

Antimicrobial activity of some medicinal plants

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ABSTRACT

The antimicrobial activity of methanol extract of *Ocimum americanum*, *Syzygium cumini*, *Murraya koenigii*, *Eucalyptus maculata*, *Lawsonia inermis*, *Adhatoda vasica*, *Tridax procumbens*, *Prunus amygdalus*, *Azardirecta indica*, *Syzygium aromaticum* on *E.coli*, *S. aureus*, were evaluated by well diffusion method. The methanol extract of such medicinal plant showed the zone of inhibition against *E.coli* and *S.aureus*. The *Ocimum americanum* slightly inhibited the growth of *E.coli* and *S. aureus* with zone of inhibition diameter of 2 mm and 1mm respectively. The *Syzygium cumini* show no zone of inhibition against *E.coli* and show the 2mm zone of inhibition against *S.aureus*. No Zone of inhibition was observed by *Syzygium aromaticum*, *Lawsonia inermis*, *Adhatoda vasica* and *Prunus amygdalus* against *E.coli* while *Murraya koenigii*, *Tridax procumbens*, *Azardirecta indica*, *Eucalyptus maculate* inhibited the growth of *E.coli* ie. 2mm, 1mm, 2mm, 5mm respectively. The methanolic extract of *Ocimum americanum*, *Syzygium cumini*, *Murraya koenigii*, *Lawsonia inermis*, and *Eucalyptus maculate*, *Azardirecta indica*, *Tridax procumbens* profoundly inhibited the growth of *S.aureus* with inhibition zone diameter between 1-5mm. This revealed that *Ocimum americanum*, *Syzygium cumini*, *Murraya koenigii*, *Lawsonia inermis*, and *Eucalyptus maculate*, *Azardirecta indica*, *Tridax procumbens*, *Adhatoda vasica* have antimicrobial activity against *E.coli* and *S.aureus*. This information may probably used to control the infection associated with these microorganism.

Key words: Antimicrobial activity, well diffusion, *E.coli*, *S.aureus*.

INTRODUCTION

According to world health organization medicinal plants would be the best source to obtain a variety of drugs in developed countries about 80 of plants are used in traditional medicine. Therefore such plants have been investigated. Herbal medicine can be used as an actaconative to some commercial drugs. Medicinal plants contain inestimable projection for new drugs discoveries because of the matchless availability of chemical range. The practice of herbal medicine in Asia signifies a long activity of human interaction with the environment (Sasidharantn *et al.*, 2011) medical uses of medicinal plant range from the administration of the root, barks stems, leaves and seeds to the use of extract and decoction from the plants (ogbulie *et al.*, 2007). Dental cariouses is a disease of complex etiology microorganism play an important role in the etiology of dental cariase. Ran-tulsi, scientifically known as *Ocimum americanum* and tulsi *Ocimum sanctum* time-tested premier

medicinal herb. Plants have ability to synthesize aromatic substance such as phenolic, nitrogen compound vitamins terpenoids and some other endogenous metabolites. These substances serve as plant defense mechanism against predation by microbes, insects' herbivores (Bharathi *et al.*, 2011). Two types of oil are distributed from these plant one contain methyl cinnamete as principle constituent the other 2 camphor. They will yield from herb verities room 0.46 to 0.65% oil is used a perfumes and cosmetics. It is natural source of camphor. Seeds of this plant are tonic and diuretic. They will from its leaves has the properly of destroying bacteria and insects. The development of drug resistance in human pathogen against commonly used antibiotics has necessitated. The search for new antimicrobial substance from other source screening of *O. americanum* from antimicrobial activities and photochemical is important for finding potential new compounds for theuraptic uses (Dahale *et al.*, 2010).

Among all plants families member of the lamiaceae have been used for folk medicine antibacterial efficacy of *Ocimum gratissimum* on *listeria monocytogens* associated with ready to eat dairy product and to determine the active principle in plant extract. The leaves of *Syzygium cumini* have been used in traditional medicine as remedy for diabetes. The leaves also used to strengthen the teeth and gums. The major phytoconstituent are reported (himesh soni et al) extract of seed of *Syzygium cumini* were found to have antibiotics antiinflammatory hyepatoprotedctive. These properties of *Syzygium cumini* seed have been attributed to its saponins, tannin and flavanoids. The antibacterial activity of water extract of seed was performed. The seed of *Syzygium cumini* contain good antibacterial action and phytochemicals which probably evolved as chemical defense against predation infection. Flavonoids prevent oxidative all damage suggesting antiseptic anticancer, antiinflammatory effects and mild, hypersensitivity properties (Shobha borhde, 2012). *Murraya koenigii* L sprang (fam Rutaceae) a small tree with dark gray bark is distributed throughout India, Bangladesh, Nepal, Malaysia. Traditionally the plant is used as a stimulant, stomachic, febrifuge, analgesic and for the treatment of diarrhea, dysentery and insects bites. An alcoholic extract of different part of *Murrrya koenigii* is tested for antibacterial and antifungal activity by using a gram positive, gram negative and fungi. Leaf extracts of eucalyptus have been approved as food additives, and the extract are also currently use in cosmetic formulation. Research data has demonstrated that the extract exhibited various biological effects. Such as antibacterial antihyperglycemic (Gray and Flat, 1998). Ancient Egyptians are said to have prepared both oil and an ontiment from the henna flowers for making the limbs supple. In early Islamic culture henna (*Lawsonia inermis*) usage is very evident in the book of prophetic medicine as mention by his flowers and other that ware close to him in his household, were recorded (Dinesh *et al.*, 2009). Studies on *Azardirecta indica* have showed that it contains active substance with multiple medicinal properties. Aqueous extract of *Azardirecta indica* leaf extract has good therapeutic potential as antihyperglycemia agent in IDDDM and NIDDM (Bajaj and Srinivasan, 1999). *Azardirecta indica* aqueous extract as powerful chemotherapeutic

