ISSN:2249-1236

INTERNATIONAL JOURNAL OF RESEARCH AND REVIEWS IN PHARMACY AND APPLIED SCIENCES

Research Article

Received: 13-09-2011 *Accepted: 06-10-2011* *Published: 29-11-2011*

A COMPARATIVE STUDY ON ANTIMICROBIAL ACTIVITY OF CLERODENDRUM INFORTUNATUM, SIMAROUBA GLAUCA AND PSORALEA CORYLIFOLIA

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ABSTRACT

Ethanolic extracts of leaves of *Clerodendrum infortunatum Linn, Simarouba Glauca* and *Psoralea corylifolia* (Babchi) were subjected to preliminary screening for antimicrobial activity. All ethanolic extracts exhibited significant anti-microbial activity comparable to the standard drug tetracycline. Ethanolic extract of *Clerodendrum infortunatum* shows more inhibitory zone as compared to ethanolic extracts *Simarouba Glauca* of and *Psoralea corylifolia* .The mixture of all three extracts together in equal concentration shows more inhibitory zone as compared to other extracts.

Keywords: *Clerodendrum infortunatum, Simarouba Glauca, Psoralea corylifolia*, antimicrobial.

INTRODUCTION

Many plants were found to contain compounds, which are used as natural medicines to treat common bacterial infections. Indian medicinal plants are regularly used in various system of medicine because of minimal side effect and cost effectiveness. The potential for developing antimicrobials from higher plants appears rewarding as it may lead to the development of phytomedicine against microbes.

Clerodendrum infortunatum Linn. (Verbanaceae Bhat in Hindi, Ghentu in Bengali, Bhania in Oriya) is a terrestrial shrub having square, blackish stem and simple, opposite, decussate, petiole, exstipulate, coriacious, hairy leaves with a disagreeable odour. The plant is common throughout the plains of India. Various parts of the plant have been used by tribes in colic, scorpion string, snake bite, tumour and certain skin diseases also used in Indian folk medicine as in the treatment of bronchitis, asthma, fever, diseases of the blood, inflammation, burning sensation and epilepsy. Fresh juice of the leaves has been used as vermifuge and in treatment of malaria. *Clerodendrum infortunatum* leaves on preliminary chemical analysis are found to contain saponin, clerodin (a bitter diterpene) and some enzymes. Leaves also contain a fixed oil which consists of Glycerides of Lenoleic, oleic, stearic and lignoceric acid. Previous phytochemical investigation of the plant revealed the presence of alkyl sterols and 2,- (3,4-dehydroxyphenyl)ethanol-1-O-α-2-rhamnopyranosyl-(1→3)-β-D-(4-O-caffeoyl) glycolpyr - anoside (acteoside) in this plant.

Simarouba Glauca (Family: Simaroubaceae) This medium sized evergreen tree begins to bear fruits, when it is 6-8 years old (3-4 years in case of grafts) and attains stability in production after another 4-5 years.The flowering is annual, beginning in December in India, and continuing up to following February. The trees are polygamodioecious and only some females are heavy bearers. By grafting with a suitable scion in situ the sex of the plant can be transformed as desired and the productivity can be increased. The drupelets turn black (in Kaali variety) or greenish yellow (in Gauri variety) when they are ready for harvest during April/May. Manually harvested drupelets are depulped, washed and sun-dried (moisture about 10%) and transported at convenience for processing. The main active groups of chemicals in simarouba are called quassinoids, which belong to the triterpene chemical family. Quassinoids are found in many plants and are well known to scientists. The antiprotozoal and antimalarial properties of these chemicals have been documented for many years. Several of the quassinoids found in simarouba, such as ailanthinone, glaucarubinone, and holacanthone, are considered the plant's main therapeutic constituents and are the ones documented to be antiprotozal, anti-amebic, antimalarial, and even toxic to cancer and leukemia cells. The main plant chemicals in simarouba include: ailanthinone, benzoquinone, canthin, dehydroglaucarubinone, glaucarubine, glaucarubolone, glaucarubinone, holacanthone, melianone, simaroubidin, simarolide, simarubin, simarubolide, sitosterol, and tirucalla.

