



Research Article

**ANTIMICROBIAL POTENTIAL OF MEDICINAL PLANT EXTRACTS AGAINST HUMAN
PATHOGENS**

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Abstract: Medicinal plants constitute an effective source of both traditional and modern medicines. The emergence of drug resistant bacteria mandates the need for newer antibiotics. The present paper deals with the antimicrobial activities of seed extracts of *Ricinus communis* and leaves extract of *Tridax procumbens*, *Hibiscus sabdariffa*, *Majorana hortensis*, *Origanum majorana* antimicrobial activity against some human pathogenic bacteria, *Staphylococcus*. The aqueous extracts of seeds & leaves were screened for their antibacterial activity using agar disc diffusion method. The aqueous seed extracts showed zone of inhibition against the tested pathogens.

Keywords: *Tridax procumbens*, *Hibiscus sabdariffa*, *Majorana hortensis*, *Origanum majorana*, antimicrobial activity

INTRODUCTION

In Asia use of herbal medicine represents a wide range of history of human interaction with the environment. The medicinal importance of plants depends upon chemical constituents that produce marked healing action on human body. The most important of these agents are alkaloids, flavanoids and tannins. According to World Health Organization medicinal plants represent source for a variety of drugs. About 80% of individuals from developed countries use traditional medicine, having compounds derived from medicinal plants. Therefore, such plants should be investigated to better understand their properties, safety and efficiency.

Ricinus communis

Ricinus communis popularly called castor bean in English is a plant that is widely distributed in virtually in all continents of the world. Its leaves are verticillate, long petiolate with palmately divided laminae flowers in terminal panicles are usually over topped by lateral shoots male flowers clustered at the bottom, female flowers above with inconspicuous caduceus perianth.¹

Tridax procumbens

Tridax procumbens Linn, commonly known as Ekdandi and Mexican Daisy, is a native of tropical America. It also grows widely in tropical Africa, Asia and Australia and is available in all seasons and in most parts of the country. It is a hardy Perennial herb. It possesses a large number of chemical constituents which have been identified and isolated in flowers as well as other aerial parts of the plant.²

Hibiscus sabdariffa

Hibiscus sabdariffa (Linn) is an annual dicotyledonous shrub plant popularly known a Gongura in Hindi or PulichaKeerai in Tamil which is an indigenous edible medicinal plant used in Ayurvedic medicine in India, china

and Thailand. There are various phytochemical constituents and diverse medicinal activities attributed to this plant. In traditional medicine, this plant has good features useful in several applications, such as antidotes to poisonous chemicals (acid:, alkali, pesticides) and venomous mushrooms.³

Origanum majorana

Origanum majorana is a cold sensitive perennial herb (or) under shrub with sweet pine and citrus flavours also called as sweet marjoram or knotted marjoram and marjoram hortensis. It is an incredible herb in which wild oregano has been used for centuries in the mediterranean to help people maintain good health. Recent laboratory studies have confirmed the powerful antibiotic, antifungal and antiviral properties of wild oregano oil.⁴

Majorana hortensis

Majorana hortensis is an aromatic herb, of mint family, 30 to 60cm high. It is extensively cultivated in India. Sweet marjoram is characterized by a strong spicy and pleasant odor. The flavour is fragrant, spicy, slightly sharp, bitterish and camphoraceous. The color of the dried herb is light green with a slight grayish tint. The whole leaves are small with hairs on both sides of the leaf when examined under the microscope; many dot-sized oil glands are seen on the leaf. They yield 3.5% volatile oil.⁵

MATERIALS & METHODS

Extraction of Secondary Metabolites⁶

Ricinus communis

5g of sunshade dried seeds of *Ricinus communis* are taken and grounded using phosphate buffer in mortar and pestle. The grinded substances are mixed with 10ml of phosphate buffer and it is filtered. The filtrate is centrifuged at 8000 rpm for 8min, take the supernatant as an alkaloid

(Secondary metabolites) source of plant extract to study about antimicrobial activity.

Tridax procumbens

5g of sunshade dried leaves of *Tridax procumbens* are taken and grounded using phosphate buffer in mortar and pestle. The grinded substances are mixed with 10ml of phosphate buffer and it is filtered. The filtrate is centrifuged at 8000 rpm for 8min, take the supernatant as an alkaloid (Secondary metabolites) source of plant extract to study about antimicrobial activity.

