

**SCREENING OF ANTIMICROBIAL ACTIVITY OF *OCIMUM SANCTUM* LINN.
AGAINST CERTAIN HUMAN PATHOGENS****Mohammad Neyametullah Khan**Department of Microbiology,
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ABSTRACT

The beneficial health effects of extracts from different types of plants that are used for many purposes have been claimed for centuries. The purpose of the present study was to examine the effectiveness of three extracts of *Ocimum sanctum* for control of growth and survival of microorganisms. Inhibition of growth was tested by the paper disc agar diffusion method. Antibiotic susceptibility discs were used as control. Three bacterial strains viz. *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Escherichia coli* were used as test microorganisms for the antibacterial activity of *O. sanctum*. Some of the extracts were found to be active against some bacterial strains. The methanolic extract exhibited a higher level of antibacterial activity.

Keywords: Antimicrobial activity, *Ocimum sanctum* Linn., *S. aureus*, *K. pneumoniae* and *E. coli*, Zone of Inhibition.

INTRODUCTION

There is nothing more important in the world than the health of a person. Throughout the ages plants have been used by humans as a source of food, cosmetics, medicines, clothing and even shelter. It has been estimated by the World Health Organization that about 80% of the world's inhabitants rely mainly on traditional medicines for their primary health care. The United States National Cancer Institute (NCI) has screened well over 100,00 plant extracts for anticancer activity and over 30,000 for anti-AIDS activity. A number of workers have carried out investigations pertaining to antimicrobial action of plant extracts against an array of pathogens²⁻¹⁰.

Ocimum sanctum Linn. a member of Labiatae family commonly known as '*Tulsi*'. A genus of aromatic herbs, under shrubs or shrubs distributed in the tropical and warm temperate regions of the world. Nine species are found in India of which three are exotic. Several *Ocimum* species yield essential oils which are valued in medicine and perfumery¹.

The plant is held sacred by Hindus all over India and frequently grown in courtyards and temples. The plant is used as a pot herb. Leaves are used as condiment in salad and other foods. It is also reputed to have medicinal properties. Besides the volatile oil, the plant is reported to contain alkaloids, glycosides, saponins and tannins. The leaves contain ascorbic acid (83mg/100g) and carotene (2.5 mg/100g)¹. The juice of leaves possess diaphoretic, antiperiodic stimulating and expectorant properties; it is used in catarrh and bronchitis, applied to the skin in ringworm and other cutaneous diseases and dropped into the ear to relieve earache. An infusion of the leaves is used as a stomachic in gastric disorders of children. *O. sanctum* is not only known for use in the treatment of hepatic disorders but also used in the treatment of some liver diseases³. A decoction of the root is given as a diaphoretic in malarial fevers. The seeds are mucilaginous and demulcent and are given in disorders of genito-urinary system. They contain antistaphylo-coagulase which can be extracted with water and alcohol¹. The present work was carried out to investigate the antimicrobial activity of different extracts of *O. sanctum*.

EXPERIMENTAL**Preparation of Extracts****Aqueous extract:**

Fresh leaves of *Ocimum sanctum* Linn. were collected and shade dried at room temperature. 30g of dry leaves were extracted with 150ml of distilled water in a Soxhlet apparatus and the extract obtained was concentrated and evaporated under reduced pressure at 50°C using a rotavapor apparatus.

Methanolic extract:

30g of dry leaves of *O. sanctum* were macerated in 150ml of 80% methanol and extracted and concentrated as described above.

Petroleum ether extract:

30g of dry leaves of *O. sanctum* were extracted with 150ml of petroleum ether in a Soxhlet apparatus and the extract obtained was concentrated as described above.

In each case, one petriplate served as control and was provided with a filter paper disc impregnated with double distilled water.

Microbial strains:

The microorganism used in the study were *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Escherichia coli*.

Table - 1 : Antibacterial activity of *Ocimum sanctum* against human pathogens

	<i>Staphylococcus aureus</i>	<i>Klebsiella pneumoniae</i>	<i>Escherichia coli</i>
	(Zone of Inhibition in mm)		
Aqueous extract	12	10	9
Methanolic extract	16	13	15
Petroleum ether extract	14	12	12
Control	0	0	0

Microbial assay:

The antibacterial activity of the extracts was evaluated by the paper disc agar diffusion method. Test plates were prepared with Nutrient Agar medium. Paper discs of size (5.2mm) were impregnated with the extract and deposited on the surface of the inoculated plates. After 24 hours of incubation at 37°C, positive results were established by the presence of clear zones of inhibition around the active extracts.