and viral agent (Hasson amer *et al.*, 2010). *Azardirecta indica* leaves has antibacterial properties and could be used for controlling airborne bacterial contamination in the residential premise (sassed *et al.*, 2008). In the present paper methanol extracts of *Ocimum americanum*, *Syzygium cumini* *Murraya koenigii*, *Lawsonia inermis* *Eucalyptus maculate*, *Azardirecta indica*, *Adhatoda vasica* was evaluated for antimicrobial activity against *E. Coil* and *S. Aureus*.

MATERIALS AND METHODS

Collection of Plant Materials

Fresh samples of *Ocimum americanum*, *Syzygium cumini*, *Murraya koenigii*, *Lawsonia inermis*, *Eucalyptus maculata*, *Azardirecta indica*, *Adhatoda vasica*, were collected from surrounding area of Vaijapur and v. p. collage Vaijapur. These plants were identifies and authenticated by the Department of Botany V.P. collage Vaijapur.

Preparation of Extracts

Fresh leaves of *Ocimum americanum*, *Syzygium cumini*, *Murraya koenigii*, *Lawsonia inermis*, and *Eucalyptus maculata*, *Azardirecta indica*, *Tridax procumbens*, *Adhatoda vasica*, were all thoroughly washed using tap water and rinse with distilled water. The leaves were dried in an oven at 50 °C for one week and then pulverized or a fine powered with the aid of a blender mixed. The solvent were use for the preparation of the extract is methanol extract. The methanol extract was prepare by weighing out 1 gm of milled powdered leaves of all medicinal plant soaked in 15ml methanol and mixed well at 37 °C for 24 hours at room temperature. The extracts were then filtered using whatman no.1 filter paper. All filtrates were air dried at 37°C.

Preperation of test microortganism

The isolated of *E.coli* and *.S.aureus* were obtained from the Shiv chatrapati collage ,Department of Biotechnology , Aurangabad, isolates culture were tested for antimicrobial activity of the ten medicinal plants.

Preperation of the disc

Each of discs which are approximately 5mm in diameter was cut from whatman filter paper. The sterile discs were put in to a Petri dish and then impregnated with the extract by soaking in the extract for 24 hours. Each of the disc contains methonolic extract with the recovered from the extract aseptically into the agar surface in a plate.

Determination of antimicrobial activity of the extracts by well diffusion method

Agar well diffusion technique as described by Cheesbrough (2006) was used to determine the antimicrobial activity of the extract. An 18ml of Nutrient agar plates that has been checked for sterility were seeded with 100µl of an overnight broth culture of each bacterial isolate in sterile petridish a standard to cut uniform well on the

surface of the agar, the well filled with 2ml of each extract were the add a sterile syringe one of the well in each Nutrient agar plate is left unfilled as control. All the plates were incubated at 37° c for 24 hours and observed zones of inhibition .A significance zone of inhibition has been observed around each well and the diameter of such zone was measured in millimeters (fig.1).



Fig.1: Well diffusion method shows the zone of inhibition against broth culture



Fig.2: *E. maculata* against *S.aureus*



Fig.3: *E. maculata* against *E. Coil.*



Fig.4: *S.Cumini* against *S. aureus.*



Fig.5: *S.aromaticum* against *S. aureus*



Fig.6: *M.koenigii* against *S.aureus*



Fig.7: *M.koenigii* against *E. coli*



Fig.8: *T.procumbens* against *E. coli.*



Fig.9: *T.procumbens* against *S. aureus*



Fig.10. *Adhdadoda vasica* against *S.aureus*



Fig. 11. *O.americanum* against *E. coli*

RESULTS AND DISCUSSION

The results obtained for the antimicrobial test performed on different extraction of medicinal plant are presented in Table (1). The result obtained from this work indicated that methanolic extract of *Ocimum americanum*, *Syzygium cumini*, *Murraya koenigii*, *Syzygium aromaticum*, *Tridax procumbens*, *Lawsonia inermis*, *Azadiracta indica*, *Eucalyptus maculata*, *Adhatoda vasica*, *Prunus amygdalus* inhibited the growth of *E.coli* and *S.aureus*. From the above observation sample *E.maculata* Show the significance zone of inhibition against the *E. coli* (3mm) and significance zone of inhibition against *S. aureus*

