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## PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL POTENTIAL OF CHLOROFORM CRUDE EXTRACT OF *PARKINSONIA ACULEATA* LIN. (FAMILY- LEGUMINOSEAE) LEAVES AGAINST SOME BACTERIA CAUSING URINARY TRACT INFECTION (UTI) IN HUMANS

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### ABSTRACT

The present study evaluates the qualitative analysis of phytochemicals and antibacterial activity of Chloroform leaves extract (CLE) of *Parkinsonia aculeata* L. (Family-Leguminoseae) leaves against some bacteria causing Urinary tract infection (UTI) in humans. The preliminary phytochemical screening showed the presence of flavonoids, alkaloids, C-glycosides and saponins. The crude extract showed maximum antibacterial activity against *Escherichia coli* with zone of inhibition  $23 \pm 0.02$  at concentration of 500mg/ml. The extract also showed antibacterial activity against *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Staphylococcus chonii*, *Proteus mirabilis* and *Pseudomonas aeruginosa* with zone of inhibition  $18.94 \pm 0.01$ mm,  $22.15 \pm 0.004$ mm,  $19.70 \pm 0.01$ mm,  $20.16 \pm 0.01$ mm and  $21.21 \pm 0.033$ mm at 10mg/disc concentration respectively. All the six selected strains of bacteria are also inhibited by starting concentration of 50mg/ml i.e. 1mg/disc of crude extract. Thus, CLE was found to be active against UTI causing bacteria.

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## INTRODUCTION

Mankind has been using plants as chemotherapeutic agents for thousands of years and continues exploring their beneficial characteristics for healthcare. According to WHO, around 80% of the world's inhabitants depend on traditional medicines for their primary healthcare. Plants used in traditional medicine contain a wide variety of compounds that can be used to treat chronic as well as infectious diseases. The medicinal value of plants lie in some chemical compounds especially secondary metabolites that produce a definite physiological action on the human body. The most important of these bioactive compounds of plants are flavonoids, terpenes, alkaloids, tannins, saponins and phenolic compounds. There must be a continuous research for new drugs to cope up with multidrug resistance in pathogens which is one of the most serious threats to successful treatment of microbial diseases (1). Uropathogens are easily entered into female urinary tract and cause severe life-threatening problems. There are higher incidence of female UTI (75%) than in male (25%) where multiple factors have probably led to the emergence and spread of UTI (2). The increasing failure of the chemotherapeutics and antibiotic resistance exhibited by pathogenic microbial infectious agents has led to the screening of several medicinal plants for their potential antimicrobial activity (3). Thus the present study is carried out to study the antibacterial activity of *Parkinsonia aculeata* against UTI causing bacteria in humans.

## MATERIALS AND METHODS

### Collection of plant material

The plants of *Parkinsonia aculeata* L. Family-Leguminosae were collected from areas around Hoshangabad road, Bhopal, M.P. in India. Identification of plant was carried out by Dr. Jagrati Tripathi HOD, Department of Botany, Unique College, Bhopal (M.P.) and a voucher specimen no.SSLJ/2008/PS/01 was procured in herbarium record maintained at the Laboratory, in the Department of Zoology, S.S.L. Jain P.G., College, Vidisha (M.P.). The plant material was thoroughly washed with water and was kept for drying in shade at room temperature for 20 days. The

thoroughly air dried plant material was grinded to powder to about 40-60 mesh size weighted and stored in large plastic bottles.

### Solvent Extraction:

The plant powder is extracted according to Harborne and Baxter (4). In this method the 40-60-mesh size powdered plant material was extracted with Soxhlet apparatus using 80 and 50 % methanol for 38 hrs. After defatting with petroleum ether for 24 hrs.. The extraction was done for 48 hrs. duration or till cycles are completed. Almost all the chlorophyll and lipid is deposited on the side of the flask and with skill it was removed. The crude was pipette off skillfully; almost completely free of lipid impurities and filtered through Whatmann filter paper no.1. Filtrate is then evaporated to 1/10<sup>th</sup> volume (<40°C), acidified by 2M H<sub>2</sub>SO<sub>4</sub> and is extracted with chloroform leaving behind the aqueous acidic layer. This extract is then dried in vacuum evaporator at <40°C (5).

### Phytochemical screening

Phytochemical screening were performed to assess the qualitative chemical composition of different crude extracts using commonly employed precipitation and coloration reactions to identify the major secondary metabolites like alkaloids, flavonoids, saponins, phenolic compounds, tannins. The phytochemical analyses were carried out using standard procedures (6, 7).

### Antibacterial assay

The plate well diffusion assay was used to determine the growth inhibition of bacteria by plant crude extract (8). The bacterial cultures were maintained on nutrient broth (Himedia). The bacteria were incubated at 37° for 24 hrs. Nutrient agar media was prepared and poured in autoclaved Petri dishes. Wells were made in the poured plates using sterile cork borer (5mm) and inoculum containing 10<sup>6</sup> CFU/ml of test bacteria were spread on solidified plates with a sterile swab moistened with the bacterial suspension. Then the wells were filled with 50µl of the crude extract. The four different concentrations (50, 100, 250, 500mg/ml) of leaves extract were prepared by dissolving in DMSO (Dimethyl Sulphoxide) and were tested for antibacterial activity. The experiment was performed in triplicates and the mean values were presented with standard deviation.

