




INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

Published by Pharmascope Publications

Journal Home Page: www.pharmascope.org/ijrps

A comparative study on *mussaenda erythrophylla* leaves extract for larvicidal properties

Astalakshmi N^{*1}, Sundara Ganapathy R², Surendra Kumar M³¹Karpagam Academy of Higher Education, Karpagam University, Coimbatore.²Faculty of Pharmacy, Karpagam Academy of Higher Education, Karpagam University, Coimbatore.³Senghundur College of Pharmacy, Tiruchengode, Namakkal Dt.

Article History:	ABSTRACT	
Received on: 06.08.2018 Revised on: 17.12.2018 Accepted on: 19.12.2018	Medicinal plants serve humankind with its wide diversity of applications in various areas of disease and disorders. <i>Mussaenda erythrophylla</i> Schumach. & Thonn. (rubiaceae), is largely known plant for its ornamental properties throughout the southern parts of India. Mosquitoes, are found to be the major source for diseases such as dengue fever, yellow fever, malaria, etc., The present study aims at evaluating the larvicidal potential of Petroleum ether, chloroform, ethyl acetate and methanolic extracts of <i>Mussaenda erythrophylla</i> leaves at 100, 250, 500, 1000, 2000 µg/ml against third and fourth instar larvae (<i>Aedes aegypti</i>). The larvicidal potential was assessed for 24hrs at the various interval, and percentage mortality was noted. All four extracts found to possess poor larvicidal properties. <i>Mussaenda erythrophylla</i> Schumach. & Thonn. leaves extract is not a suitable crude drug of choice for larvicidal properties.	
Keywords:		
<i>Mussaenda erythrophylla</i> , Larvicidal, <i>Aedes aegypti</i> , Instar, Mortality, Methanol		

* Corresponding Author

Name: Astalakshmi N

Phone: +91- 8825707617

Email: skshravansk@gmail.com

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v10i1.1806>

Production and Hosted by

Pharmascope.org

© 2018 Pharmascope Publications. All rights reserved.

INTRODUCTION

Traditional systems of medicine have its history and serve the people for a wide diversity of diseases and disorders (Shylaja Gunasekaran *et al.*, 2015). They are found to be a rich source for the development of novel chemical entities for various ailments (Surendra Kumar *et al.*, 2011). Rubiaceae family is a rich source of medicinal plants with 500 genera, 5300 species (194 species of ornamental plants) within it (Astalakshmi and Sundara Ganapathy, 2017). *Mussaenda erythrophylla* Schumach. & Thonn. is an evergreen shrub with hairy leaves. The plant is well known for its ornamental

nature and used for leprosy, hepatotoxic, jaundice, cough, etc., (Chinna Eswaraiah, M. *et al.*, 2012).

One of the world's biggest health hazardous problems is mosquito-borne diseases viz., dengue fever, malaria, yellow fever, filariasis etc., (Surendra Kumar M and Kavimani S., 2014). Mosquitoes - *Aedes aegypti*, is the major carrier of dengue and hemorrhagic fever. These highly endemic diseases are believed to be affected in 100 countries and more than 2.5 billion people (Borah, R. *et al.*, 2010). Repetitive use of synthetic agents to control these tiny creatures leads to environmental and health hazards (Yang, Y.C. *et al.*, 2002). These problems lead to the development of a newer larvicidal drug with less or no hazards and also with commercial significance.

MATERIALS AND METHODS

Collection of plant material: The leaves of *Mussaenda erythrophylla* Schumach. & Thonn. was collected from in and outskirts of Tamil Nadu and the same was authenticated at Botanical Survey of India, Coimbatore, Tamil Nadu.

Preparation of extracts: The collected leaves were shade dried and coarsely powdered. The

Table 1: Evaluation of the larvicidal potential of Petroleum ether, chloroform, ethyl acetate and methanolic extracts of *Mussaenda erythrophylla* Schumach. & Thonn

Treatment	Concentration ($\mu\text{g/ml}$)	Percentage Mortality						
		0hr	1 st hr	2 nd hr	3 rd hr	6 th hr	12 th hr	24 th hr
Control	-	0	0	0	0	0	0	0
<i>Mussaenda</i>	100	0	0	0	0	0	0	0
<i>erythrophylla</i>	250	0	0	0	0	0	0	0
Leaves	500	0	0	0	0	0	0	0
Petroleum	1000	0	0	0	0	0	0	0
ether extract	2000	0	0	0	0	0	0	0
<i>Mussaenda</i>	100	0	0	0	0	0	0	0
<i>erythrophylla</i>	250	0	0	0	0	0	0	0
Leaves	500	0	0	0	0	0	0	0
chloroform	1000	0	0	0	0	0	0	0
extract	2000	0	0	0	0	0	0	0
<i>Mussaenda</i>	100	0	0	0	0	0	0	0
<i>erythrophylla</i>	250	0	0	0	0	0	0	0
Leaves	500	0	0	0	0	0	0	0
ethyl acetate	1000	0	0	0	0	0	0	0
extract	2000	0	0	0	0	10	15	15
<i>Mussaenda</i>	100	0	0	0	0	0	0	0
<i>erythrophylla</i>	250	0	0	0	0	05	05	10
Leaves	500	0	0	05	10	10	15	20
Methanolic	1000	0	0	10	15	20	25	25
extract	2000	0	10	15	20	20	25	25

powdered leaves were successively extracted using petroleum ether (60-80°), Chloroform, ethyl acetate and Methanol using hot continuous extraction process. The collected extracts were freed of solvents and used for the study.

