



Antimicrobial activity of curry leaves and papaya leaves against pathogenic strains

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ABSTRACT

The main intent of the present study is to evaluate antibacterial activity of Curry leaves (*Murraya Koeniggi*) and Papaya Leaves (*Carica papaya*) extracts against pathogenic strains *E. coli* ATCC 8739 and *S. typhi* ATCC 14028 using Cup Plate Method. Curry and Papaya Leaves extract was used to test antimicrobial activity against the test organism *E. coli* ATCC8739 and *S. typhi* ATCC 14028. Methanol, ethanol and aqueous extracts of varying concentrations 20mcg/ml, 40mcg/ml, 60mcg/ml, and 80mcg/ml were prepared and tested against pathogenic test organisms. Gentamicin is used as standard to compare the effect of antimicrobial activity of leaf extracts in the same concentrations. The methanolic extracts of Curry and Papaya leaves have shown higher antimicrobial activity as compared to other extracts. The above studies showed that Papaya leaves and Curry leaves are having good inhibitory properties against *E. coli* ATCC8739 and *S. typhi* ATCC 14028. Therefore, solvent extracts of papaya and curry leaves could be seen as a good source for useful drugs.

Key words: Curry Leaves, Papaya Leaves, *E. coli*, *S. typhi*, Antimicrobial activity

INTRODUCTION

Curry and Papaya leaves are used in traditional medicine as a source of many therapeutic agents in the Indian culture and grows well in the tropical countries. Curry leaves, known as *Murraya Koeniggi*, belonging to *Rutaceae* family are widely used as a medicinal herb and has characteristic aroma^[1]. Curry leaf is commonly used as spice due to aromatic nature of leaves. Medicinally, these leaves found use in diarrhoea, dysentery and to prevent vomiting^[1]. The Leaves and fruits are also a source of an essential oil which finds use as a fixative for heavy type of soap perfume. It is rich source of carbazole alkoids, Carbohydrates, steroids and flavonoids are also present in the root extracts of the plant. It showed some antimicrobial activity as well as antifungal activity.

Papaya is also known as *Carica papaya* is a member of the *Caricaceae* Family. The leaf of papaya contains beta carotene, calcium, carpaine, fats, flavonoids and vitamin C^[2]. Papaya leaves are also used as antimalarial drug It contains chemical compound of karpain, substance which kills microorganisms that often interferes with the digestive function^[3]. The antimicrobial activity of papaya leaves and curry leaves are checked against *E. coli* ATCC 8739 and *S. typhi* ATCC14028 by Cup-Plate Method.

EXPERIMENTAL SECTION

Plant Collection

Healthy, disease free curry leaves and papaya leaves were collected in September 2015, from the plants of Ghaziabad. The plant were authenticated by a former botanist Dr. Harimohan Saran of I.P (P.G) College, Bulandshahr.

Preparation of Extract

After collection it was washed, dried and powdered. 15g of dried powder of Curry and Papaya leaves were macerated in ethanol, methanol and water in separate container. 15g of dried leaves powder were taken in a separate container. To this 50 ml of ethanol, methanol and water was added and kept for 24 hrs with periodic shaking then filtered and the filtrates were collected. The procedure was repeated three times with fresh volume of each solvent. The filtrates were pooled and concentrated up to 50ml.

Test Pathogens

Two Pathogenic bacteria were used in this study *E.coli* ATCC8739 ATCC 8739 and *S.typhi* ATCC14028. ATCC 14028. The pure pathogenic strains were collected from Dept.of Microbiology, Institute of Microbial Technology(IMTAC), Chandigarh. The collected pure culture were maintained on Soyabean Casein digest Agar slants at 32-35°C and subcultured for 24hrs before use.

Antimicrobial Activity

Antibiotic Assay Medium no.11 was prepared, autoclaved at 121°C for 15minutes at 15 Psi pressure. Base layer (17ml) was prepared in sterile petriplates, after solidification of base layer the seed layer (4ml) was poured over it and left at room temperature to set the media^[4]. Antimicrobial activity of the Curry and Papaya leaves solvent extracts was determined by Cup-Plate Method on Antibiotic Assay Medium No11. Wells were made on Antibiotic Assay Medium No.11 after solidification of media by using standard sterile cork borer of 8mm of diameter^[4]. When well is loaded (100 µl) with antibiotics by the help of micropipette, it diffuses in the medium and inhibits the growth of organism. The plates were left for 1hr for pre-diffusion and incubated in bacteriological incubator at 32-35°C for 24hrs. At the end of incubation, the zone of inhibition is measured around each well using vernier calliper and the susceptibility is determined.

