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Evaluation of antibacterial activity of different parts of *Tagetes erecta*

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Abstract

Tagatus erecta is a common ornamental herbaceous plant with long history of traditional medicinal use in many countries. *The Tagetes erectus* belong to the family Asteraceae. It is a small shrub, which grows up to 1-2 m and it is used widely in our Traditional System of Medicine for curing various diseases.The present study was aimed to investigate the antibacterial activity of this common locally available plant. Antibacterial activity of different part of ethenolic extract of *Tagetes erecta* was evaluated using disc diffusion method against gram positive and gram-negative bacterial strains. Streptomycin (Standard) was used for antibacterial activity. The aim of this study was to evaluate the antibacterial activity of extract from this plant parts against 5 bacterial by using Disc Diffusion Method. The result indicates that the leaf and flower of this plant part showed a broad spectrum of antibacterial activity.

Key-Words: ***Tagetes erecta,*** Antibacterial activity, Disc Diffusion Method

Introduction

Current research on natural molecules and products primarily focuses on plants, they can be sourced, and selected more easily based on their ethno medicinal use.[1] Plant derived medicines have been part of traditional health care system in most parts of the world for thousands of years and nowadays there is increasing interest in plant as sources of agents to fight microbial diseases[2].

The beneficial medicinal effects of the plants materials typically result from the combination of secondary products present in the plant. Plants produce secondary metabolites as defenses against animals, parasites, bacteria and viruses and so rely on these chemical and other deterrents for their survival. These secondary metabolites constitute the medicinal value of a drug plant, which produces a definite physiological action on human body[3]. *Tagetes erectus* belong to the family Asteraceae. It is a small shrub, which grows upto 1-2 m and it is used widely in our Traditional System of Medicine for curing various diseases like ulcers, laxation and in the treatment of eye diseases. The leaves are used in kidney troubles and in muscular pain and are applied on boils and carbuncles. Infusion of plant is used against rheumatism, cold and bronchitis [4]. In Unani medicine, a confection of tender leaves and purified sugar is prescribed in anuria, retention of urine and kidney troubles.

From the literature cited very few works has been carried out in this plant. Thus it was thought worthwhile to explore this plant for its therapeutic activity. The aim of this study was evaluate the antibacterial activity of extract from this plant against five bacterial strains by using disc diffusion method.

Material and Methods

Plant Material

Fresh plant parts of *Tagetes erecta* were collected from diffident place of Sagar district. All plant part were separated and washed under running tap water and then with isopropyl alcohol (5%) followed by distilled water. All plant parts were allowed to shade dry for 15 days and homogenized to get a coarse powder. This powder was stored in an air tight container for successive extraction.

Preparation of extract

The shade dried plant material leaves, stem, roots and flowers was extracted with ethanol by continuous hot extraction using soxhlet apparatus for 12 hours. The extract was filtered and concentrated to remove the solvent and dried on a desiccator. The residue was used for this study[5].

Determination of antibacterial activity

Microorganism

The test organism for antibacterial activity *S. lutea, B. subtilis, E.coli, S.aurious, B.circulence* were procured from NCIM Pune India.

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Culture media

Nutrient agar media was used for antibacterial activity and was prepared in distilled water. The composition of the media was as given under:

1. Agar -20grm
2. Beef Extract-3grm
3. Peptone- 10grm
4. Glucose- 25grm
5. Distilled water 1000 ml

The medium was autoclaved at 15 lbs.' per square inch pressure for 20 min.

Preparation of Media

Nutrient agar medium was accurately weighed and suspended in 1000 ml of distilled water in a conical flask. It was heated on a water bath to dissolve the medium completely. Direct heating was avoided as it may lead to charring of the medium components and render it useless for the purpose[6].The conical flask containing the nutrient agar medium was plugged with the help of non-absorbent cotton plug. The mouth of the conical flask and the cotton plug were properly covered with aluminum foil. The medium was then sterilized by autoclaving at 15-lbs per square inch pressure for 20 minutes.

Evaluation of Antibacterial Activity

The antibacterial activity of different parts extract of Tagetes erecta was studied by disc diffusion method against *Bacillus subtilis, Staphylococous aureus, Echerichai coli, Staphylococous lutea. Bacillus circulence* bacteria are in nutrient agar medium. The medium was sterilized by autoclaving at 15 lbs/in2 for 20 min. A previously liquefied and sterilized medium was poured in to sterilize petri plates of 100 mm size. The plates were prepared and were kept for solidify at room temperature. The ethanolic extract of the all plant parts in the concentration of 10mg/ml were made in 75% ethanol. Entire surface of the agar plates swabbed with test organism to be tested or the bacterial lawn in prepared on the plate. Individual disc of plant extract was dispensed on the plate. Streptomycin was used as a standard drug. One disc of streptomycin (Standard) was placed aseptically to the center of each plate. Individual disc of plates were incubated for 24 hours at 37℃. At the end of incubation period, the diameter zone of inhibition was measured in millimeters .Clear zone around the dices shows inhibitory nature of the plant parts extract. After 24 hours of incubation the zone of inhibition was calculated and the mean value thus obtained after three repeats are presented below in table no. 1.

