Phytochemical analysis and antimicrobial activity of leaves of *DurantaPlumieri*Jacq.

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Abstract

The plant *Durantaplumieri*Jacq.is a perennial herb, locally know as "Bogadawmyetkhon" which belongs to the family Verbenaceae. The plant was collected from YenanchaungTownship ,during the flowering period. The morphologyical characters of this plant were identified with the help of available literature .In phytochemical test , the power samples were examined by the method of Trease and Evevs , 1989;British pharmacopoeia 1966. The preliminary phytochemical investigation, revealed the presence of saponins, reducing sugar, phenolic compound, glycoside,tannis, alkaloid and starch but α-amino acid, carbohydrate and flavonoid were not detected in these plant. The antimicrobial activity of 70% ethanols, ethyl acetate, acetone and aqueous extracts of leaves of *Durantaplumieri*Jacq.wasstudied by using agar-well diffusion methods. The ethyl acetate provesto be the best antimicrobial activity against *Bacillus pumalis*. Similary 70% ethanol extract and aqueous extracts showed inhibitory effects on *Pseudomonas aeruginosa*. The acetone extracts did not inhibit the test organisms, but inhibit the *Bacillus pumalis*.

Keywords: *Durantaplumieri*Jacq., Antimicrobial activity

INTRODUCTION

*DurantaPlumieri*Jacq. perennial shrubs, is a member of the family Verbenaceae. This plant is locally known as "Bogadowmyetkhon/siyopan" in Myanmar and it is also called 'Golden Dgw Drop; Pigeon Berry' in English.

The plants were collected and identified with the literatures of Hooker (1984), Backer (1968), Dassanayake (1983), Flora of Hong Kong (2009), Backer (1965), and Christophe Wiart (2006). The leaves of *D. plumieri*Jacq.is used as antipyretic, detergent, diuretic, insecticide, larvicide and stimulant. The leaves contain saponin and fruits an alkaloid analogonous to narcotine. Macerated fruits, which even ditution of 1:00 parts of water is lethal to mosquito larvae (Khare, 2007 and Wealth of India, 1972). In Ghana

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some herbalists use its leaves to manage wounds and skin affections. Aqueous extracts of seeds of *D.plumieiri*Jacq. is rich in poly phenol oxidase activity (Ipsita, 2002).

Bacteria are small microorganisms with a relatively simply and primitive form of cellular organization. They are generally unicellular, but the cell may grow attached to one another in clusters, chains, rods, filaments or, as in the "higher bacteria," a mycelium. This cells are smaller (usually between 0.4 and 1.5μ in short diameter) than those of protozoa and fungi, (Cruickshank, 1975).

This research is aimed, promoting the Myanmar tradition medicine scientifically. This research has been made with the objective of identifying of *Durantaplumieri*Jacq. experimenting of antimicrobial activity of Acetone, ethyl acetate, 70% Etoh and aqueous extract of leaves and preliminary phytochemical tests to observe the present of active substance.

Materials and Methods

Leaves of *DurantaPlumieri*Jacq.Verbenaceae, were collected from YenanchaungTownship , during the flowering period.The plant parts were washed and dried under shady place for 15 days. After that, these were homogenized by blender to get powdered and stored in air tight containers for phytochemical tests and antimicrobial activities.

The solvent extracts were tested against six microorganisms by using agar well diffusion method.

Antimicrobial activity determination

Preliminary phytochemical analysis concerned with the present or absent ofsaponins, reducing sugar,α-amino acid,carbohydrate, phenolic compound, glycoside, tannis, Alkaloid , flavonoid and starch were investigated by the methods of British pharmacopeia (1968), Central Council for Research in Unani Medicine (1989) and Trease and Evans (2002).

Results

Scientific Name - *Duranta plumierJacq.*

Myanmar Name - Bogadawmyetkhan/siyopan

Family - Verbenaceae

Flowering period - Throuh out the year

Distribution - widely distributed in Myanmar .

