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Effects of Plant *Chloroxylon switenia* Bark Extracts On Pathogenic Microorganisms

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ABSTARCT
Plants are known to possess various secondary metabolites, which exhibit inhibitory effect against the growth of pathogens .To avoid the use of these harmful diseases causing synthetic chemicals, the plants and their products should be utilized to combat pathogens. This study is focused at testing the efficacy of plant bark extracts of *chloroxylon switenia* for antibacterial activity on pathogens like *E.coli, P.aeruginosa* and *S.aureus*. The study exhibited good results for antimicrobial activity against *S.aureus* and *P.aeruginosa*.

INTRODUCTION

In order to maintain the productivity, more and more chemicals are being added in the natural environment, which enter the food chain through water, soil, and air resulting serious harmful affects on human health [1]. To avoid the use of these harmful diseases causing synthetic chemicals, the plants and their products should be utilized to combat pathogens. Plants are known to possess various secondary metabolites, which exhibit inhibitory effect against the growth of pathogens [2]. Coliforms are major problem in drinking water contaminated with domestic sewage. Medicinal plants may be defined as any plant that can be put to culinary or medicinal use such as fox glove, opium poppy, and garlic. Ethno pharmacologists, botanists, microbiologists, and natural-products chemists are combing the Earth for phytochemical sources and "leads" which could be developed for treatment of infectious diseases. While 25 to 50% of current pharmaceuticals are derived from plants, a very few are used as antimicrobials. Traditional healers have long used plants to prevent or cure infectious conditions; Western medicine is trying to duplicate their successes. Keeping these problems in view, efforts are underway to search economical and safe phytochemicals, which could be utilized for disease control. Therefore, the screening and testing the efficacy of *chloroxylon switenia* for antibacterial activity was undertaken to explore their bactericidal activity.

MATERIALS AND METHOD

Plant collection: - Fresh bark was collected from the forest of Hoshangabad. Plant material was air dried, homogenized to a fine powder and stored in air-tight bottles.

Sample preparation and extraction: - Alcoholic and aqueous extract was used for this study. These crude extraction processes are done at room temperature for 48 hours by soxhlet extraction method. Muslin cloth was then used to filter the plant residues and the filtrates thus obtained were further purified by filtration through what man No 1 filter paper [3]. These stock solutions of extracts were sterilized by filtration through Millipore membrane filter of 0.45 m pore-size [4]. The sterile extract obtained is store in sterile capped bottles and refrigerated at 4^0c until when required for use.

Test Organisms: - The test organisms included in this study are ***Escherichia coli*** (NCIM no.2065), ***Pseudomonas aeruginosa*** (NCIM no 2200***),*** and ***Staphylococcus aureus*** *(NCIM* no. 2079). The pure clinical isolates were obtained from National Collection of industrial microorganisms (NCIM) Pune. Clinical isolates were checked for purity and maintained on Nutrient agar at 4^0c in the refrigerator until required for use.

Phytochemical tests: -Standard phytochemical tests for tannins, phlobatanins, flavinoids, cardiac glycosides and terpenoids were done.

Anti-microbial test by disc diffusion method: - The antimicrobial assay of aqueous and alcoholic extracts of bark was performed by disc diffusion method [5,6]. The disc (0.7 cm) (Hi-Media) was saturated with 100 l of the dilution series of (100%, 50%, and25%) test compound for 20 mins, allowed to dry and then placed on the upper layer of the seeded agar plate. The plates were incubated at 37°C. Antibacterial activity was determined by measuring the diameter of the zone of inhibition (mm) surrounding bacterial growth [7]. Clear zone around the discs shows inhibitory nature of the plant extracts. For bacterial strain, controls were included that comprised pure solvents instead of the extract [8].

RESULTS

After 24 hours of incubation on nutrient agar medium the zone of inhibition was calculated and the mean value thus obtained after three repeats are presented below:

Table:1

S.no	Name of microorganisms	Plant extract	Concentration	Zone of inhibition (in mm)
1	S.aureus	Alcoholic bark	0,1,2,3	0.6,1.7,1.4,1.5 respectively
2	P.aeruginosa	Alcoholic bark	0,1,2,3	0.6,0.8,0.7,0.7
3	E.coli	Alcoholic bark	0,1,2,3	0.7,0.8,0.7,0.7
4	S.aureus	Aqueous Bark	0,1,2,3	0.7,1cm,0.8,1cm
5	P.aeruginosa	Aqueous Bark	0,1,2,3	0.8, 1.2, 0.8, 1.5respectively after 48 hrs zone of inhibition is 5.7cm.
6	E.coli	Aqueous Bark	0,1,2,3	0,0,0,0