Hibiscus sabdariffa

5g of sunshade dried leaves of *Hibiscus sabdariffa* are taken and grounded using phosphate buffer in mortar and pestle. The grinded substances are mixed with 10ml of phosphate buffer and it is filtered. The filtrate is centrifuged at 8000 rpm for 8min, take the supernatant as an alkaloid (Secondary metabolites) source of plant extract to study about antimicrobial activity.

Origanum majorana

5g of sunshade dried leaves of *Origanum majorana* are taken and grounded using phosphate buffer in mortar and pestle. The grinded substances are mixed with 10ml of phosphate buffer and it is filtered. The filtrate is centrifuged at 8000 rpm for 8min, take the supernatant as an alkaloid (Secondary metabolites) source of plant extract to study about antimicrobial activity.

Majorana hortensis

5g of sunshade dried leaves of *Majorana hortensis* are taken and grounded using phosphate buffer in mortar and pestle. The grinded substances are mixed with 10ml of phosphate buffer and it is filtered. The filtrate is centrifuged at 8000 rpm for 8min, take the supernatant as an alkaloid (Secondary metabolites) source of plant extract to study about antimicrobial activity.

Preparation and Inoculation of Antibiotic Disc ⁷

Whatmann No.1 filter paper was used to prepare susceptibility discs of 4mm in diameter which were sterilized in hot air- oven. A sterile cotton swab was dipped in broth culture of the test organism and inoculated on the media aseptically by lawn culture method. After inoculation the agar plates were allow to dry for 5 to 15 minutes. With the help of sterile forceps, the discs are dipped in respective extract and after drying they are placed carefully on the media at equal distance. They should be well efficiently separated from each other to produce a clear zone- of -inhibition without the zone of mergence. It can be achieved in such a way that the disc is 15mm away from the edge and the distance between them should be 20 to 24mm. The disc should be pressed gently and then incubated at 37°C for 24 to 48hrs.

RESULT

Assay of Antimicrobial Activity

Among Various plant extracts were tested at defined concentration for inhibiting the growth of microbes. Seeds of *Ricinus communis Ricinus communis* had shown the antimicrobial activity against the following organism after 24 hours .

TABLE: 1 Leaves Extract of Various Plants Had Shown The Antimicrobial Activity Against The *Staphylococcus*

S.No	Plant extracts	Test organism	Diameter of zone in mm	Interpretation
1	<i>Ricinus communis</i>	<i>Staphylococcus</i>	10	Sensitive
2	<i>Tridax procumbens</i>		10	Sensitive
3	<i>Hibiscus sabdariffa</i>		9	Sensitive
4	<i>Origanum majorana</i>		9	Sensitive
5	<i>Majorana hortensis</i>		8	Sensitive

DISCUSSION

Plant essential oils and extracts have been used for many thousands of years, in food preservation, pharmaceuticals, alternative medicine and natural therapies. It is necessary to investigate those plants scientifically which have been used in traditional medicine to improve the quality of healthcare. Plant extracts are potential sources of novel antimicrobial compounds especially against bacterial pathogens.

Plants remain the most common source of antimicrobial agents. Many aromatic plants have been used traditionally in folk medicine as well as to extend the shelf life of foods, showing inhibition against bacteria, fungi and yeast.⁸. Phytochemical constituents such as alkaloids, flavanoids, glycosides and several other aromatic

compounds are secondary metabolites in plants that have alleviated the pathogenic.

The antimicrobial activity of different plant species show significant activity. Among the organisms *Staphylococcus* shows the most susceptible bacteria to all plant extracts, whereas the gram negative organisms are most resistant microorganisms. These observations are likely to be the result of the differences in cell wall structure between gram positive and gram negative bacteria, with gram negative outer membrane acting as a barrier to many environmental substances including antibiotics.

This work may provide essential information in the selection of plant extract for further isolation of constituents responsible for the activity against the studied species,

thereby aiding to explore an antibacterial lead that is helpful in combating the diseases caused by *Staphylococcus*. This investigating has opened up the possibility of the use of this

plant in drug development for human consumption for the treatment of wound infection and various diseases.



PICTURE: 1 Leaves Extract Of *Hibiscus sabdariffa* Had Shown The Antimicrobial Activity Against The *Staphylococcus*

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