Psoralea corylifolia Linn.(Family: Papillionaceae)commonly known as Babchi. According to Ayurveda, root is useful in carries of teeth whereas leaves are good for diarrhea. Fruit is diuretic, and causes biliousness. It is useful in treatment of vomiting, piles, bronchitis, inflammation, anaemia etc. It improves hair growth and

complexion. Seeds are refrigerant, alternative, laxative, antipyretic, anthelmintic, alexiteric and good for heart troubles. Seed oil is used externally in treatment of elephantiasis. According to Unani system of medicine, its seed is purgative, stomachic, anthelmintic, vulnerary, stimulant, aphrodisiac and cures blood related troubles. It is applied externally in treatment of skin related troubles. *P. corylifolia* extract contains a number of bioactive compounds that are the molecular basis of its action, including flavonoids (neobavaisoflavone, isobavachalcone, bavachalcone, bavachinin, bavachin, corylin, corylifol, corylifolin and 6-prenylnaringenin), coumarins (psoralidin, psoralen, isopsoralen and angelicin) and meroterpenes (bakuchiol and 3-hydroxybakuchiol

MATERIAL AND METHODS

Plant Material:

Leaves of *Clerodendrum infortunatum*, leaves of *Simarouba Glauca* and leaves of *Psoralea corylifolia* were collected from Hinganghat dist. Wardha (M.S.).The collected material was authenticated by available literature.

Extract preparation

The collected materials were washed thoroughly in water, chopped, air dried for a week at 35- 40oC and pulverized in electric grinder and exhaustively extracted successively in soxhlet apparatus, using petroleum ether and ethanol respectively. The extracts were concentrated under reduced pressure and were then made to powder. These powders were dissolved in (DMSO).These solutions extracts were used for analyzing the antimicrobial activity against reference strains.

Microorganisms

Three clinical strains *E.coli, Bacillus subtilis, Staphylococcus aureus* were used for assessing the antimicrobial activity with standard tetracycline (10ug/ml). Three fungal strains *Aspergillus niger, Aspergillus flavus and Candida albicans* were used for antifungal activity.

Antimicrobial Activity:

Antimicrobial activity was determined by the disc diffusion method. Muller hilton and Saboured dextrose broth were used as medium for bacterial and fungal strains respectively. Control experiments were carried out under the similar condition by using tetracycline (100ug/ml). The Petri dishes with bacterial and fungal cultures were incubated at 37±2°C for 24 hrs and 27±2°C for 48 hrs respectively. The assessment of antimicrobial activity was based on the measurement of diameter of inhibition zone formed by dissolving the plant material extract in DMSO and standard drug also. The experiment was repeated thrice and results were taken as mean of these readings.

RESULTS AND DISCUSSION

The results of antimicrobial activity of ethanolic extracts of *Clerodendrum infortunatum*, *Simarouba Glauca* and *Psoralea corylifolia* are given in table 1.From the results it was found that all ethanolic extracts exhibited significant antimicrobial activity comparable to the standard drug tetracycline.Ethanolic extract of shows *Clerodendrum infortunatum* more inhibitory zone as compared to ethanolic extracts of *Simarouba Glauca* and

Psoralea corylifolia.When the three extracts were mixed together in equal concentration(1:1:1), it shows more inhibitory zone as compared to other individual extracts. From these results we can concluded that some of the component from the mixture of all three extracts exhibit the synergistic action. It needs the isolation of the active component from these extracts that exhibit synergistic action against bacteria.

Table 1: Antimicrobial activity of *Clerodendrum infortunatum*, *Simarouba Glauca* and *Psoralea corylifolia*

Treatment	Conc. (mcg/ ml)	Diameter of zone of inhibition(cm.)					
		Bacteria			Fungi		
		B. subtilis	***E.coli***	***S. aureus***	***A. niger***	***A. flavus***	***C. albicans***
C.infortunatum	500	2.0	1.9	1.9	1.9	1.9	1.5
Simarouba Glauca	500	1.6	1.4	1.3	1.3	1.2	1.2
Psoralea corylifolia	500	1.4	1.4	1.3	1.3	1.4	1.1
Mixture of *C.infortunatum+ Simarouba Glauca + Psoralea corylifolia (1:1:1)*	500	2.1	2.2	2.1	2.2	2.3	1.9
Standard (Tetracycline)	100	2.4	2.6	2.7	2.3	2.9	2.2

ACKNOWLEDGEMENT

Author is thankful to University Grant Commission, Westernal Regional Office, Ganeshkhind, Pune and Dr. George Augustine, Principal R. S. Bidkar College, Hinganghat Dist. Wardha for providing necessary facilities.

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