



Effect of *Vitex negundo* and *Datura metel* aqueous extracts on common pathogen and its preliminary phytochemical screening

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ABSTRACT

Medicinal plants have been studied for its activity over pathogenic species which has produced more suitable compounds to treat that particular pathogen. The medicinal plants *Vitex negundo* and *Datura metel* leaves aqueous extracts has been studied against *E.coli* MTCC 443 and *Pseudomonas aeruginosa* MTCC 2488. The extract was prepared by soxhlet extractor at 1:5 ratio of powdered leaves and solvent by which extracts were air dried. The dried material was subjected to preliminary phytochemical screening and antibacterial activity. Disc diffusion method was followed with varying concentration ranging from 50mg/ml to 250mg/ml. The zone of inhibition recorded to be 18mm and 20mm for *E.coli* and for *Pseudomonas aeruginosa* to be 15mm and 21mm respectively. The resulted zone of inhibition was compared with commercial ampicillin disc and zone observed to be 20mm and 24mm. The phytochemical screening revealed the presence of flavonoid, phenols, saponins, terpenoids and volatile oils. The zone formed due to the activity of the secondary metabolites over the pathogenic strains and observed results from this study has provided potential agent to treat common pathogens through effective medications by developing these secondary metabolites into potential drug source.

Key words: *Vitex negundo*, *Datura metel*, Phytochemical, Disc diffusion, Zone of inhibition.

INTRODUCTION

Plants have great potential for producing newer type of bio active compounds for human lives to treat against common and infectious pathogens. A part of population in developing countries still believes and uses folk medicine from plant resources [1]. The infection to common pathogens with remarkable increase in developing and developed countries which gets resistant to medicine provided by the medicinal practioners. The research on herbal drugs increased due to bacterial resistant against commercially available drugs. The multiple drug usage against these pathogens had developed resistance and alarming increase in antibiotic resistance pathogens. The medicinal plants provides a source of novel drug molecules or bio active compounds like alkaloids, tannins and phenolic compounds which originates the development of clinical drugs from natural products. The rise in alternative drugs for the infectious disease from medicinal plants gives effective and newer therapeutic agents.

Vitex negundo commonly called as nochi or nirgundi throughout India [2] in which leaves and barks are used in folk medicine [3]. It is a large aromatic shrub with quadrangular whitish branchlets of thin yellowish grey bark. Leaves

are foliolate with upper surface is green and lower surface with silvery in color. Flowers are bluish purple with cylindrical roots in grey brown in color [4]. *Datura metel* is a family of solanaceae which grow up to height of 1.5m; leaves are simple with dark green and ovate. Flowers are solitary, trumpet shaped with fragrance while fruits are in the form of capsule covered with short spines. The plant parts are used in folk medicine to treat diarrhea, skin diseases, laryngitis and treacheries [5].

EXPERIMENTAL SECTION

Collection plant material:

Leaves of *Vitex negundo* and *Datura metel* have separately been collected. Then shade dried for 3-5 weeks and powdered using electrical blender, the powdered material was collected and stored in air tight container.

Chemicals:

Analytical grade chemicals were obtained from Hi-Media and Micro fine Chemicals in which stocks prepared as per manufacturer instructions.

Preparation of the extract:

The plant extraction were carried out with soxhlet extractor with 1:5 ratio of plant leaves powder to water until the color of the solvent changes to its original color. Then the extract material was collected air dried and stored for further use.

Bacterial strain and inoculums preparation:

The pathogenic strains of *E.coli* MTCC No: 443 and *Pseudomonas aeruginosa* MTCC No: 2488 were obtained from Microbial Culture Collection Centre, IMTECH, Chandigarh, India. And the test organism was maintained on nutrient agar slants.

Phytochemical analysis:

The preliminary phytochemical study was carried out to detect the presence of alkaloid, flavonid, steroids, phytosterols, terpenoids, glycoside and volatile oils [6].