Outstanding characters

Perennial spinescent erect shrubs up to 18 ft in height, with dropping branches. Leaves simple, opposite and decussate, blades ovate, gland-dotted beneath, exstipulate. Inflorescences axillary or terminal racemes. Flowers bisexual zygomorphic, 5 merous, bracteates, violet or white; sepals 5 united, puplish blue, corolla tubes slightly curved bilabiate, stamens free, didynamouns, petalostempnous, inserted, the anthers 2-celled, basifixed, yellow, ovary superior, ovoid, carpels 4, 8 locular due to false septum, one ovule in each locule on the axile placenta; style filiform, stigma capitates. Fruit fleshy, ovoid, orange-yellow. Pod leathery, strap-shaped, straight, flat, base attenuate, pubescent and beak a cute, hard seeds brown, oval, flat, glossy.

A

B

Figure (1). Habit of of*Durantaplumieri*Jacq.

A. C. Inflorescences
B. Fruits

Preliminary phytochemical examination of *Durantaplumieri*Jacq.Leaves

The preliminary phytochemical tests confirmed the present of saponins, reducing sugar, phenolic compound. glycoside, tannis and starch in the leaves of *Durantaplumieri*Jacq. The rest of amino acid, carbohydrate and flavonoid were absent in this leaves.The results of preliminary phytochemical tests are show in Table (1).

Table (1).Preliminary phytochemical examination of *Durantaplumieri*Jacq.leaves.

	Plant constituents	Extract	Test Reagent	Observaton	Result
1.	Saponins	H_2O	Dill water	Forthing	+ +
2.	ReductingSuger	Dill H_2O	Benedict's solution	Yellow ppt.	+ +
3.	α-aminoacid	H_2O	Ninhydrin Reagent	Pink sport	_
4.	Carbohydrate	H_2O	10%-α napthol+Conc	Red ring	_
5.	Phenolic compound	H_2O	K3Fe$(CN)_6$and $FeCl_3$	Deep blue ppt.	+ +
6.	Glycoside	H_2O	10%Lead acetate	White ppt.	+ +
7.	Tannis	H_2O	1% Gelatin	ppt.	+ +
8.	Alkaloid	10% Acetic acid +Etoh	1.Dragendroff's reagent 2.Maryer's reagent	Orange ppt. White ppt.	+ + + +

9.	Flavonoid	Methanol	Hcl/Mg burning	Pink colour	_
10.	Starch	H_2O	I_2 Solution	Blue Black	+ +

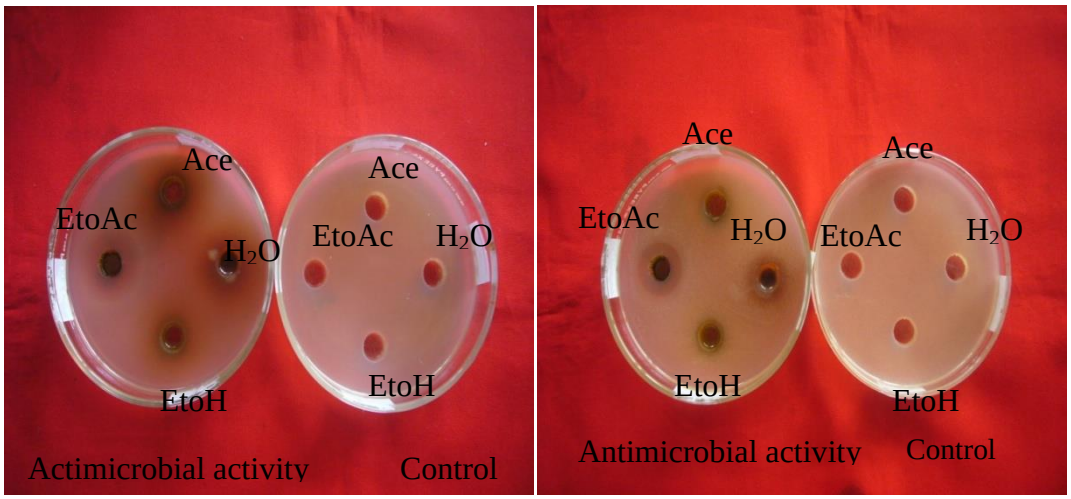
Screening for antibacterial activity

Antimicrobial activities were studied with 70% ethanol, ethylacetate, acetone and aqueous extracts agar- well diffusion method was used to determine the zone of inhibition of microbial growth at particular concentration of various extracts as shown in Figure (2) and Table (2).

