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Antimicrobial Activity and Phytochemical Analysis of Carica Papaya Leaves, Root Extracts

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ABSTRACT

The leaves and roots of Caricapapaya were screened for its antimicrobial and phytochemical activities. The solvents used for the leaves and root extraction were benzene, acetone, aqueous. The extract was tested against infectious disease causing bacterial such asEscherichia coli, Pseudomonas aerginosa, staphylococcus aureus using the well diffusion method. The benzene, acetone extract of leaves of Carica papaya inhibition against all the test microbe ranging from 11mm to 13mm diameter inhibitory zone. The acetone and aqueous extract of root of Carica papaya inhibition against all the test microbe ranging from varying zone of inhibition of the growth of tested organism than benzene, acetone, aqueous, phytochemical properties of leaves and roots of Carica papaya obtain from, benzene, acetone, aqueous extract were investigated. The result confirmed that the presence of antibacterial activity and phytochemical in the shade dried extract of Carica papayaagainst the human pathogenic organisms.
Keyword: Carica Papaya Extract, Phytochemicals, Antimicrobial Activity.

I. INTRODUCTION

Medicinal plants have been identified and used throughout human history. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and herbivorousmammals. At least 12,000 such compounds have been isolated so far; a number estimated to be less than 10% of the total (1) Chemical compounds in plants mediate their effects on the human body through processes identical to those already well understood for the chemical compounds in conventional drugs; thus herbal medicines do not differ greatly from conventional drugs in terms of how they work. This enables herbal medicines to be as effective as conventional medicines, but also gives them the same potential to cause harmful side effects (2).

Caricapapaya is one of the medicinal plants available on the earth; *Caricapapaya* belonging to family*caricaceae* is commonly known as papaya in English, papita in Hindi and erandakarkati in Sanskrit. [3, 4] Papaya is a powerhouse of nutrients and is available throughout the year. It is a rich source of threes powerful antioxidant vitamin C, vitamin A and vitamin E; the minerals, magnesium and potassium; the B vitamin pantothenic acid and folate and fiber. In addition to all this, it contains a digestive enzyme papaintha effectively treats causes of trauma, allergies and sports injuries. All the nutrients of papaya as a whole improve cardiovascular system, protect against heart diseases, heart attacks, strokes and prevent colon cancer. The fruit is an excellent source of beta carotene that prevents damage caused by free radicals that may cause some forms of cancer. It is reported that it helps in the prevention of diabetic heart disease. Papaya lowers high cholesterol levels as it is a good source of fiber.[5]

II. MATERIALS AND METHODS

A. COLLECTION OF PLANT MATERIAL

Collection of plant material the leaves, roots of *Carica papaya* were done from the area around pachore, Madhya Pradesh. The whole plant and parts were done by Phytochemical extraction and screening.

B. EXTRACTION OF PLANT

The leaves of *Carica papaya* were allowed to dry in shade for week and then grounded into fine powder in mixer grinder. 10 gm of dried powder was subjected to

soxhlet extraction with 200 ml of solvents starting from Benzene, followed by extraction with other solvents Benzene and Acetone and pure distilled water in separate ways. Soxhlet process was allowed to carry out till the complete exhaustion of sample material use for extraction with the maintenance of temperature below the boiling points of the solvents used. The extract in crystalline/slurry form which were suitably diluted and used for preliminary phytochemical analysis and studies of their antimicrobial activity.

The twigs of the roots of *Carica papaya* were washed and allowed to dry in shade for a week and then grounded into fine powder in mixer grinder. Similar as the extraction for leaves, 10 grams of dried powder of roots was subjected to soxhlet extraction with 200 ml of solvents starting from Benzene, followed by extraction with other solvents Acetone, and pure distilled water in separate ways. Soxhlet process was allowed to carry out till the complete exhaustion of sample material use for extraction with the maintenance of temperature below the boiling points of the solvents used. The extract in crystalline/slurry form which were suitably diluted and used for preliminary phytochemical analysis and studies of their antimicrobial activity.

C. PHYTOCHEMICAL ANALYSIS OF THE EXTRACT

A small portion of the extracts were subjected to the phytochemical test using Harbourne's(1983) methods to test for alkaloids, tannis, saponins, flavonoids, glycosides, steroids, phenolic compound, amino acids.[6]

Test for alkaloids: About 0.2 g extract warmed with 2% H2SO4 for two minutes, filtered and few drops of Dragendorff's reagent added orange red precipitate indicates the presence of alkaloids. And or filtrates were treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown/reddish precipitate indicates the presence of alkaloids.

Test for glycosides: The extracts hydrolyzed with HCl solutions and neutralized with NaOH solutions. A few drops of Fehling solution A and B were added. Red precipitate indicates the presence of glycoside. Another test use was Benedict's test, in which the filtrates were treated with Benedict's reagent and heated gently. Orange red precipitate indicates the presence of reducing sugars.

