

Phytochemical Screening and Anti Microbial Studies of *Phylanthus emblica*

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Abstract— Many forms of alternative medicines were available for those who cannot be helped by conventional medicine. Ayurvedha and Herbal medicine were two important forms of alternative medicine that was widely available in India. This work was mainly concerned with the identification of the therapeutic properties of *Phylanthus emblica*. The ethanolic extract of *Phylanthus emblica* root was used for its anti oxidant and antimicrobial activity. *Phylanthus emblica* root extract has very well anti oxidant and anti microbial activity. The ethanolic extract of *Phylanthus emblica* was checked for anti microbial activity against pathogenic bacteria such as *Salmonella*, *pseudomonas aeruginosa* and fungi *Aspergillus niger*.

Index Terms— *Phylanthus emblica*, Antioxidant activity, anti microbial activity, phytochemical screening

I. INTRODUCTION

Phylanthus emblica commonly known as Indian Sarsaparilla, belonging to the family Asclepiadaceae, is a slender laticiferous, twining, sometimes prostrate or semi erect shrub, occurring over the greater part of India. Roots are woody and aromatic; stems numerous, slender, terete, thickened at the nodes; leaves opposite, short-petioled, very variable, elliptic-oblong to linear-lanceolate often variegated with white above, sometimes silvery white and pubescent beneath, flowers are greenish outside, purplish inside, crowded in subsessile axillary cymes; follicles are slender, four inches long, cylindrical, sometimes curved, divaricate; seeds numerous, black, flattened, with a silvery white coma. This is a common medicinal plant widely used in Indian Systems of Medicine (Anonymous, 1997) and also an official drug in Indian Pharmacopoeia (Anonymous, 1996) and British Pharmacopoeia (Anonymous, 2003). Various market samples are available in the name, identified as *H. indicus*, *Decalepis hamiltoni* and *Cryptokpis buchanani* belonging to the family Asclepiadaceae; *Ichnocarpa frutescens* and *Vallaris solanaceae* of the family Apocyanaceae. Apart from this *H. indicus* exists with two variants namely var. *indicus* and var. *pubescens*, which are not given much emphasis. Hence the review was carried out to enumerate the benefits of *H. indicus* (Anonymous (1986, 1997), Mukherjee, 1980). The roots are used as antipyretic, anti-diarrhoeal, astringent, blood purifier, diaphoretic, diuretic, refrigerant and tonic (Anonymous, 1986, 1997; Nadkarni, 1989). Roots are useful in biliousness, blood diseases, dysentery, diarrhoea, respiratory disorders, skin diseases, syphilis,

fever, leprosy, leucoderma, leucorrhoea, itching, bronchitis, asthma, eye diseases, epileptic fits in children, kidney and urinary disorders, loss of appetite, burning sensation and rheumatism (Mukherjee, 1953; Chandra et al 1995; Anonymous, 1986; Nadkarni, 1989). Root bark is used to cure dyspepsia, loss of appetite, nutritional disorders, fever, skin diseases, ulcer, syphilis, rheumatism and leucorrhoea (Nadkarni, 1989). Stem of *H. indicus* is used as diaphoretic, diuretic, laxative and in treating brain, liver and kidney diseases, syphilis, sleet, urinary discharges, uterine complaints, leucoderma, cough and asthma (Bhandary et al 1995).

II. MATERIAL AND METHODS

Collection of Plant Materials

The fresh and healthy roots of *Phylanthus emblica* were collected. The plant specimens were identified in Department of Biotechnology, Sri krishnadevaraya University, Anantapuram.

Preparation of Root Extract of *Phylanthus emblica*

The extraction of roots of *Phylanthus emblica* was carried out using known standard procedures. The roots were dried in shade and powdered in a mechanical grinder. The powder (10.0 g) was initially defatted with ethyl alcohol by using a Soxhlet extractor for 72 hours at a temperature not exceeding the boiling point of the solvent. The extracts were filtered using Whatman filter paper (No.1) while hot, concentrated in vacuum under reduced pressure using rotary flask evaporator, and dried in a desiccator. The ethyl alcoholic root extract yields a dark reddish residue weighing 4.50 g (45.0% w/w). This crude

extracts of ethylalcohol was used for further investigation for potential of antimicrobial properties.

Preliminary Phytochemical Screening

The root extracts were subjected to preliminary phytochemical testing to detect for the presence of different chemical groups of compounds. Air-dried and root powder was screened for the presence of saponins, tannins, alkaloids, flavonoids, triterpenoids, steroids, glycosides, anthraquinones, coumarin, saponins, gum, mucilage, carbohydrates, reducing sugars, starch, protein, and amino acids.