Larvicidal assay

The larvicidal assay was done using third and fourth Instar larvae of *Aedes aegypti*. The study was carried out at 5 different test concentrations viz., 100, 250, 500, 1000, 2000 $\mu\text{g/ml}$ for each extract. 1 ml of the specified concentration of the extracts was added to water in a beaker, and final volume was made up to 250ml for all extract samples. 20 larvae per concentration were used for the study. The number of dead larvae at 0, 1st, 2nd, 3rd, 6th, 12th and 24th hours were recorded, and the percentage of mortality was calculated. A negative control group was maintained using only water. The study was performed in triplicate, and the average of the study is taken (Surendra Kumar, M. *et al.*, 2016; Sen-Sung chung *et al.*, 2009 and Lokesh, R., *et al.*, 2010).

RESULTS AND DISCUSSIONS

India is known to be a rich source of plants. Exploring these plants for their medicinal values remains till today at its base level. In the present study, an attempt has been made to explore one such plant *Mussaenda erythrophylla* Schumach. & Thonn. for its larvicidal properties. In the developing countries like India, one of the biggest threats for the

public is the tiny creature – mosquitoes. *Aedes aegypti* causes numerous health hazards for the people in the form of dengue fever, yellow fever, malaria, etc., These mosquitoes can be controlled through mosquito repellent, which causes mortality and kills them. Plants serve as a rich source for potential insecticide (Mordue(Luntz), A.J. and Blackwell, A., 1993). These plant-derived insecticides are found to be effective, less expensive, easily biodegradable and nontoxic products (Alkofahi, A. *et al.*, 1989). *Mussaenda erythrophylla* is a well-known member of the rubiaceae family, familiar for its ornamental value. The leaves of the plant were collected and successively extracted using solvents of increasing polarity such as viz., Petroleum ether (60-80°), Chloroform, ethyl acetate and methanol. The prepared extracts were evaluated for its larvicidal properties at 100, 250, 500, 1000, 2000 $\mu\text{g/ml}$ against third and fourth instar larvae of *Aedes aegypti*. The study period was 24 hours, and the percentage of mortality was calculated at various intervals. The evaluation clearly shows all the extracts exhibits poor larvicidal property. However, the methanolic extract was found to be little effect as compared to the other extracts but not up to a significant level.

CONCLUSIONS

It can be concluded that *Mussaenda erythrophylla* leaves extracts are the poor drug of choice for larvicidal properties.

REFERENCES

- Alkofahi, A., Rupprecht, J.K., Anderson, J.E., Mclaughlin, J.L., Mikolajczak, K.L., Scott, B.A. Search for new pesticides from higher plants. In: Amason, J.T., Philogene, BJR, Morand, P. (Eds.), Insecticides of plant origin. American Chemical Society, Washington, DC, 1989.
- Astalakshmi and Sundara Ganapathy. A comprehensive review of the genus: *Mussaenda*. International journal of research in pharmaceutical sciences, vol.8, no.4, 2017 pp.534 -541.
- Borah, R., Kalita, M.C., Kar, A. and Talukdar, A.K. Larvicidal efficacy of *Toddalia asiatica* (Linn.) Lam against two mosquito vectors *Aedes aegypti* and *Culex quinquefasciatus*, *African Journal of Biotechnology*, vol. 9, no.16, 2010 pp. 2527-2530.
- Chinna Eswaraiyah M., Elumalai A. and Manasa N. Pharmacognostical evaluation of *Mussaenda erythrophylla* Linn leaves. *Research Journal of Pharmacognosy and Phytochemistry*, vol. 4, no. 4, 2012 pp. 197-200.
- Lokesh, R., Leonard Barnabas, E., Madhuri, P., Saurav, K. and Sundar, K. Larvicidal activity of *Trigonella foenum* and *Nerium oleander* leaves against mosquito larvae found in Vellore city, India. *Current Research Journal of Biological Sciences*, vol. 2, no.3, 2010, pp.154-160.
- Mordue(Luntz), A.J. and Blackwell, A. Azadirachtin an Update. *Journal of insect physiology*, vol. 39, 1993 pp. 903-924.
- Sen-Sung chung, Chin-Gi Huang, Ying-Ju Chen, Jane-Jane Yu, Wei -June Chen and Shang-Tzen Chang. Chemical compositions and larvicidal activities of leaf essential oils from two eucalyptus species. *Bioresource technology*, vol. 100, 2009 pp. 452-456.
- Shylaja Gunasekaran, Shoba Sundaramoorthy, Mythili Sathiavelu and Sathiavelu Arunachalam. The genus *Mussaenda*: A phytopharmacological review. *Journal of Chemical and Pharmaceutical Research*, vol. 7, no. 7, 2015 pp.1037-1042.
- Surendra Kumar, M and Kavimani, S. Studies on *Millingtonia hortensis* Linn.F Stem Bark for Larvicidal Properties. *International Journal of PharmTech Research*, vol. 6, no. 7, 2014 pp.2051-2053.
- Surendra Kumar, M., Astalakshmi, N., Anagha, CM., Aparna, P., Lulushad, N., Vijisha, C.P. and Babu, G. Evaluation of *Moringa oleifera* Lam. leaves, flowers and fruits aqueous extract for the larvicidal property. *World journal of pharmacy and pharmaceutical sciences*, vol. 5, no. 4, 2016 pp. 1892-1896.
- Surendra Kumar, M., Rajeswari and Astalakshmi, N. Evaluation of antimicrobial activities of *Aristolochia indica* (Linn). *International journal of pharmacy and pharmaceutical sciences*, vol. 3, no. 4, 2011 pp. 271 - 272.
- Yang, Y.C., Lee, S.G., Lee, H.K., Kim, M.K., Lee, S.H. and Lee, H.S. A piperidine amide extracted from *Piper longum* L. fruit shows activity against *Aedes aegypti* mosquito larvae. *Journal of Agricultural and Food Chemistry*, vol. 50, 2002 pp. 3765-3767.