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Research Article

PHYTOCHEMICAL AND ANTIBACTERIAL ACTIVITY OF *MORINDA CITRIFOLIA* L.

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ABSTRACT

Plants are rich in minerals and nutrients that are important for most of the biochemical reaction. The present study aims at elucidating the phytochemical activity of the plant *Morinda citrifolia* L. (Noni), that possess the secondary metabolites alkaloids, flavonoids, tannins, cardiac glycosides, saponins, etc in the aqueous, methanol, ethyl acetate crude extracts. The antibacterial activity of the plant *M. citrifolia* were possess the high resistance in the antibiotic chloramphenicol and ampicillin respectively in the aqueous, methanol and ethyl acetate extracts in two different concentration(30µg and 60µg).

Keywords:

Morinda citrifolia L. (Noni), Phytochemicals, Chloramphenicol, Ampicillin, Resistance.

1. INTRODUCTION

Morinda citrifolia L. (Noni), better-known commercially as noni, grows widely throughout the Pacific and is one among the foremost vital sources of ancient medicines among pacific island societies. This tiny evergreen tree is native from Southeastern Asia to Australia[1]. Noni is noted for its extraordinarily wide range of environmental tolerances. It can grow in infertile, acidic and alkaline soils and is at home in terribly dry to very wet areas. It grows naturally in comparatively dry or lowland areas in shut proximity to shorelines, or as a vital forest under story species in low-elevation Pacific island forests and rain forests. Noni's intensive vary of environmental tolerances conjointly includes exposure to wind, fire, flooding, and saline conditions[2]. All components of the plant have ancient and/or trendy uses, together with roots and bark, trunks, and leaves and fruits. Single trees are encouraged or cultivated in gardens principally for healthful functions. Most components of the tree are wide used medicinally

since precedent days. Roots serve to treat stiffness and tetanus and are proved to combat blood vessel tension. Elsewhere they're used as antipyretic, tonic and antiseptic. The fruits are used as a water pill, a laxative, Associate in nursing emollient and as an agent, for respiratory illness and alternative metabolism issues, as a treatment for unhealthy and comparable inflammations, in cases of leucorrhoea and sapraemia and for maladies of inner organs. Roots, leaves and fruits could have anthelmintic properties. In ancient medication the components used are administered raw or as juices and infusions or in ointments and poultices.

The curative properties of the plant components are ascribed to the presence of medicinally active anthraquinone derivates[3]. The fruit contains rancid smelling saturated fatty acid and unsightly tasting saturated fatty acid. It's thought that antibiotically active compounds are present. The fruit pulp can be accustomed cleanse hair, iron and steel. In Asian country and Thailand the tree is used as a support for pepper plants[4].

2. MATERIALS AND METHODS

Collection and processing of plant samples

The mature roots of *Morinda citrifolia* L. were collected from Trichy district, Tamil Nadu. The collected plants were washed under the running tap water and dried under shade at room temperature. The plants were cut into small pieces, powdered in a mixer grinder and stored in sterile containers for further use.

Preparation of extract

5 gram of powdered sample were dissolved in 50ml of Ethyl Acetate, methanol and aqueous separately. Kept the samples on rotary shaker at 190-220rpm/min at 30^0C for 3 days. After the incubation the extract was filtered and allow to evaporate in room temperature. After the evaporation the sample were collected and stored it for further use.

Phytochemical screening [5]

The extracted plant sample of *M. citrifolia* L. were screened for the presence of secondary metabolites.

Alkaloids

1.5 ml of 10% HCL was added to about 5 ml of the extract, and the mixture was heated for 20min. It was cooled and filtered. 1ml of Dragendorff's reagent was added. Formation of a reddish or orange coloured precipitate indicates the presence of alkaloids.

Cardiac glycosides

5 ml of extract was treated with 2 ml of glacial acetic acid containing one drop of ferric chloride solution. This was under laid with 1 ml of concentrated sulphuric acid. A brown Evidence-Based Complementary and Alternative Medicine 3 ring at the interface indicates a deoxy sugar characteristic of cardenolides. A violet ring may appear below the brown ring, while in the acetic acid layer, a greenish ring may form just gradually throughout thin layer.

Flavonoids

About 5 volumes of dilute ammonia solution were added to a portion of the sample followed by addition of concentrated H_2SO_4. A yellow coloration that was observed indicated the presence of flavonoids. The yellow coloration disappeared on standing.

Tannins

A few drops of 0.1% ferric chloride were added to the sample and observed for the formation of brownish green or a blue-black coloration.

