Research article Available online www.ijsrr.org ISSN: 2279–0543

International Journal of Scientific Research and Reviews

ANTIMICROBIAL POTENTIALS OF THE METHANOLIC EXTRACTS OF PLANTS

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ABSTRACT

The problem of microbial resistance and degenerative diseases are growing. This paper has made an effort to study the antimicrobial potentials of the methanolic extracts of five plants viz. *Azadirachta indica* (neem), *Coriandrum sativum* (Coriander), *Ocimum Sanctum* (Tulasi), *Trachyspermum copticum* (Omam) and rhizome of *Centella asiatica* (vallarai) against Escherichia coli. The result of the study shows that the methanolic extracts of five plants selected shows significant antimicrobial activity against gram-negative bacteria *E. coli* as assessed by the diameter of zone of inhibition. The plants extracts differs in their antimicrobial activity. The best antimicrobial activity is observed in the extract of *Ocimum Sanctum*, against *E.coli* with diameter of zone of inhibition as 13mm. The extract of *Trachyspermum copticum* and *Coriandrum sativum* show the same diameter of zone of inhibition which is 11mm showing significant inhibitory activity against E.coli. The extract of *Centella asiatica* significantly inhibits *E.coli* with the diameter of zone of inhibition as 10 mm. The extract of *Azadirachta indica* is effective against *E. coli* with inhibition of 9 mm. This shows the fact that plants are still reservoir of many pharmaceuticals which can be noted and used in treating infectious diseases.

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INTRODUCTION:

Infectious diseases are the leading cause of death worldwide. The problem of microbial resistance and degenerative diseases are growing and the outlook for the use of drugs in the future is still uncertain. Many infectious diseases have been known to be treated with the herbal remedies throughout the history of mankind.

Medicinal plants continue to be a rich source of proven medicaments for new and revolutionary drugs. The ubiquitous plants harbor an inexhaustible source of active ingredients invaluable in the management of many intractable diseases.

The cost of production of synthetic drugs is very high and they produce adverse effect compared to plant derived drugs. Hence much attention has been paid recently, to the biologically active compounds derived from plants used in herbal medicine. At present, it has been estimated that about 80% of the world population rely on botanical preparations as medicine to meet the needs as they are considered safe and effective against certain ailments.

OBJECTIVE:

To study the antimicrobial potentials of the methanolic extracts of five plants viz. *Azadirachta indica*, *Coriandrum sativum*, *Ocimum Sanctum*, *Trachyspermum copticum* and rhizome of *Centella asiatica* against Escherichia coli.

Plants used for the Study:

The plant material of five plants *viz. Azadirachta indica*, *Coriandrum sativum*, *Ocimum Sanctum*, *Trachyspermum copticum* and rhizome of *Centella asiatica* were tested for their antimicrobial property.

Azadirachta indica:

Widely known as neem (margosa tree), *Azadirachta indica* is a tree that has proven value to both city and farm dwellers throughout the dry tropics and subtropics. Neem has long been recognized as a versatile multipurpose tree for urban re-greening, agro-forestry, fuel wood production, and for a variety of other products, including bio-pesticides. *Azadirachta indica* is a

member of the Meliaceae (mahogany) family. The tree is also known as nim, margosa, limba, mimba, nimbi and Indian lilac.

It is a large, evergreen and densely growing tree. It is 10-15 meters tall with a thick bark, dark green compound eaves, alternate, imparipinnate. Flowers are axillary, small, white, aromatic and complete.

Coriandrum sativum:

Coriander (*Coriandrum sativum*) is an annual herb belonging to the family Apiaceae. Coriander is native to regions spanning from southern Europe and North Africa to south-western Asia. It is a soft, hairless plant growing to 50 cm tall. The leaves are variable in shape, broadly lobed at the base of the plant, and slender and feathery higher on the flowering stems. The flowers are borne in small umbels, white or very pale pink, asymmetrical, with the petals pointing away from the centre of the umbel longer (5–6 mm) than those pointing towards it (only 1–3 mm long). The fruit is a globular, dry schizocarp 3–5 mm in diameter.

Ocimum sanctum:

Ocimum sanctum (Tulasi) grows all over India up to 2000 meters height. It is grown in houses, temples and gardens. It grows 0.5-1.5 meters annually and has red or purple quadrangular branches. Its leaves are opposite, about 2-4 cm long, margins entire or toothed, hairy on both the surfaces, dotted with minute glands and are aromatic. The flowers tiny, purple and inflorescence is a long spike or 12-14 cm in length. The fruits are small, smooth nut lets, reddish grey in color.

Botanically, Tulasi belongs to family Lamiaceae. The leaves contain an essential oil. The seed also contains oil composed of fatty acids.

The ancient Ayurvedic scriptures have mentioned the plant in the management of several diseases. The plant is supposed to have a purifying influence by liberating ozone and also is said to repel the mosquitoes. Thus, in many parts of India, the plant is grown in the courtyard, traditionally and worshipped daily as a necessary ritual for family will-being. Ayurvedic texts categorize it as kasaghna (alleviates cough), svedala (induces sweating), ajirnanasaka (mitigates indigestion) and agnimandyanasaka (alleviates anorexia).