Streptomycin (10µg/50µl) was used as standard. Control was prepared using DMSO only.

## RESULTS

The antibacterial activity of Chloroform leaf extract (CLE) of *Parkinsonia aculeata* was assayed by well diffusion method against bacteria causing urinary tract infection (UTI) in humans. Table-2 summarizes the microbial growth inhibition of the CLE. The crude extract showed maximum antibacterial response against *E.coli*

with maximum zone of inhibition 23.21±0.02mm at concentration of 500mg/ml. The extract also showed antimicrobial response against *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Staphylococcus chonii* and *Proteus mirabilis* with zone of inhibition 18.94±0.01, 21.21±0.033, 22.15±0.004, 19.70±0.01 and 20.06±0.01 respectively at concentration of 500 mg/ml. All the six selected strains of bacteria are inhibited by starting concentration of 50mg/ml i.e. 1mg of the crude extract.

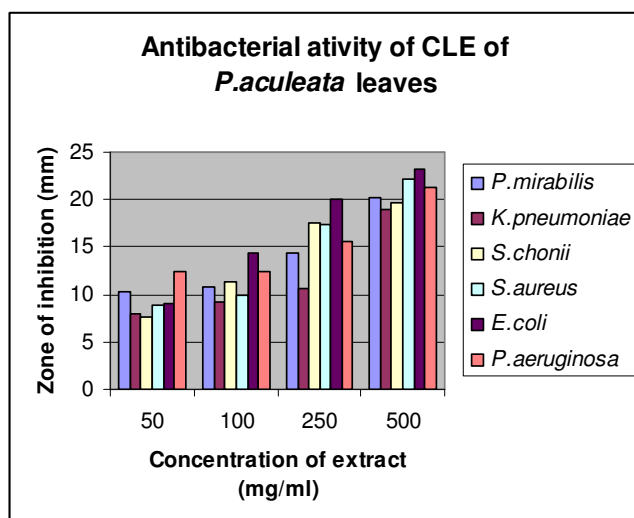
**Table: 2** Antimicrobial activity of methanol crude extract of *Parkinsonia aculeata* leaves

S.No.	Bacterial Strains	Standard	Zone Of Inhibition			
		(Streptomycin)	Chloroform Crude Extract			
			(mg/ml)			
		10µg/disc	50	100	250	500
1	<i>Proteus mirabilis</i>	11.31±0.21	10.27±0.02	10.85±0.1	14.31±0.01	20.16±0.01
2	<i>Klebsiella pneumoniae</i>	11.6±0.71	8.03±0.04	9.14±0.22	10.64±0.02	18.94±0.01
3	<i>Staphylococcus chonii</i>	14.6±0.12	7.65±0.01	11.30±0.006	17.59±0.004	19.70±0.01
4	<i>Staphylococcus aureus</i>	21.4±0.35	8.80±0.01	9.85±0.04	17.31±0.03	22.15±0.004
5	<i>Escherichia coli</i>	161±0.25	9.08±0.006	14.43±0.01	20.03±0.02	23.21±0.02
6	<i>Pseudomonas aeruginosa</i>	9.9±0.47	12.44±0.05	12.45±0.02	15.66±0.01	21.21±0.033

The preliminary phytochemical screening reveals the presence of flavonoids, alkaloids, C-glycosides and saponins (Table-1). The present study states the potential of antibacterial activity of CLE of *P.aculeata*.

**Table 1:** Phytochemistry of methanol crude extract of *Parkinsonia aculeata* leaves

S.No.	Compound	Chloroform crude extract
1	Carbohydrate	+
2	C-Glycosydes	+
3	Terpenes	-
4	Flavonoids	+
5	Alkaloids	+
6	Saponin	+
7	Tannins and Phenolic Compounds	-
8	Gums and Mucilages	-



## DISCUSSION

The antibacterial activity was expressed at varying degrees and the activity is strain and dose dependent. As flavonoids are synthesized by plants in response to microbial infection it should not be surprising that they have been found invitro to be effective antimicrobial substances against a wide array of microorganisms. Generally alkaloids are extremely toxic though they do have a marked therapeutic effect in minute quantities. For this reasons alkaloids were not often used in folk medicine and then for external application only. Pure isolated plant alkaloids and their synthetic derivatives are used as basic medicinal agents over the world for their analgesic, antispasmodic and bactericidal effects (9). This antibacterial activity would support the folk therapy of infections whose symptoms might involve bacteria (10). Antibiotics provide the base for treatment of bacterial infections. But, for the possession of high genetic variability bacteria easily develop antibiotic resistance. Thus, there has been a continuing search for new and more potent antibiotics (11). CLE from *P. aculeata* leaves showed potent antibacterial activity against UTI causing bacteria thus this plant can be used for isolation of bioactive compound especially flavonoids, as lead compound for development of novel antibiotics.

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