botany Department, Janata PG College, A.P.S. University, Rewa (M.P.), Voucher specimen No. JC/NA/3430 was deposited in our department. The bark were later air-dried, powdered and stored in an air-tight container for further use.

Preparation of extracts [11]

The plant material was coarsely powdered and extracted sequentially with petroleum ether (60-80°C), chloroform and ethanol (95%) using Soxhlet apparatus. The aqueous extract was prepared by maceration. The extracts were filtered and allowed to evaporate to dryness.

Preparation of microorganisms for experiment

All the microorganisms were isolated from in & outpatients samples from Chotiram hospital and research centre Indore. For use in experiments, the organisms were sub-cultured in agar media.

Preparation and application of disks for experiment [12-14]

Different concentration of the extracts (10-60 µg/ml) was prepared by reconstituting with DMSO. The test microorganisms were streak to Muller Hinton agar medium by streaking plate method. After streaking the autoclaved filter paper discs (5 mm in diameter) impregnated with the extracts were placed on plates using flame-sterilized forceps. The antibacterial assay plates were incubated at 37°C for 24hr. For positive control cefitaxime (60µg/ml) and for negative control solvent DMSO was used.

Observation of results

Results were recorded as presence or absence of zone of inhibition. The inhibitory zone around test paper disks indicated absence of bacterial growth and it was reported as positive (growth inhibition observed) and absence of zone as negative. The test was repeated thrice in interday interval to insure reliability of the results. The diameters of the inhibition zones were measured in mm (after subtraction the diameter of disc i.e 5mm), shown in table 1.

Results and discussion

In this study the results of the investigations show that all the extracts from the bark possess anti-bacterial activities against mentioned test organisms. Table 1 shows the results of antibacterial activity against the tested microorganisms. All extracts showed varying degrees of inhibition against all the bacterial stains. Chloroform extract showed higher zone of inhibition as compared with the aqueous, petroleum ether and ethanolic extracts and it is found to be more active. Hence, it was concluded from present investigation that extracts of the root bark of *N. arbortristis* Linn. exhibited significant anti-bacterial activity .

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Table 1: Zone of inhibition for extracts, Standard & Control

Con in µg/ml		Zone of Inhibition (mm)*				
		EC	BS	PA	SA	SF
AE	10	-	-	-	-	-
	20	-	-	4.00±0.21	-	-
	40	2.23±0.23	-	4.20±0.80	3.21±0.16	4.71±0.70
	60	3.30±0.45	2.06±5.20	5.01±0.16	4.31±0.21	6.09±0.39
EE	10	4.89±0.89	-	7.08±0.22	-	-
	20	4.31±0.21	-	8.10±0.32	2.06±0.20	4.16±0.72
	40	5.21±0.43	3.20±0.28	10.17±0.62	3.00±0.21	6.34±0.90
	60	6.00±0.22	4.00±0.51	11.00±0.52	3.51±0.21	652±0.56
PE	10	3.21±0.16	4.41±0.30	4.09±0.12	4 .06±0.62	5.34±0.90
	20	5.62±0.30	6.22±0.49	6.06±0.22	5.23±0.23	6.40±0.78
	40	5.33±0.56	6.40±0.78	8.14±0.38	5.41±0.30	6.62±0.30
	60	7.78±0.99	8.34±0.90	8.00±0.08	878±0.99	7.33±0.56
CH	10	8.06±0.28	6.09±0.39	10.06±0.62	7.16±0.72	8.89±0.89
	20	11.19±0.42	9.51±0.21	12.06±0.28	8.62±0.30	8.50±0.76
	40	15.03±0.34	12.0±0.34	14.71±0.70	14.20±0.28	9.10±0.32
	60	18.52±0.56	16.16±05	20.01±0.29	14.51±0.21	13.08±0.22
SD	60	22.50±0.76	27.51±0.28	24.16±0.72	25.16±0.26	23.83±0.16
Con	-	-	-	-	-	-

* mm= Mean of three replicates±SEM
AE= Aqueous extract EE: Ethanolic extract; PE: Petroleum ether extract; CH: Chloroform extract; Con: Control (DMSO); SD: Standard (CE = cefitaxime)
EC= *Escherichia coli*, BS= *Bacillus subtilis*, PA= *Pseudomonas aeruginosa*, SA= *Staphylococcus aureus*, SF= *Streptococcus facecalis*