Test for tannins: Small quantity of extracts mixed with water, heated, filtered and ferric chloride added. A dark green solution indicates the presence of tannins.

Test for saponins: About 0.2g of the extracts shaken with 5ml of distilled water and then heated to boil frothing (appearance of creamy mix of small bubbles) shows the presence of saponins.

Test for flavonoids: Extract of about 0.2 g of the extracts shaken with 5ml of distilled water and then a few drops of 10% lead acetate solution is added. A yellow or dirty white precipitate shows the presence of flavonoids.

D. CULTURE MEDIA AND INOCULUM PREPARATION

Nutrient agar broth cultures of the pure culture isolates of *Staphylococcus aureus, E. coli and Pseudomonas aeruginosa* were prepared by transferring a loop of culture into sterile nutrient broth and incubated at 37^{o}C for 48hours. A loop full was taken from these broths and seeded onto sterile nutrient agar plates through sterile cotton swab to develop diffused heavy lawn culture.

E. ANTIMICROBIAL ACTIVITY

The well diffusion method was used to determine the antibacterial activity of the extracts prepared from the*Carica papaya* leaves and roots using standard procedure. In this method, first the test bacteria broth of bacteria is used to inoculate on the nutrient agar plates with the help of sterile cotton swabs to develop the lawn culture. Then to these plates 6 mm diameter well are punched in agar plates pre-inoculated with test microorganisms Undiluted overnight broth cultures should never be used as an inoculum. Routine direct application of suitably diluted extracts is poured into the well. The plates were incubated at 37oC for 24 hr. and then examined for clear zones of inhibition. Sterile water was used as control. [7]

III. RESULT AND DISCUSSION

PHYTOCHEMICAL ANALYSIS OF BIOACTIVE COMPOUND IN DIFFERENT SOLVENTS EXTRACTS OF CARICA PAPAYA

The plant leaves extracts in different solvent were screened for the presence of various bioactive phytochemical compounds. The acetone leaves extract ofcarica papaya were found in alkaloids, glycosides, saponins, flavonoids, amino acids and phenolic compounds although tannins, and steroids are absent. The benzene leaves extract ofcarica papaya were found in alkaloids, glycosides, saponins, flavonoids, amino acids although tannins, phenolic compound and steroids are absent. The aqueous leaves extract of carica papaya were found in tannins, saponins, phenolic compound and steroids although alkaloids, glycosides, flavonoids, amino acids are absent. The aqueousroot extractof caricapapyawere found in alkaloids, tannins, saponins, flavonoids, phenolic, steroids althoughglycosides and amino acid are absent. The actone root extract ofcarica papaya were found in alkaloids, tannins glycosides, saponins, phenolic although flavonoids, amino acids, steroidsare absent. The benzene root extract ofcarica papaya were found in alkaloids, glycosides, saponins, flavonoids, steroids although tannins, amino acids, phenolic compound are absent. This were documented in table 1 and 2.

Table 1. phytochemical analysis of *Carica papaya* extracts from Leaves.

S.N.	Constituents	Benzene extract	Acetone extract	Aqueous extract
1	Alkaloids	+	+	-
2	Tannins	-	-	+
3	Glycosides	+	+	-
4	Saponins	+	+	+
5	flavonoids	+	+	-
6	Amino acids	+	+	-
7	Phenolic compound	-	+	+
8	steroids	-	-	+

[(+) means present, (-) means absent]

Table 2. Phytochemical analysis of Carica papaya extract from roots.

S.N.	Constituents	Benzene extract	Acetone extract	Aqueous extract
1	Alkaloids	+	+	+
2	Tannins	-	+	+
3	Glycosides	+	+	-
4	Saponins	+	+	+
5	Flavonoids	+	-	+
6	Amino acids	-	-	-
7	Phenolic	-	+	+
8	Steroids	+	-	+

ANTIMICROBIAL ACTIVITY OF DIFFERENT ORGANIC SOLVENT EXTRACTS OF CARICA PAPAYA

Antimicrobial activity of different solvents extract of *Carica papaya* is shown in table that the benzene, acetone extract of leaves of Carica *papaya*impart sufficient inhibitory actions against the test microbe ranging from 7 mm to 13 mm diameter inhibitory zones. And put of the aqueous extract only limitedinhibition was observe.

The acetone and aqueous extracts of *Carica papaya* impart sufficient inhibitory action against the test microbe ranging from 10 to 16 mm diameter inhibitory zones. The acetone extract of root has maximum zone of inhibition against the *Staphylococcus aureus* the common Gram positive pathogenic microorganism and this is the maximum inhibitory potential out of the all extracts viz. leaves and roots. And benzene extract of root only inhibition zone observe is against of Escherichia *coli*. The result of antibacterial activity is shown in table 3 and 4 and figure 1 and 2.