Antibacterial assay:

The antibacterial activity of aqueous extracts was tested against pathogenic strains by disc diffusion method [7]. The varying concentration disc ranging from 50mg/ml to 250mg/ml were prepared by adding extracts to sterile filter paper which were cut into 8mm disc and applied over the plates at equidistance. Then the plates were incubated at 37°C for 18-24 hrs. After incubation plates were observed for zone of inhibition around the discs.

RESULTS

The Phytochemical screening reveals the presence of the secondary metabolites which includes flavonid, volatile oils, phenols, saponins and glycosides (Table 1). The antibacterial activity against aqueous extracts on the pathogenic strains resulted in the form of zone of inhibition (Table 2 &3). The *Vitex negundo* aqueous extract showed 18mm for *E.coli* and 15mm for *Pseudomonas aeruginosa* respectively at 250mg/ml of the concentration. The *Datura metel* extracts showed zone of inhibition of 20mm for *E.coli* and 21mm for *Pseudomonas aeruginosa* respectively at the concentration of 250 mg/ml. The commercial antibiotic disc of ampicillin were tested against these test pathogenic species and resulted in 20mm for *E.coli* and 24mm for *pseudomonas aeruginosa* respectively.

Table 1: Phytochemical analysis of aqueous extracts of *Vitex negundo* and *Datura metel*

Compounds	Aqueous extract of <i>Vitex negundo</i>	Aqueous extract of <i>Datura metel</i>
Alkaloid	-	-
Flavonid	+	+
Phenols	+	+
Terpenoids	-	+
Glycosides	+	-
Saponins	+	+
Steroids	-	+
Phytosterols	-	-
volatility	+	+

Table 2: Antibacterial activity of aqueous extracts of *Vitex negundo* and *Datura metel* against *E.coli*

S.No	Concentration of the disc mg/ml	Aqueous extract of <i>Vitex negundo</i>	Aqueous extract of <i>Datura metel</i>
1	50	-	7mm
2	100	9 mm	9mm
3	150	12 mm	13mm
4	200	14 mm	17mm
5	250	18 mm	20mm

Table 3: Antibacterial activity of aqueous extracts of *Vitex negundo* and *Datura metel* against *Pseudomonas aeruginosa*

S.No	Concentration of the disc mg/ml	Aqueous extract of <i>Vitex negundo</i>	Aqueous extract of <i>Datura metel</i>
1	50	6 mm	7 mm
2	100	9 mm	10 mm
3	150	11 mm	12 mm
4	200	14 mm	15 mm
5	250	15 mm	21mm

DISCUSSION

The tested bacterial pathogen was susceptible to ampicillin which was used as control antibiotic. The Phytochemical screening of *Vitex negundo* leaf extract exhibited the presence of Alkaloid, flavonoid, phenol and showed zone of inhibition to the range of 12mm for *E.coli* and 11 mm for *pseudomonas aeruginosa* were recorded [8]. The inhibitory zone of 25mm were observed for *E.coli* at 1 % (v/v) by pradeep singh [9]. The *pseudomonas aeruginosa* showed maximum zone of inhibition of 15mm and 19 mm for *E.coli* at 250mg/ml of ethyl acetate leaf extracts respectively. For methanolic leaf extracts zone of 11mm for *E.coli* and 15mm for *pseudomonas aeruginosa* was recorded [10]. The secondary metabolites of flavonoid, tannins, glycosides, phenols, terpenoids and alkaloids were present in the *Datura metel* leaf aqueous extract and antibacterial activity showed the zone of inhibition to the range of 18 mm for *E.coli* and 20mm for the *Pseudomonas aeruginosa* respectively [11].

CONCLUSION

The present study showed the presence of secondary metabolites of flavonoid, phenols, terpenoids, saponins and volatile oils which led to the inhibitory zones formed over the test pathogens. It shows the presence of Phytochemical in the leaf extracts showed the bioactive compounds which inhibits the growth of the bacterial pathogens which resulted through antibacterial activity assessing by disc diffusion method. These bioactive compounds are able to convert into active ingredient to the pharma drug molecule to treat the drug resisting bacterial pathogens and ability to cure infections causing through opportunistic bacterial pathogens.

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