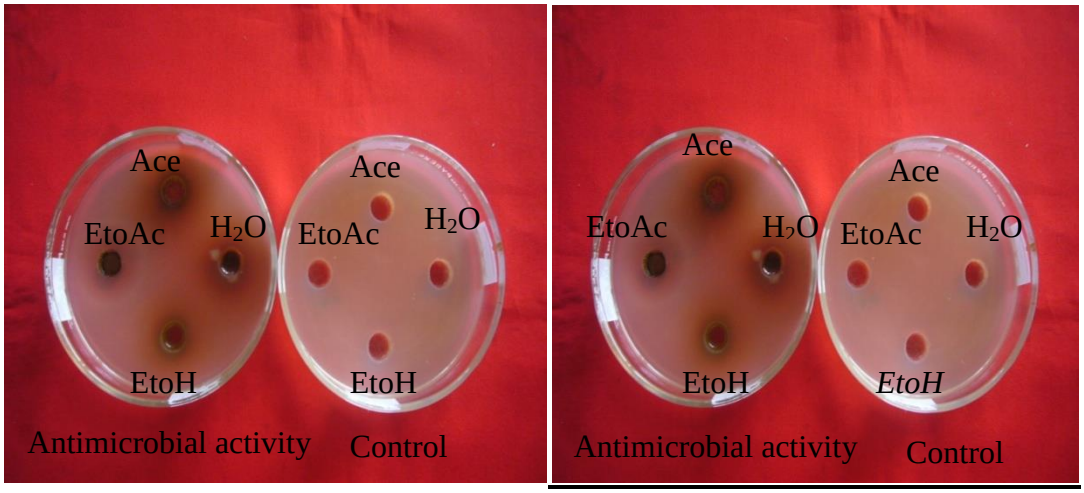
Table (2) Antimicrobial activity of different solvent extracts of dried leaves of *DurantaPlumieri*Jacq.

Extract	Organisms					
	Bacillus Subtilis	*Staphylococcus aureus*	*Pseudomonas aeruginosa*	*Bacillus Pumalis*	*Candida albican*	*Escherichia coli*
Acetone	-	-	-	17mm (++)	-	-
Etonc	20mm (+++)	23mm (+++)	23mm (+++)	28mm (+++)	15mm (++)	15mm (++)
70%Eth	13mm (+)	19mm (++)	26mm (+++)	16mm (++)	-	-
Water	13mm (+)	15mm (++)	20mm (+++)	14mm (+)	15mm (++)	-

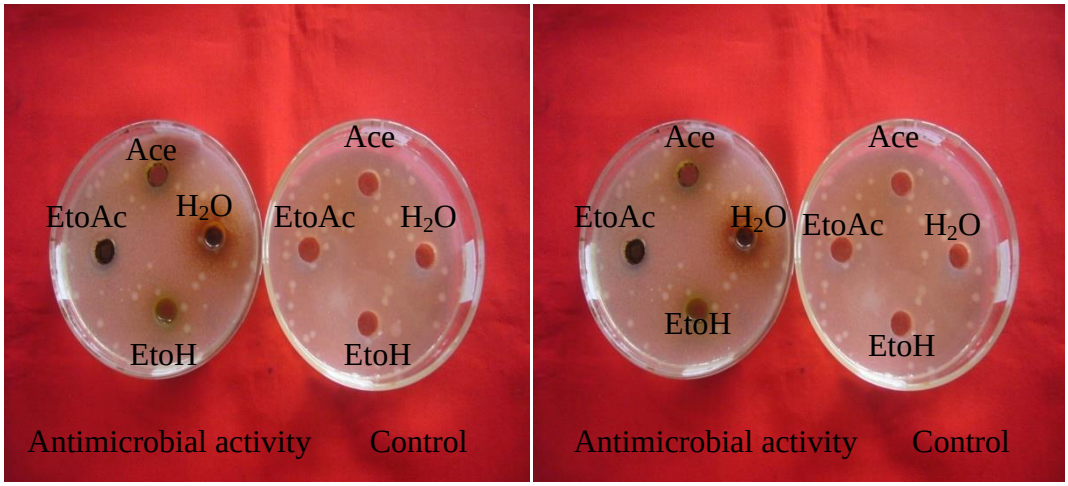
Agar-well- 10mm , 10mm-14mm (+), 15mm-19mm(++), 20mm above(+++)