RESULTS AND DISCUSSION

The antibacterial activity shown in Table - 1 and Fig.-1 indicates that the different extracts of *Ocimum sanctum* inhibit the growth of bacterial strains to a great extent. Methanolic extract of the plant shows a great degree of activity against the pathogens selected for the investigation. Methanolic extract shows a maximum zone of inhibition of 16mm against *S. aureus*, which is

higher than any of the extracts selected against *K. pneumoniae* and *E. coli*.

It is a well known fact that a number of ailments are cured with the help of herbal drugs the world over. The practitioners of indigenous Unani, Ayurvedic and Homeopathic systems of medicine in general and tribals in particular heavily and solely rely on the therapeutic efficacy of herbs for the treatment of all sorts of human ailments. In the present investigation, *O. sanctum* leaf extracts (Aqueous, Methanolic and Petroleum ether) have been tested against three bacterial strains *i.e.* *S. aureus*, *K. pneumoniae* and *E. coli* for its antimicrobial activity. All the above mentioned strains were found to be more sensitive to methanolic extract which is evident from the diameter of ZOI (Table -1). It is followed by Petroleum ether extract and least effect was aqueous extract of this plant. This inhibitory effect is of crude extract and further investigations are needed to find out or isolate the active principle

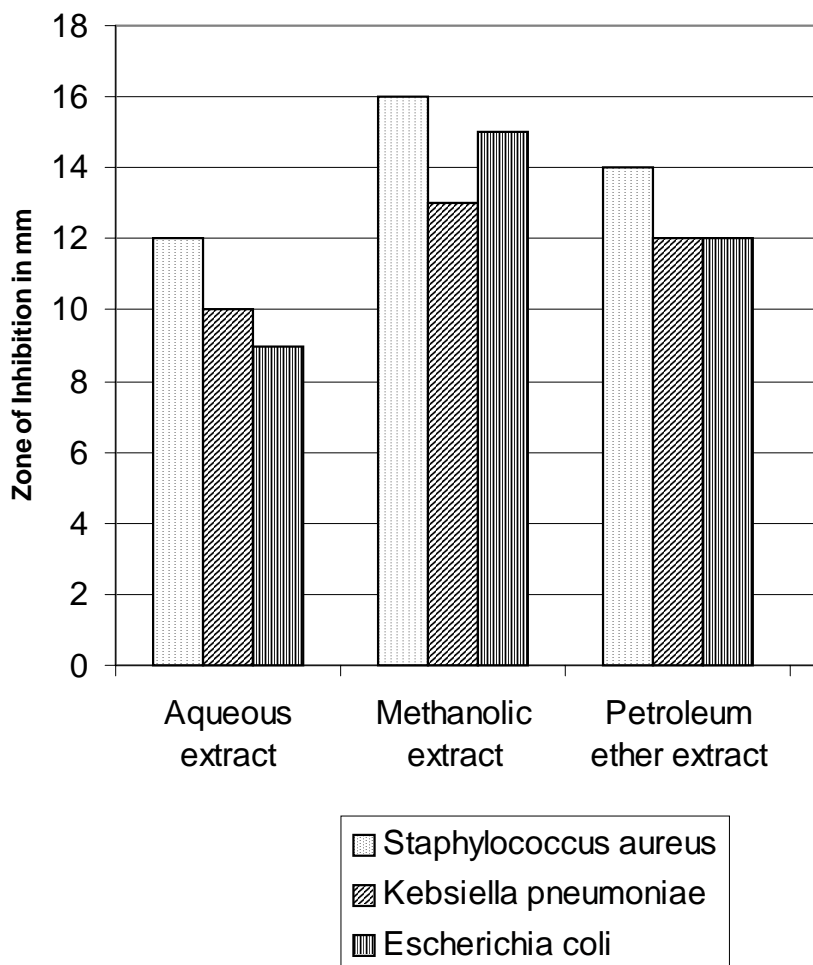


Figure - 1 : Different extracts of *Ocimum sanctum* showing antibacterial activity against human pathogens

which can be attributed with antimicrobial potential. It is likely, that the active principle when administered alone in pure form may exercise higher degree of bactericidal or bacteriostatic action.

In our country, majority of the people live below poverty line and therefore, in case of suffering from an ailment cannot afford the sky rocketing prices of chemotherapeutic mode of treatment. Therefore, if found effective, the herbal drugs may be alternative source of treatment which are within the reach of a common man. Such investigations should be encouraged because of abundance of

medicinal herbs available at hand which can relieve the ailing humanity.

The results reported here can be affected by factors such as extraction method, yield of extract, antibacterial test methods etc.

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