

# Evaluation of Antibacterial, Antifungal and Anthelmintic Activity of *Morinda citrifolia L.* (Noni)

Khuntia Tapas Kumar<sup>1\*</sup>, Panda D. S.<sup>2</sup>, Nanda U. N.<sup>3</sup>, Khuntia S.<sup>4</sup>

<sup>1\*</sup>Department of Pharmacology, KLR. Pharmacy College, Paloncha, A.P., India

<sup>2</sup>Department of Pharmaceutics, Institute of Pharmacy and Technology, Salipur,  
Orissa, India

<sup>3</sup>Department of Pharmaceutics, Seemanta Institute of Pharmaceutical sciences,  
Orissa, India

<sup>4</sup>College of Pharmaceutical Sciences, Puri, Orissa, India

\*Corres.author: tapaskhuntia\_mpharm@yahoo.com, \*Phone No: +91 9393798381

**ABSTRACT:** In the present study, the petroleum ether and alcoholic extract of *Morinda citrifolia L.* (Noni) leaves were subjected to preliminary screening for antimicrobial and anthelmintic activity. The alcoholic extract exhibited significant anti bacterial, antifungal activity, comparable to the standard drug tetracycline. The petroleum ether and alcoholic extract were evaluated for Anthelmintic activity on adult Indian earthworms, '*Pheretima posithuma*'. The alcoholic extract produced more significant Anthelmintic activity than petroleum ether extract and the activities are comparable with the reference drug Piperazine citrate.

**Keywords:** Antimicrobial, *Morinda citrifolia*, Anthelmintic, Tetracycline, Piperazine citrate.

## INTRODUCTION

Since the time immemorial, our traditional system of medicine and folklore claiming that medicinal plant as whole or their parts are being used in all types of skin diseases successfully including anti-bacterial and anti-fungal. Parasitoses have been of concern to the medical field for centuries and the helminthes still cause considerable problems for human beings and animals. The most of the medicinal preparation now a day available in the market are either not effective up to the mark or has developed resistance resulting in reoccurrence again. Plant derived drug serve as prototype to develop more effective and less toxic medicines. The plant *Morinda citrifolia L.* (Noni) (Rubiaceae) has been used in folk remedies by Polynesians, Indians for over 2000 years, and is reported to have a broad range of therapeutic effects, including antibacterial, antiviral, antifungal, antitumor, analgesic, hypotensive, anti-inflammatory, and immune enhancing effects. <sup>[1]</sup>

A survey of literature revealed that no methodical reports on anti bacterial, anti fungal and anthelmintic activity of various extracts of *Morinda citrifolia L.* (Noni) leaves are available. Therefore it was thought worthwhile to explore this indigenous plant for its activity against different microorganisms.

## MATERIALS AND METHODS

### Plant Material:

Leaves of *Morinda citrifolia L.* (Noni) were collected from the coconut gardens of Salipur, Orissa in the month of December. The plant was identified, authenticated and a voucher specimen was kept in the herbarium of Department of Pharmacognosy, Institute of Pharmacy and Technology, Salipur, Orissa.

### Extract Preparation:

The leaves were collected and washed thoroughly in water, chopped, air dried for a week at 35-40<sup>0</sup> C and pulverized in electric grinder. 150 gm. of the powder subjected to Soxhlet apparatus using solvents such as

petroleum ether and alcoholic extract. The solvent was then removed under reduced pressure, which obtained a greenish- black colored residue. The yield was 9.4% and 7.9% respectively. The prepared extracts were used for the antimicrobial and anthelmintic activity.

## EXPERIMENTAL DESIGN

### Anthelmintic Activity Study:

The Anthelmintic activity was done on adult Indian earth worm '*Pheretima posithuma*' due to its anatomical and physiological resemblance with the intestine round worm parasites of human beings. [2,3]

### **Study Protocol:**

Four groups of approximately equal size earthworms consisting of six earthworms in each group were used for the present study.

**Group-1** Control (normal saline)

**Group-2** Standard (Piperazine citrate- 10mg/ml)

**Group-3** Pet. ether extract of different concentration (10mg/ml, 50mg/ml, 100mg/ml)

**Group-4** Alcoholic extract of different concentration (10mg/ml, 50mg/ml, 100mg/ml).

Observations were made for the time taken to paralysis and death in individual worms. Paralysis was said to occur when the worms do not revive even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body color. [4, 5]

### **Anti microbial Study:**

#### **Micro Organisms:**

Three strains of E.Coli, Bacillus Subtilis, Staphylococcus aureus were used for assessing the anti microbial activity standard tetracycline (10µg/ml). Two fungal strains Asperigillus niger and Candida albicans were used for anti-fungal activity. The microorganisms were obtained from the Department of Pharmaceutical Microbiology, KLR. Pharmacy College, Paloncha, Andhrapradesh, India.

### **Study Protocol:**

Antimicrobial activity was determined by Disc Diffusion method. Muller Hinton and Saboured Dextrose Broth were used as medium for bacterial and fungal strains respectively. [6, 7] Positive control experiment was carried out under the similar condition by using tetracycline (10µg/ml).