Saponins

2 ml of distilled water were added to the plant extract. It was shaken well for 15 minutes at lengthwise. The formation of 1cm foam layer indicates the presence of the Saponins.

Terpenoids

5 ml of each extract was mixed in 2 ml of chloroform, and concentrated H_2SO_4 (3 ml) was carefully added to form a layer. A reddish brown coloration at the interface was formed to show positive results for the presence of terpenoids.

Reducing sugar

The extract was shaken with distilled water and filtered. The was boiled with fehlings solution A and B for few minutes an orange red indicates the presence of reducing sugar.

Phlobatannins

Few drops of 1% aqueous hydrochloric acid solution were added to the sample and it was boiled with hot plate stirrers, and observed the red colour precipitation.

Glycosides

3 ml of chloroform with 10% ammonia solution were added to the plant extract and observe the appearance of the pink colour.

Anthraquinones

A few drops of 10% ammonia solution were added to plant extract and observe the formation of the pink colour.

Antibacterial activity [6]

2 different concentration of plant extract were screened against the activity of *Pseudomonas aeroginosa* and *Staphylococcus aureus.* Antimicrobial activity was carried out using disc-diffusion method, Petri plates were prepared with 20ml of sterile Mannitol salt agar for *S. aureus* and Pseudomonas Isolation Agar for *P. aeroginosa*. The test cultures were swabbed on the top of the solidified media and allowed to dry for 10min.

The tests were conducted at two different concentrations of the crude extract respectively, 30µg and 60µg per disc. The loaded discs were placed on the surface of the medium and left for 30min at room temperature for compound diffusion. Negative control was prepared using DMSO. Ampicillin and Chloramphenicol were used as positive control for *P. aeruginosa* and *S. aureus* respectively. The plates were incubated for 24 h at 37^{o}C. Zone of inhibition was recorded in millimeters and the experiment was repeated twice.

3. RESULTS AND DISCUSSION

Table -1 Phytochemical analysis of *M. citrifolia* L.

Test	Aqueous extract	Methanol extract	Ethyl acetate extract
Alkaloids	+	–	–
Cardiac glycosides	++	++	+
Flavonoids	++	++	++
Tannins	++	++	++
Saponins	++	–	–
Terpenoids	++	–	++
Reducing sugar	+	+	++
Phlobatannins	–	+	+
Glycosides	++	++	++
Anthraquinones	–	++	+

– = absent; + = present; ++ = appreciable amount.

The curative properties of *M. citrifolia* were perhaps due to the presence of various secondary metabolites such as alkaloids, flavonoids, glycoside, phenols, saponins, steroids, tannins etc., The Phytochemical analysis of the aqueous, methanol and ethyl acetate extract from the root of the *M. citrifolia* shown in table 1 respectively. The antibacterial activity of *P. aeuroginosa, S. aureus* shows the high resistance to the antibiotic such as chloramphenicol and ampicillin. The zone of inhibition of *P. aeruginosa* at the concentration of 30 and 60µg in aqueous extract was 20 and 25 respectively, in methanol extract 15 and 23 and in ethyl acetate extract 23 and 27 respectively. In case of the *S. aureus* at the same concentration of the extract of 30 and 60µg in aqueous extract 12 and 18, in methanol extract 18 and 23, in ethyl acetate extract 20 and 25. The result was showed in Table 2 respectively. [7, 8]

Table -2 Zone of inhibition of the *P. aeuroginosa and S. aureus*.

S. No	Microorganism	Zone of inhibition of *M. citrifolia* root extract(dm)					
		Aqueous Extract		Methanol Extract		Ethyl acetate Extract	
		30µg	60µg	30µg	60µg	30µg	60µg
1	*Pseudomonas aeuroginosa*	20	25	15	21	23	27
2	*Staphylococcus aureus*	12	18	18	23	20	25

4. CONCLUSION

M. citrifolia root extract had an appreciable amount of secondary metabolites in different extracts. It also had an activity against *S. aureus* and *P. aeuroginosa*. The antibacterial activity of *M. citrifolia* root extract is compared with the antibiotics of the respective organisms. The observation of the zone of inhibition was equal or greater than the zone of inhibition of antibiotics, a result it is sure that these root extract can surely inhibit the growth of these microorganism. The antimicrobial activity produced by Noni suggested that the defense mechanism against insects, bacterial infections. *M. citrifolia* was analyzed and its organic components responsible for antibacterial activity.

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