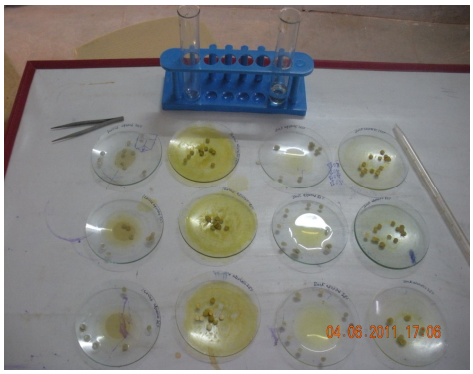
Used keys: 0= control (Pure solvent), 1 = 100% Solvent, 2 =50% Solvent, and 3 = 25% Solvent

Table: 2- PHYTOCHEMICAL RESULTS

S.no	PLANT MATERIAL	Tanins	Phobatanins	Flavonoid	Terpenoid	Cardiac glycosoides
1	Bark alcoholic	+	-	+	-	+
2	Bark aqueous	+	-	+	-	+

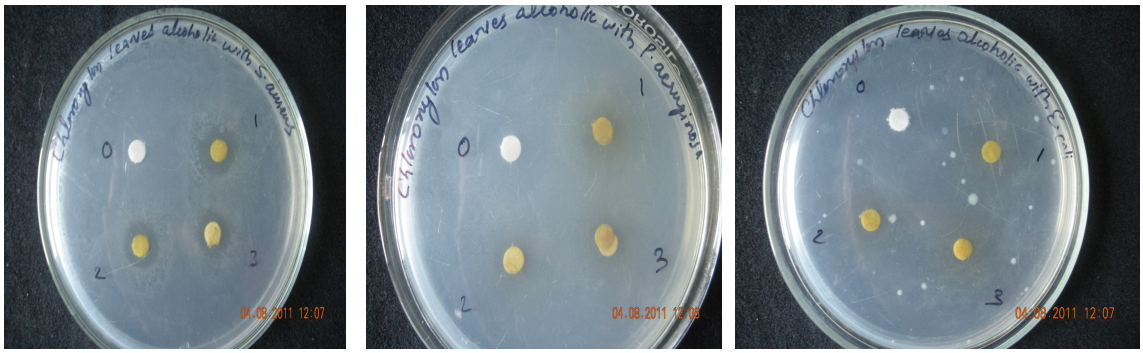
Chloroxylon switenia

Phytochemical test

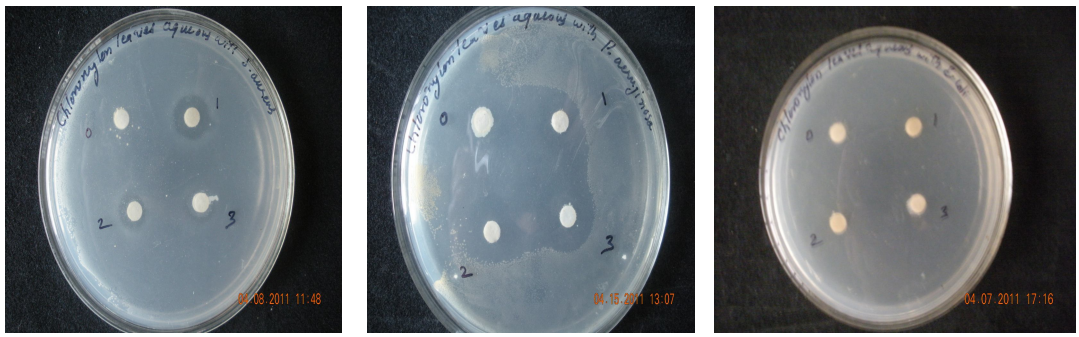


Dilution of extracts

Cultures of microorganisms



Zone of inhibition on target organism in alcoholic bark extracts



Zone of inhibition on target organism in aqueous bark extracts

DISCUSSION

Plant derived medicine have made significant contribution towards human health. Phytomedicine can be used for the treatment of diseases. In the present study *E .coli, P.aeruginosa, & S.aureus* have been used to study the antibacterial activity of *chloroxylon switenia* . Bark extracts was used. The result showed the maximum antibacterial activity against aqueous extracts of bark. This investigation revealed that the aqueous and alcoholic extract of bark of *chloroxylon switenia* produced good inhibitory zones against *S.aureus* and *P.aeruginosa* then *E.coli.* So it is expected that *chloroxylon switenia* may be further studied for its active ingredients for its therapeutic principles, as it shows significant antibacterial effect against *S.aureus* and *P.aeruginosa* .

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