The petridishes with the bacteria and fungal cultures were incubated at 37±2<sup>0</sup> C for 24 hrs and 27±2<sup>0</sup> C for 48 hrs respectively. The assessment of anti microbial activity was based on the measurement of diameter of inhibition zone formed. The experiment was repeated thrice and the results were taken as mean of three readings. [8, 9]

## RESULTS AND DISCUSSION

From the anthelmintic activity study, the alcoholic extract at a dose of 100mg/ml has significant anthelmintic activity where as petroleum ether showed moderate activity. (Table-1)

The results of antimicrobial activity of petroleum ether and alcoholic extracts of *Morinda citrifolia L.* (Noni) were studied and it was found that alcoholic extract of 10mg/ml produced potent antimicrobial activity as it shows more inhibitory zone as compared to other individual concentrations of petroleum ether. The activities are comparable with the reference drug Piperazine citrate. (Table-2)

## CONCLUSION

Though there are a number of antibacterial, anti-fungal and Anthelmintic drugs available in the market, they produce many side effects; hence to improve the status of therapy, various ailments of plant extracts like *Morinda citrifolia L.* (Noni) will be much useful. From the results obtained, it is clear that if a detailed research is carried out on the alcoholic extract of *Morinda citrifolia L.* (Noni), some useful drugs may develop for the treatment of bacterial, fungal and anthelmintic action.

**Table-1 Anthelmintic Activity of *Morinda citrifolia L.* (Noni) leaf extract.**

Group	Treatment	Con. (mg/ml)	Paralysis time (min.)	Death time (min.)
1 <sup>st</sup>	Control (Normal saline)	-	-	-
2 <sup>nd</sup>	Piperazine citrate	10	20.5±0.7	26.4±0.5
3 <sup>rd</sup>	Petroleum ether Extract	10	90.3±1.7	100±2.7
		50	70.2±1.5	90.5±1.6
		100	57.3±1.0	70.5±1.9
4 <sup>th</sup>	Alcoholic Extract	10	86.3±1.9	90.5±1.0
		50	67.8±1.5	80.3±2.0
		100	40.0±0.9	50.3±0.8

Table-2 Anti microbial activity of *Morinda citrifolia* L. (Noni) Report

Treatment		Concentration	Diameter of Zone of Inhibition (cm.)				
			Bacteria			Fungi	
			B. Subtilis	E. Coli	S. Aureus	C. Albicans	A. Niger
<i>M. citrifolia</i>	Pet. ether extract	5mg/ml	1.7	2.0	1.7	2.0	2.5
		10mg/ml	1.9	2.1	1.8	2.2	2.6
	Alcoholic extract	5mg/ml	1.9	2.1	1.8	2.0	2.7
		10mg/ml	2.0	2.4	2.1	2.5	2.9
Standard Tetracycline		10µg/ml	2.1	2.5	2.3	2.9	3.3

**ACKNOWLEDGEMENT**

The authors are thankful to the staff, K.L.R. Pharmacy College, Paloncha, A.P. and Institute of Pharmacy and Technology, Salipur, Orissa, for providing the necessary facilities and support to carry out this work.

**REFERENCES**

- [1] WANG Mian-Ying *et. al.*, *Morinda citrifolia* (Noni): A literature review and recent advances in Noni research. *Acta Pharmacol Sin.* 2002; 23:1127 – 1141
- [2] Vigar Z. *Atlas of Medical Parasitology*, 2<sup>nd</sup> Edn. Publishing House, Singapore, 1984; 216-218
- [3] Vidyarthi R.D., *A Test book of Zoology* 14<sup>th</sup> Edn., Chand and Co., New Delhi, 329-331.
- [4] Qureshi Md. Shamim *et. al.* Anthelmintic activity of *Smilax zeylanica* leaf. *Research J. of Pharmacognosy and Phytochemistry*, 2009; 1: 78-79.
- [5] Dwivedi S. *et. al.* Anthelmintic activity of alcoholic and aqueous extract of fruits of *Terminalia chebula*, *Ethno. Leaflets*, 12: 741-743.
- [6] Chakraborty G.S. *et al.* Anti microbial activity of *Chlorophytum borivillianum* leaves, *Indian Drugs*, 2009; 46: 579.
- [7] Trapti Rastogi *et. al.* Studies on Antimicrobial activity of *Boswellia serrata*, *Moringa oleifera* and *Vitex negundo*: A comparison. *Research J. of Pharmacognosy and Phyto chemistry*. 2009; 1: 75-77.
- [8] Sherad *et. al.* Phyto chemical Investigation and anti microbial and anthelmintic activity of *Solanum xanthocarpum*. *Adv. Pharmacol. Toxicol*, 2008; 9: 45-49.
- [9] S. Kumar Raja *et. al.* Anti bacterial activity of ethanolic extract of roots of *Caesalpinia pulcherrima*. *Adv. Pharmacol. Toxicol*, 2008; 9: 37-38.

\*\*\*\*\*