RESULTS AND DISCUSSION

Depending upon the active ingredient and diffusion capacity into agar medium, Curry and Papaya Leaves extracts showed the antimicrobial activity with respect to Gentamicin Standard against the tested microorganisms (*E.coli* ATCC8739 and *S. typhi* ATCC14028)

The methanolic extracts of curry and papaya leaves showed the maximum antimicrobial activity against the tested microorganism in comparison to ethanolic and aqueous extracts. The antibacterial activity observed in form of zone of inhibition measured in mm (millimetre) is shown in **Table 1, Table 2, Table 3 and figure 1, Figure 2**. The potency of antimicrobial activity of plant extracts are in following manner: Methanol Extracts > Ethanolic Extracts > Aqueous Extracts.

Table1. Antimicrobial Activity of Papaya Leaves Extracts against *E.coli* and *S.typhi*

Conc. (mcg/ml)	Methanolic Extract		Ethanolic Extract		Ethanolic Extract	
	<i>E.coli</i>	<i>S.typhi</i>	<i>E.coli</i>	<i>S.typhi</i>	<i>E.coli</i>	<i>S.typhi</i>
	Zone of Inhibition in mm					
20	11.5	9.5	11.2	9.5	10.5	8.2
40	13.6	9.6	11.8	9.7	11.2	9.2
60	14.4	10.1	13.1	10.0	12.4	9.8
80	16.2	10.5	14.6	10.2	13.3	10.0

Table2. Antimicrobial Activity of Curry Leaves Extracts against *E.coli* and *S.typhi*

Conc. (mcg/ml)	Methanolic Extract		Ethanolic Extract		Aqueous Extract	
	<i>E.coli</i>	<i>S.typhi</i>	<i>E.coli</i>	<i>S.typhi</i>	<i>E.coli</i>	<i>S.typhi</i>
	Zone of Inhibition in mm					
20	12.3	11.1	10.5	11.0	10.3	9.2
40	13.1	12.7	12.5	11.2	11.1	9.9
60	14.3	13.5	13.3	11.8	12.3	10.5
80	15.3	15.1	14.9	12.5	13.0	10.9

Table3. Antimicrobial Activity of Gentamicin against *E.coli* and *S.typhi*

Conc. (mcg/ml)	Methanolic Extract		Ethanolic Extract		Aqueous Extract	
	<i>E.coli</i>	<i>S.typhi</i>	<i>E.coli</i>	<i>S.typhi</i>	<i>E.coli</i>	<i>S.typhi</i>
	Zone of Inhibition in mm					
20	14.1	13.7	13.7	12.6	13.3	11.2
40	15.2	14.2	14.8	13.6	14.5	12.8
60	16.4	15.4	15.1	14.7	15.4	13.5
80	17.1	16.6	16.7	15.5	16.3	14.0

Antimicrobial activity of Methanolic Extract of Papaya leaves against *E.coli*

A,B,C,D represent the concentration in mcg/ml

A= 20mcg/ml

B= 40mcg/ml

C=60mcg/ml

D=80mcg/ml



Figure 1

Antimicrobial activity of Methanolic Extract of Curry leaves against *E.coli*

A= 20mcg/ml

B= 40mcg/ml

C=60mcg/ml

D=80mcg/ml



Figure 2

CONCLUSION

It was observed that the three extracts were able to inhibit the growth of micro-organisms under test. Among the three extracts, the methanolic extract showed the maximum antimicrobial activity against *E.coli* ATCC8739 and

S.typhi ATCC14028. The results revealed the presence of medicinally important constituents in these solvent extracts. Therefore, Curry leaves and Papaya leaves extracts could be seen as a potential source for useful drugs.

Acknowledgment

The authors are thankful to the authorities of Indian Pharmacopoeia Commission, Ghaziabad for their support in providing necessary facility for conducting the study.

Conflict of Interest

Responsible authors declare no relevant conflicts of interest.

REFERENCES

- [1]Manisha Vats; Harneet Singh; Satish Sardana.*Brazilian Journal of Microbiology*, **2011**, 42(4), 1517-8382
- [2]D. S Bansode; M. D Chavan. *World Journal of Pharmaceutical Sciences*,**2014**, 2321-3086
- [3]J.P Peter; Y Kumar; P Pandey; H Masih. *IOSR Journal of Pharmacy and Biological Sciences*,**2014**,9(2),2278-3008
- [4]Indian Pharmacopoeia, 7edition, Indian Pharmacopoeia Commission, Ministry of Health and Family Welfare,Ghaziabad,**2014**(1),50-59