

Antibacterial Activity of Swertia Chirayita Leaf Extracts Against Urinary Tract Infection Pathogens Isolated from Clinical Samples of Female Patients of Hazaribagh, Jharkhand

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Abstract

Urinary tract infections (UTI), a significant health hazard in human's patients of rural area of Hazaribagh, Jharkhand, These infections result from bacterial colonization in urinary tract, 80% cases is due to E.coli (Flores-Mireles AL et. al., 2015). India.UTI is most common bacterial infection among women's worldwide. Multidrug resistance (MDR) in infectious pathogens is concern for the health industries (Godkar et.al., 2014). The current research is to isolate infection agent from urine samples collected from female patents and finding photochemical present in aqueous extract of Swertia chirayita for antibacterial property against these causative microbes. Biochemical tests were performed to provide preliminary identification of these causative agents based on the characteristic of microbes.

Keywords: Swertia chirayita, antimicrobial activity, urinary tract infections, UTI pathogens, natural remedy.

INTRODUCTION

Urinary tract infections (UTI) are among the most common bacterial infections, affecting millions of women's world wide (Foxman B 2002). Bacterial colonization in urinary tract is being reported cause. Most common pathogen is reported as E.coli Multidrug resistance (MDR) among causative agents leads to the researchers to explore medicinal plants components for alternative (Koneman EW et. al., 2005). Given the growing global concern of antibiotic resistance, the present study aims to assess the antibacterial potential of Swertia chirayita leaf extracts against UTI-causing pathogens. By evaluating its efficacy against three pathogens isolated from UTI patients samples.

Materials and Methods

Swertia chirayita sample Collection and extract preparation

The leaves of Swertia chirayita were collected from geo location, cleaned with distilled water followed with drying for two weeks in shade. Dried leaves were grounded into fine powder by mechanical grinding. Leaf fine powder 10g was mixed with 100 ml distilled water to obtain aqueous extract. Extract obtain was heated at 60°C for 30 minutes using a hot plate followed with filtration to remove residues. The filtrate was concentrated by evaporating excess water in a hot plate at 40°C, and the resulting

extract was stored at 4°C until further use.

Microbe's isolation from UTI patient's samples

Urine samples from female UTI patients were collected from hospitals and diagnostic centres. Samples were inoculated on Cystine-lactose-electrolyt-deficient (CLED) agar and Mac Conkey agar plates. Plates were incubated at 37°C for 18-24 hours.

Biochemical test of isolated bacteria

Bacteria obtained were tested with various biochemical tests (a) Citrate Utilization Test (b) Triple Sugar Iron (TSI) Test (c) Urease Activity Test (d) Indole Production Test (Forbes BA et. al., 2007; Holt JG et. al., 1994; Jorgensen JH and Turnidge JD 2015; James S and Joseph L 2021).

After the biochemical tests, the confirmed bacterial isolates were stored in nutrient broth and peptone water at 4°C for further experimental analysis.

Antibacterial Activity by Agar Disc Diffusion Method

The antibacterial activity of *Swertia chirayita* leaf extract (Eloff JN 1998), was assessed by disc diffusion method (Bauer AW 1966). Agar plates with appropriate media were prepared in sterile condition. Isolated bacteria was spread on plate followed with disc containing *Swertia chirayita* extract 5mg and 10mg placed on plates with *E.coli*, 5mg, 10mg, 20mg and 30mg for *Pseudomonas aeruginosa* and 5mg, 10mg and 20mg for *Klebsiella* respectively in triplicates. Plates were incubated at 37°C for 18 to 24 hrs. Positive control was prepared using standard discs of Ampicilline (1 µg).

Result and Discussion

Bacteria growth found in urine samples of female UTI patients. Three types of bacteria was isolated and pure culture obtained from single colony. Biochemical tests primarily indicate the isolated microbes from UTI samples are *E.coli*, *Klebsiella pneumonia* and *Pseudomonas aeruginosa* (Table 1) (Fig 1). Antibacterial activity of discs diffusion result shown zone of inhibition 1mm present in 10mg aqueous extract against *E.coli* (Table 2) (Fig 2), zone of inhibition 0.5 mm present in 30 mg *Pseudomonas aeruginosa* (Table 2) (Fig 2) and zone of inhibition 8 mm present in 20 mg *Klebsiella pneumonia* (Table 1) (Fig 2).