Results and Discussion

Table no 1 show the antibacterial activity of the ethenolic extract from the zone of inhibition produce by the extracts. It was observed that *S. lutea, B.circulence, B.subtilis* were most sensitive of the leaf extract (Fig. no 1) while *E. coli* and S. *aureous* were least sensitive to the ethenolic extract. Flower extract exhibited significant antibacterial activity against *S. lutea, E.coli, B.circulence*. Root ethenolic extract show minimum inhibitory Zones against test organism. So it further studied for its active ingredients principles as it shows significant antimicrobial effect against test bacteria's.

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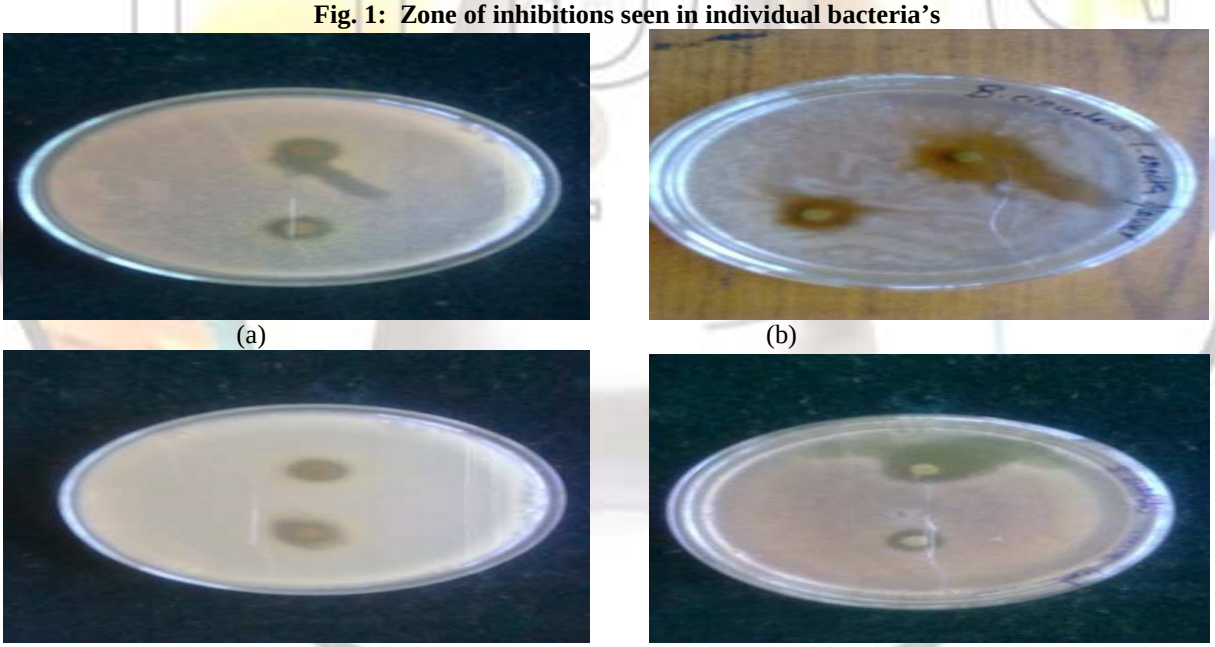
Table 1: Time of incubation and Zone of inhibition in mm of Diffrente microorganism in different parts of *T.erecta*

S/No.	Plant part	Name of organism	Time of incubation	Zone of inhibition in (mm)	Inhibition Zone with streptomycin
1	Leaves	*S.lutea*	24 hours	±26mm	25mm
		B.subtilis		±13.50mm	24mm
		E.coli		±9.50mm	28mm
		S.aurious		±11mm	26mm
		B. Circulence		±12.70mm	27mm
2	Flower	*S.lutea*	24 hours	±17.70mm	25mm
		B.subtilis		±11mm	24mm
		E.coli		±22.70mm	28mm
		S.aurious		±10mm	26mm
		B. Circulence		±24.70mm	27mm
3	Stem	*S.lutea*	24 hours	No Activity	25mm
		B.subtilis		No Activity	24mm
		E.coli		No Activity	28mm
		S.aurious		±10.2mm	26mm
		B. Circulence		No Activity	27mm
4	Root	*S.lutea*	24 hours	No Activity	25mm
		B.subtilis		±8.5mm	24mm
		E.coli		±15.70mm	28mm
		S.aurious		±12mm	26mm
		B. Circulence		±7mm	27mm

Fig. 1: Zone of inhibitions seen in individual bacteria's



(a) (b)

(c) (d)

a: Zone of inhibition of **E.coli in *T. erecta* (Leaf), b: Zone of inhibition of B. circulance in *T. erecta* (Flower), c: Zone of inhibition of B.circulence in *T. erecta* (Leaf), d: Zone of inhibition of B. subtilis in *T.recta* (Leaf)**