Test Microorganisms and Growth Media

Salmonella (MTCC 1240), *Pseudomonas aeruginosa* (MTCC 1688) and fungal strain *Aspergillus niger* (MTCC 1785) were chosen based on their clinical and pharmacological importance. The bacterial strains obtained from Department of Microbiology, Osmania University, were used for evaluating antimicrobial activity. The bacterial and fungal stock cultures were incubated for 24 hours at 37°C on nutrient agar and potato dextrose agar (PDA) medium, respectively, following refrigeration storage at 4°C. The bacterial strains were grown in Mueller-Hinton agar (MHA) plates at 37°C (the bacteria were grown in the nutrient broth at 37°C and maintained on nutrient agar slants at 4°C), whereas the fungi were grown in Sabouraud dextrose agar and PDA media, respectively, at 28°C. The stock cultures were maintained at 4°C.

Antimicrobial Activity

Whatman No: 1 filter paper discs of 6mm diameter are prepared and autoclaved by keeping in a clean and dry Petri plate. The filter paper discs were soaked in plant extracts for 6 hours are taken as test material. After 6 hours the discs were shade dried. The concentrations of root extracts per disc are accounted for 0.1 grams/1ml. Subsequently they are carefully transferred to spread on cultured Petri plates. Filter paper discs immersed in ethanol, benzene, distilled water are prepared and used as control.

Testing of antimicrobial activity:

To test the antimicrobial activity on agar plates, LB agar medium was prepared using the ingredients mentioned above. The medium was sterilized at 121°C for 30 min's. The agar test plates were prepared by pouring about 15ml of the medium into 10cm Petri dishes under aseptic condition and left undisturbed for 2hrs to solidify the medium. 1ml of inoculum (containing suspension) of *P.aeruginosa* and *Sta.aureus* was poured to the respective

plates separately containing solidified agar media. Six replicates were maintained. The prepared sterile whatman no :1 filter paper discs of 6mm diameter were impregnated with the extracts and shaken thoroughly and this test plates incubated for a period of 48 hrs in BOD at 37°C for the development of inhibitory zones and the average of 2 independent readings for each organism in different extracts were recorded. The control Petri plates and also maintained above respective cultures

Measuring the diameter of inhibition zone:

The inhibition zones were lead after 1 day at 37°C for bacteria. The diameter of the inhibition zone was measured and recorded with the aid of plastic ruler. 7 paper discs placed in 1 Petri plate.

III. RESULTS AND DISCUSSION

It was found that ethyl alcoholic extracts of *Phyllanthus emblica* roots contained tannins, flavonoids, saponins, triterpenoids, steroids, glycosides, anthraquinones, reducing sugars, carbohydrates, proteins, and amino acids.

Antimicrobial activity

Ethanol extract of *Phyllanthus emblica* root



Fig 1: Pseudomonas aeruginosa



Fig 2: Salmonella

NATIONAL CONFERENCE ON ICT EMPOWERED TEACHING, LEARNING AND EVALUATION (NCICT-2016)

International Journal of Advanced Scientific Technologies in Engineering and Management Sciences (IJASTEMS-ISSN: 2454-356X) Volume.2,Special Issue.1Dec.2016

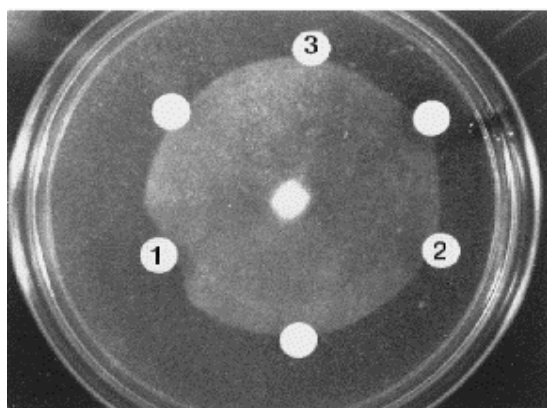


Fig 3: Aspergillus niger

Plants	Zone of inhibition (MIC)		
	<i>Pseudomonas aeruginosa</i> (-ve) (mm)	<i>Staphylococcus aureus</i> (+ve) (mm)	<i>Aspergillus niger</i> (mm)
<i>Phyllanthus emblica</i>	3.4	2.3	0.8

Table 1: Inhibitory activities of Root extract of *Phyllanthus emblica* on microorganisms

Phytochemical screening of plant leaves in different extracts

Secondary metabolites	Hexane	Ethyl acetate	Ethanollic	Aqueous
Steroids	++	+	++	+
Triterpenes	-	+	+	-
Saponins	+	+	-	++
Tri terpinoidal saponins	-	-	-	+
Alkaloids	+	+	+	+
Carbohydrates	-	-	++	-
Flavonoids	+	++	+	+

Tannins	++	-	+	+
Glycosides	+	+	+	+
Polyphenols	+	++	+	++

Table 2: *Phyllanthus emblica* phyto chemical Screening

IV. CONCLUSION

In the present study it was found that *Phyllanthus emblica* root extract has an excellent antimicrobial activity. The pathogenic bacteria like *Pseudomonas aeruginosa*, *Staphylococcus aureus* and fungus *Aspergillus niger* were inhibited in presence of the root extracts of *Phyllanthus emblica* ethanolic extract. Therefore the future studies should be aimed to exploit this plant to be used as one of the best medicinal plant is controlling pathogenic bacteria.

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