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## *In vitro* antimicrobial activity of *Lippia nodiflora* crude extract against selected microorganisms

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### ABSTRACT

*Lippia nodiflora* plant is used as traditional medicinal plant as diuretic, maturant, useful in fevers and cold, astringent to bowels, stomachic, used in lack of bowel movements, pain in knee joints and in lithiasis. It was found that the plant possesses steroids, alkaloids, carbohydrates, flavonoids, essential oil, tannins and salts of potassium. For this study aqueous extract of *Lippia nodiflora* Linn was tested against *Salmonella typhi*, *E.coli*, *Staphylococcus aureus* and *Proteus sp.* Among the five microorganisms the chloroform leaf extract was shown to be effective against *E.coli* and the ethyl acetate leaf extract was effective against *Salmonella typhi*. © 2011 Trade Science Inc. - INDIA

### KEYWORDS

Antimicrobial activity;  
Medicinal plants;  
*Lippia nodiflora*;  
*E.coli*;  
*Salmonella typhi*;  
Aqueous extract.

### INTRODUCTION

*Lippia nodiflora* Linn. (Verbenaceae) is commonly called as Poduthuvalai, Poduthalai, Talaipodam in Tamil, Bokkena in Telugu, Bakkan in Hindi. It is found throughout warmer parts of India ascending up to 900m in the hills. It is common in wet places, along irrigation channels, canal edges and river banks.

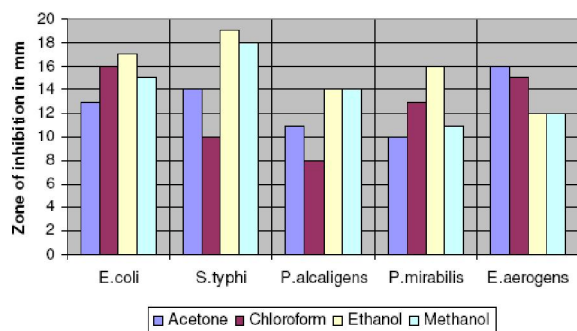
It is a creeping, prostrate, much branched perennial herb with branches spreading profusely and rooting at the nodes. In therapeutic treatments, the use of medicinal plants extracts and their phytochemicals with known antimicrobial properties can be of great significance. In different countries, a number of studies have been done to prove such efficiency<sup>[13]</sup>. In India medicinal plants

are used directly in folk remedies or indirectly in modern medicine<sup>[16]</sup>. Plants are known to contain biologically active components having antimicrobial activities<sup>[4,5]</sup>. Extracts of different parts of plants inhibit microorganisms<sup>[2,6,9]</sup>. Antimicrobial agents derived from plants include phytoalexins, allicin, isothiocyanate and phenolic compounds. It was found that the aerial parts are used as anodyne, antibacterial, diuretic, emmenagogue, parasiticide, refrigerant, febrifuge and cooling. According to traditional uses and Unani system of medicine the plant is acrid, hot and dry; diuretic, maturant, useful in fevers and cold, astringent to bowels, stomachic, used in lack of bowel movements, pain in knee joints and in lithiasis. *Lippia nodiflora* contains flavonoids, sugars, sterol, an essential oil, resin,

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**TABLE 1 : Antimicrobial activity of *Lippia nodiflora* leaf extract (200µl)**

Solvent 200µl	<i>E.Coli</i>	<i>S.typhi</i>	<i>P.alcaligens</i>	<i>P.mirabilis</i>	<i>E.aerogenes</i>
Acetone	13 mm	14 mm	11 mm	10 mm	16 mm
Chloroform	16 mm	10 mm	8 mm	13 mm	15 mm
Ethanol	17 mm	19 mm	14 mm	16 mm	12 mm
Methanol	15 mm	18 mm	14 mm	11 mm	12 mm



**Figure 1 : Antimicrobial activity of *Lippia nodiflora* leaf extract (200µl)**

nonglucosidal bitter substance, tannin, large amount of potassium nitrate and other constituents.

The present study was designed to extract leaves of *Lippia nodiflora* with organic solvents. The leaf extract were used for assay of antibacterial activity against selective microorganisms.

### MATERIAL AND METHODS

#### Plant material

The *Lippia nodiflora* plant was collected from the medicinal nursery garden. The leaves were washed with water to remove adhering particles and dried in open air protected from direct exposure to sunlight. The dried leaves were powdered.