Table 3. Result of the antimicrobial activity of leaf extracts of Carica papaya

S.N.	Test microbes	Zone of Inhibition due to *carica papaya* Leaf extract 1mg/ml (in mm)		
		Benzene extract	Acetone extract	Aqueous extract
1.	*Staphylococcus aureus*	7	13	Nil
2.	*Escherichia coli*	11	10	3
3.	*Pseudomonas aeruginosa*	7	9	5

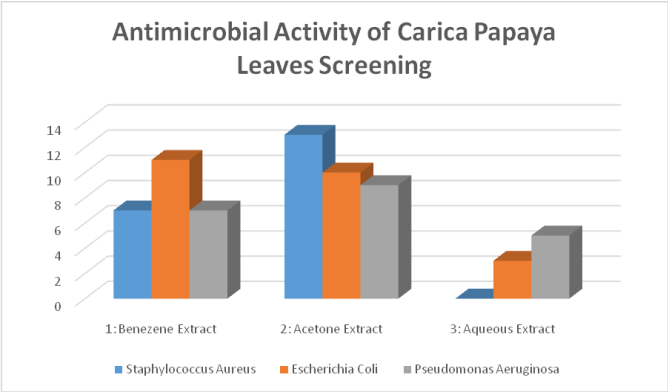

Figure 1. Graphical representation of Antimicrobial Activity of Carica papaya leaves of extract to three test species.

Table 4. Result of the antimicrobial activity of root extracts of Carica papaya

S.N.	Test microbes	Zone of Inhibition due to Carica papaya Root extract 1mg/ml (in mm)		
		Benzene extract	Acetone extract	Aqueous extract
1.	*Staphylococcus aureus*	Nil	16	14
2.	*Escherichia coli*	10	12	11
3.	*Pseudomonas aeruginosa*	Nil	10	12

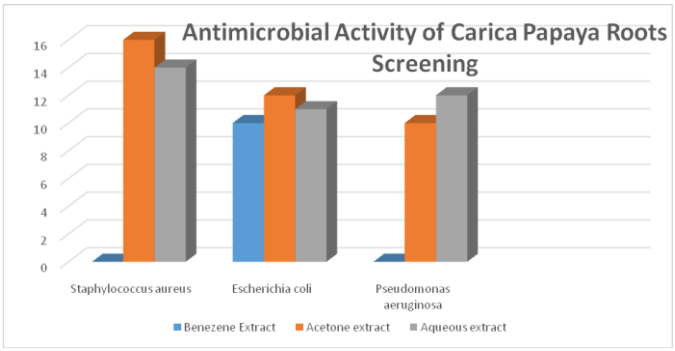

Figure 2. Graphical representation of Antimicrobial Activity of Carica papaya roots of extract to three test species.

IV. CONCLUSION

The phytochemical analysis revealed the bioactive compounds which are responsible for the in vitro antimicrobial of Carica papaya our all bacterial strains in all extracts could be benzene, acetone, aqueous extract of various parts of Caricapapaya might be exploited as a natural drug for the treatment of several infectious diseases caused by these organisms and could be useful in understanding the relations between traditional cures and current medications.

Our results showed that in present work that extracts obtained leaves of the plant Carica papaya using various solvent are rich sources of potent phytochemicals especially the leaves extract and has inhibitory effects on the experimental microbes. From previous studies and the current work, it is clear that the plants is rich source of alkaloids, glycosides, tannins, saponins, flavonoids, steroids, phlobatannis. These bioactive complex phytochemicals can be used for the development of potent drugs, medicines or antimicrobial agents that can be used for various purpose for human welfare upon further extensive and systematic studies.

V. REFERENCES

[1]. L.C. Tapsell, I. Hemphill, L. Cobiac, C.S. Patch, D.R. Sullivan, M. Fenech, S. Roodenrys, J.B. Keogh, P.M. Clifton, P.G. Williams, V.A. Fazio, K.E. Inge, (2006), "Health benefits of herbs and

spices: the past, the present, the future". Med. J. Aust.185 (4 Suppl): S4-24.
[2]. P.K. Lai, J. Roy, (2004), Antimicrobial and chemopreventive properties of herbs and spices". J. Curr. Med. Chem. 11 (11), 1451-60.
[3]. Anonymous, Ayurvedic Pharmacopoeia of India, part 1, Government of India, ministry of Health and family Welfare, Department of Ayurveda, Yoga Unani, Siddha and Homeopathy (AYUSH), New Delhi. 4
[4]. R.D. Chaudhari, (1996), Herbal drug industry. Eastern publishers New Delhi, 45-78.
[5]. Aravind, Debjit 'Traditional and Medicinal Uses of Carica papaya 'Journal of 'Medicinal Plants Studies'2013,1(1), 2320-3862.
[6]. G E Trease, and W C Evans, 1989, A textbook of Pharmacognosy, Bacillieretinal Ltd, London, 13 edition.
[7]. Satish, S, D C Moohana, M.P. Ranhavendra and K ARaveeesha, Antibacterial activity of some pathogenic of Aspergillus sp. J. of Agriculture Technology, 2007, 3: 109-119. .*Database Systems Journal, IV*(1), 37-45.