Trachyspermum copticum:

Trachyspermum copticum (Omam) is a plant of India and the Near East whose seeds are used as a spice. It is the small seed-like fruit similar to that of the bishop's weed plant, egg-shaped

and greyish in colour. The plant has a similarity to parsley. It is also traditionally known as a digestive aid, a relief for abdominal discomfort due to indigestion and an antiseptic. Many assume it relieves colic in babies, and for children it also improves digestion and appetite.

Centella asiatica:

Centella asiatica (vallarai), is a small, herbaceous, annual plant of the family Mackinlayaceae or subfamily Mackinlayoideae of family Apiaceae, and is native toIndia,Sri Lanka, Northern Australia,Indonesia,Iran, Malaysia, Melanesia, Papua New Guinea, and other parts of Asia. It is used as a medicinal herb in Ayurvedic medicine, traditional African medicine, and traditional Chinese medicine. Botanical synonyms include *Hydrocotyleasiatica* L. and *Trisanthus cochinchinensis*

MATERIALS AND METHODS:

The plant materials are shade-dried, powdered with methanol using a mortar and pestle. The ground plant materials are centrifuged at 5000rpm for 5 min and the supernatant is collected. Accurately weighed supernatantis dissolved in Dimethyl sulfoxide (DMSO) to the concentrations of 10mg/ml. This is the plant extract which is used of the anti-bacterial screening.

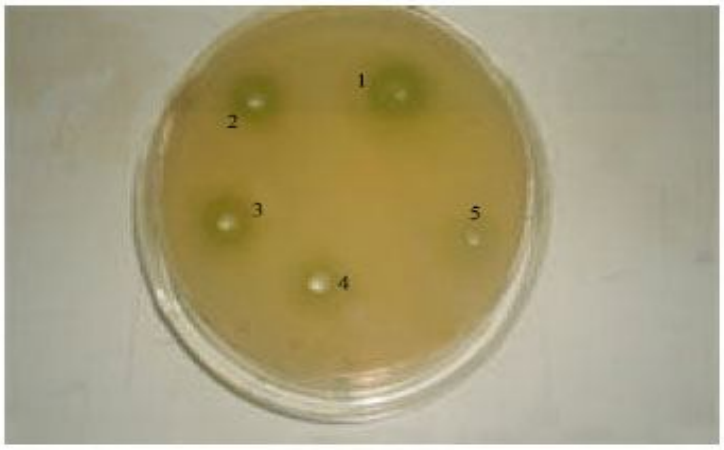
On sterilised petriplates, LB (Luria-Bertani) agar is poured in equal quantities (about 25 ml) and dried. 50 µl of the bacterial culture is spread evenly with a sterile glass spreader on the LB agar dried on the petriplates and is dried.

Wells of 6 mm diameter are bored on the prepared E-coli culture using a sterile cork borer. It is then were filled with 100 µl of the extracts prepared. These agar plates are set aside at room temperature for some time to facilitate diffusion and are then incubated at 37°C for 18-24 h.

The diameter of zone of inhibition (mm) is calculated by subtracting the diameter of the well from the diameter of the circle in which the impact of the plant extract is seen, and the values are recorded as shown.

RESULT

Plant sample	The diameter of zone of inhibition
Azadirachta indica (neem)	9mm
Centella asiatica(vallarai)	10mm
Trachyspermum copticum(Omam)	11mm
Coriandrum sativum(coriander)	11mm
Ocimum Sanctum (tulasi)	13mm



The E.coli culture with the plant extracts; Diameter of the zone of inhibition formed: *Ocimum Sanctum*-13mm; *Trachyspermum copticum*-11mm; *Coriandrum sativum*-11mm; *Centella asiatica*-10mm; *Azadirachta indica*-9mm.

The methanolic extracts of five plants selected shows significant antimicrobial activity against gram-negative bacteria *E. coli* as assessed by the diameter of zone of inhibition.

The plants extracts differs in their antimicrobial activity. The best antimicrobial activity is observed in the extract of *Ocimum Sanctum*, against *E.coli* with diameter of zone of inhibition as 13mm. The extract of *Trachyspermum copticum* and *Coriandrum sativum* show the same diameter of zone of inhibition which is 11mm showing significant inhibitory activity against E.coli. The extract of *Centella asiatica* significantly inhibits *E.coli* with the diameter of zone of inhibition as 10 mm. The extract of *Azadirachta indica* is effective against *E. coli* with inhibition of 9 mm.

CONCLUSION

The present investigation demonstrates the significant antimicrobial activity of plant extracts belonging to different families of the plant kingdom to show the fact that plants are still reservoir of many pharmaceuticals which can be noted and used in treating infectious diseases. These plant extracts can also act as effective antimicrobial agents that can be used alone or in combination in medicines or as natural food preservatives to retain the quality of food and prevent its spoilage. According to the antimicrobial activity of methanolic extract of all the plants presented in tabulation, Significant antimicrobial activity is found with *Azadirachta indica, Coriandrum sativum, Ocimum Sanctum, Trachyspermum copticum,* and rhizome of *Centella asiatica*.

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