#### Extract preparation

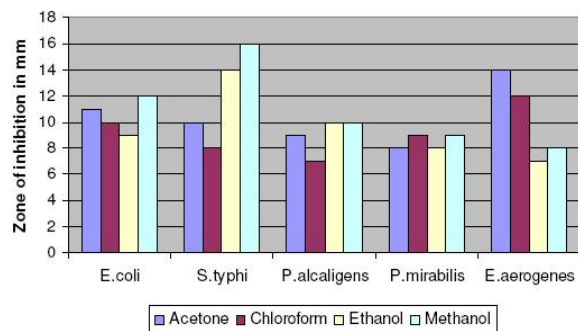
Ten grams of dried leaf powder was extracted with chloroform and ethyl acetate using a soxhlet extraction unit upto a minimum of six hours. After extraction the solvent was distilled off using rotary vacuum evaporator and concentrated.

#### Bacterial culture

In this study common human pathogenic bacteria *E.coli*, *Proteus* sp, *Salmonella typhi* and *Staphylococcus aureus* were used. These cultures were iso-

**TABLE 2 : Antimicrobial activity of *Lippia nodiflora* leaf extract (100µl)**

Solvent 100µl	<i>E.Coli</i>	<i>S.typhi</i>	<i>P.alcaligens</i>	<i>P.mirabilis</i>	<i>E.aerogenes</i>
Acetone	11mm	10 mm	9 mm	8 mm	14 mm
Chloroform	10 mm	8 mm	7 mm	9 mm	12 mm
Ethanol	9 mm	14 mm	10 mm	8 mm	7 mm
Methanol	12 mm	16 mm	10 mm	9 mm	8 mm



**Figure 2 : Antimicrobial activity of *Lippia nodiflora* leaf extract (100µl)**

lated from various clinical specimen and identified by morphological and biochemical characteristics.

#### Antimicrobial activity

Ten grams of powdered plant materials were extracted in soxhlet extraction unit with organic solvents such as Chloroform, ethanol, methanol and acetone up to a minimum of six hours. Plant leaf extract with different solvent were incorporated into commercially available sterile free disc of 6.8mm. *E.coli*, *S.typhi*, *P.alcaligens*, *P.mirabilis* and *E.aerogenes* were swabbed separately on Muller Hinton agar plates. Disc with leaf extract of different organic solvents were placed aseptically on the MHA plates and the zone of inhibition was measured after incubation.

### RESULT AND DISCUSSION

The present study reveals that ethanol leaf extract of *Lippia nodiflora* shows highest antimicrobial activity against *S.typhi*. Acetone extract, Chloroform extract, ethanol extract and methanol extracts *Lippia nodiflora* was screened for antibacterial activity against some clinically important gram negative bacteria namely *E.coli*, *S.typhi*, *P.alcaligens*, *P.mirabilis* and *E.aerogenes*.

Leaf extracts of four solvents was screened against

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the five bacteria with varying quantity (100 µl, 200 µl). Acetone leaf extract 200µl shows maximum zone of inhibition 16mm against *E.aerogenes*. TABLE 1, Figure 1 and 100µl shows minimum zone of inhibition 10mm against *P.mirabilis* (TABLE 2 & Figure 2). Chloroform leaf extract 200µl shows maximum zone of inhibition 16mm against *E.coli* and 100µl shows minimum zone of inhibition 8mm against *P.alcaligens*. Ethanolic leaf extract 200µl shows maximum zone of inhibition 19mm against *S.typhi* and 100µl shows minimum zone of inhibition 7mm against *E.aerogenes*. Methanolic leaf extract 200µl shows maximum zone of inhibition 18mm against *S.typhi* and 100µl shows minimum zone of inhibition 10mm against *P.mirabilis*. Several workers have reported many pharmacological properties including antispasmodic<sup>[3]</sup>, hair afflictions, anti-inflammatory, analgesic and antipyretic<sup>[10]</sup>, antibacterial, antihelicobacter pylori activity<sup>[17]</sup>, hypotensive activity, antinociceptive<sup>[1]</sup> and antifungal<sup>[12]</sup>. G.A.Mako and A.A.Noor have reported that crude ethanolic and aqueous extract of lippia nodiflora leaf and stem shows antibacterial activity. From the present study it can be inferred that the aerial parts of lippia nodiflora possess antibacterial activity against *S.typhi*, *E.coli*, *P.alcaligens*, *P.mirabilis* and *E.aerogenes*. Further exploration of these plants for isolation of active compounds may be considered.

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