Bacillus sublilis *Staphylococcusaureus*



PseudomonasaeruginosaBacillus pumilus



CandidaalbicanEscherichia coli

Figure (3). Antimicrobial activity of different solvent extracts against test Microorganism

Discussion and Conclusion

In the present investigation, the plant *DurantaPlumieri*Jacq.belong to the family Verbenaceae and known as Bagadawmyetkhon/siyopam in Myanmar name and grows throughout Myanmar. *Durantaplumieri*Jacq.are perennial spinescent erect shrubs. The leaves of *D.plumieri*Jacq.are simple, opposite and decussate, gland-dotted beneath, exstipulate. The inflorescences are axillary or terminal racemes. The flowers are violet or white, tubular companulate, corolla tubes slightly curved. The ovary of *D.plumieri*Jacq.has superior and axile placentation. These characters are in agreement with those of Hooker, 1894,Dassanayake, (1963), Flora of Hong Kong, (2009), Christophe, 2006 and Flora of Java 1965. The plant in this experiment was collected from Ye Nan ChaungTownships. The study was made for

identification of morphological details of this Plant *D.plumieri*Jacq.was chosen as the subject of research because it is used in Myanmar herbal medicines.

According to the literature, the leaves of *D. plumieri*Jacq.is used as antipyretic detergent, diuretic, insecticide, larvicide and stimulant. Macerated fruits, which even in dilution of 1:100 parts of water, is lethal to mosquito larvae.

Local people believed that *D.plumieri*Jacq.is used as medicine by eating fresh leaves so *D. plumieri*Jacq.emphasized in studying the antimicrobial activity in this research.

The antimicrobial properties of the studied plant *D.plumieri*Jacq.inhibited microorganisms such as *Bacillus sublilis, Staphylococcus aureus, Pseudomonas aeruginosa, Bacillus pumilus, Candida albican*and *Escherichia coli*. In this experiment, antimicrobial activities of different solvent showed that ethylacetetate, 70% ethanol extract and aqueous extracts were more effective than acetone extracts. According to the Muntha, *etal*. 2007, the extract was found to have antimicrobial activity. It exhibited antibacterial activity against all the organisms. Ethyl acetate extracts proved to be the best antimicrobial activity against *Bacillus pumilus* which causes eye infection, soft tissue infections and cutaneous infections. Ethanolic extracts and aqueous extract proved to be the best antimicrobial activity against *Pseudomonas aeruginosa* which causes Pneumonia,septic shock, urinary tract infection, gastrointestinal infection, skin and soft tissue infection. Based on the result of antimicrobial activity, *D.plumieri*Jacq.could be applied for the treatment on the diseases resulting from *Bacillus pumalis*and *Pseudomonas aeruginosa*. Therefore, ethyl acetate, 70% ethnol and aqueous extracts of the leaves of *D.plumieri*Jacq.could be useful as herbal medicine for the treatment of pneumonia, urinary tract infection, gastrointestinal infection, skin and soft tissue infection.

According to the phytochemical tests, reveled the present of saponins, reducing sugar, phenolic compound, glycoside, alkaloids, tannis and starch and absene of αaminoacid, carbohydrate and flavonoid of leaves of *D.plumieri*Jacq.This finding agree with Wall,*et al.*1952.

For the future research, the bioactivity of *D.plumieri*Jacq.for antioxidant activity antipyretic activity, diuretic activity insecticide and larvicide activity should be investigated. Moreover, *D.plmieri*Jacq.possess the medicinal value and then, the experiment on other bioactive compound should also be carried out.

Acknowledgements

I would like to express our gratitude Professor and Head,Dr. Tint Khine Aye, Department of Botany, Yenanchaung Degree collage for kindly allowing me to undertaken this research in the Department .

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