Swertia chirayita leaf extract (aqueous), has shown affective against *E.coli* followed by *Klebsiella pneumonia* and *Pseudomonas aeruginosa*,

Table 1: Biochemical test for identification of microbes obtain in samples.

Bacteria identified	Citrate	TSI	Urease	Indole
<i>E. coli</i>	Negative	Positive/H ₂ S	Negative	Positive
<i>Klebsiella pneumoniae</i>	Positive	A/A, G	Positive	Negative
<i>Pseudomonas aeruginosa</i>	Positive	Positive	Negative	Negative

Table 2: Antibacterial activity of *Swertia Chirayita* leaf extract and standard antibiotics against *E. coli*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* (zone of inhibition is recorded in mm)

Concentration of extract in mg	<i>E. coli</i> zone of Inhibition	<i>Klebsiella pneumoniae</i>	<i>Pseudomonas aeruginosa</i>
5mg	0.0	0.2±0.01	0
10mg	1mm±0.3	0.5±0.02	0

20mg	-	8mm±0.3	0
30mg	-	-	0.5±

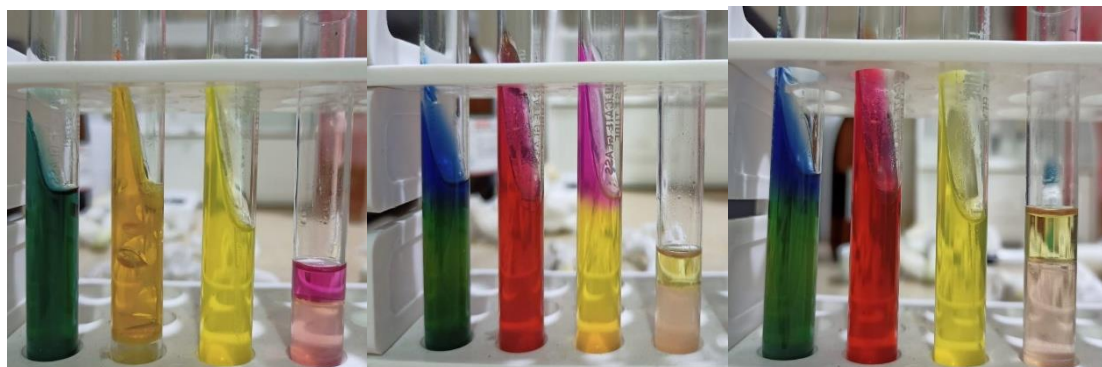


Fig 1: Results of biochemical test for bacterial identification: (a) *E. coli*, (b) *Klebsiella pneumonia* and (c) *Pseudomonas aeruginosa*

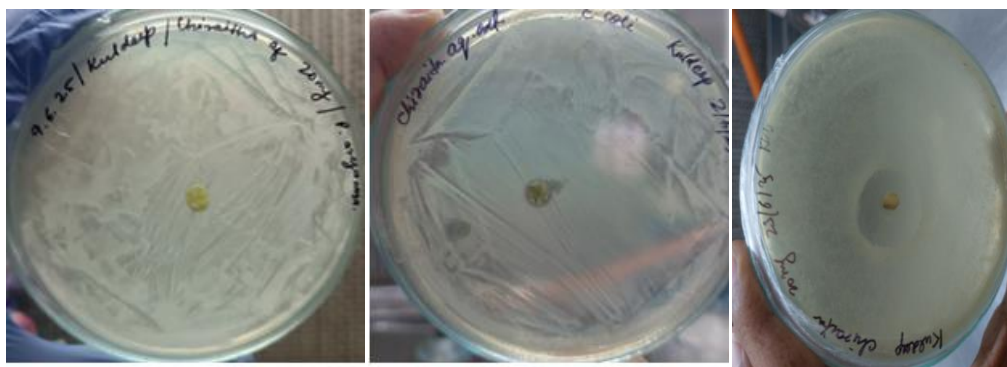


Fig 2: (a) *Swertia Chiraita* extract 10 mg against *E.coli* (b) *Swertia Chiraita* extract 30 mg against *Pseudomonas aeruginosa* (c) *Swertia Chiraita* extract 20 mg against *Klebsiella pneumoniae*

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