5mm (fig.2&3). *S.cumini* shows the no zone of inhibition against *E.coli* and show zone of inhibition against *S.aureus* 2mm (fig.4). *S.aromaticum* show the no zone of inhibition against *E.coli* and show the significance zone of inhibition against *S.aureus* 3mm (fig.5). *M.koenigii* show the zone of inhibition is against *E.coli* (2mm) and show significance zone of inhibition against *S.aureus* 5mm (fig.6&7). *T.procumbens* showed the less zone of inhibition against *E.coli* 1mm and zone of inhibition against *S.aureus* 1mm (fig 8&9). *Adathoda vasica* showed no zone of inhibition against *E.coli* and show significance zone of inhibition (4mm) (fig.10).

Table 1: Antimicrobial activity of medicinal plant

| Sr. No | Type of extraction | Medicinal Plant Name | | Concentration of sample on applied/well | Zone of inhibition in mm | | Observation note |
|--------|--------------------|-------------------------|---------------|-----------------------------------------|--------------------------|-----------------|--------------------------------------------------------------------------------------------------------------|
| | | Botanical Name | Common Name | | <i>E.Coli</i> | <i>S.aureus</i> | |
| 1 | Methanol | <i>O. americanum</i> | Ran tulsi | 100µl/well | 2 | 1 | Zone of inhibition was observed. |
| 2 | Methanol | <i>S. cumini</i> | Jambul | 100µl/well | NI | 2 | No zone of inhibition against <i>E.coli</i> , Show zone of inhibition against <i>S.aureus</i> . |
| 3 | Methanol | <i>M.koenigii</i> | Kadipatta | 100µl/well | 2 | 5 | Significance zone of inhibition was observed. |
| 4 | Methanol | <i>S.aromaticum</i> | Lawang | 100µl/well | NI | 3 | No zone of inhibition against <i>E.coli</i> , Show zone of inhibition against <i>S.aureus</i> . |
| 5 | Methanol | <i>T.procumbens</i> | Tantani | 100µl/well | 1 | 1 | Zone of inhibition was observed |
| 6 | Methanol | <i>L.inermis</i> | Henna | 100µl/well | NI | 2 | No zone of inhibition against <i>E.coli</i> , Show zone of inhibition against <i>S.aureus</i> . |
| 7 | Methanol | <i>A.indica</i> | Neem | 100µl/well | 2 | 3 | Zone of inhibition was observed. |
| 8 | Methanol | <i>E.maculata</i> | Nilgiri | 100µl/well | 3 | 5 | Significance zone of inhibition was observed. |
| 9 | Methanol | <i>Prunus amygdalus</i> | <i>Badam</i> | 100µl/well | NI | NI | No zone of inhibition was observed. |
| 10 | Methanol | <i>Adhatoda vasica</i> | <i>Adulsa</i> | 100µl/well | NI | 4 | No zone of inhibition against <i>E.coli</i> , Show significance zone of inhibition against <i>S.aureus</i> . |

O. americanum show the zone of inhibition against *E. coli* 2mm (fig.11) and zone of inhibition against *S. aureus* 1mm. *L. inermis* show the no zone of inhibition against *E. coli* and show the zone of inhibition against *S. aureus* (2mm). *A. indica* show the zone of inhibition against the *E. coli* (2mm) and the significance zone of inhibition against *S. aureus* 3mm. *Prunus amygdalus* showed the no zone of inhibition against *E. coli* and *S. aureus*. *Ocimum americanum*, *Syzygium cumini*, *Murraya koenigii*, *Syzygium aromaticum*, *Tridax procumbens*, *Lawsonia inermis*, *Azadiracta indica*, *Prunus amygdalus*, *Eucalyptus maculata*, *Adhatoda vasica*. NI- No zone of inhibition.

The result of the present study indicate that methanol extract of *Ocimum americanum*,

Syzygium cumini, *Murraya koenigii*, *Syzygium aromaticum*, *Tridax procumbens*, *Lawsonia inermis*, *Azadiracta indica*, *Eucalyptus maculata*, *Adhatoda vasica*, are show antimicrobial activity against the *S. aureus*. The result also indicated that *Adhatoda vasica*, *S. cumini*, *S. aromaticum*, *L. inermis*, *Prunus amygdalus* have no antimicrobial activity against *E. coli*. *Ocimum americanum*, *Syzygium cumini*, *Murraya koenigii*, *Syzygium aromaticum*, *Tridax procumbens*, *Lawsonia inermis*, *Azadiracta indica*, *Eucalyptus maculata*, *Adhatoda vasica* show significant zone of inhibition against *E. coli* and *S. aureus*. This showed that these samples may have great potential as remedy for infection/disease caused by *E. coli* and *S. aureus*.

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