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Evaluation of the mosquito larvicidal potential and comparative assessment of the juice of *Lantana camara* Linn and *Ocimum gratissimum* Linn

Mukesh Sharma [a], Amit Alexander [b], Kartik T. Nakhate [c], Kapil Kumar Nagwanshi [d], Ajazuddin [e,*]

[a] Department of Pharmacognosy, Rungta College of Pharmaceutical Sciences and Research, Kohka-Kurud Road, Bhilai, 490024, Chhattisgarh, India
[b] Department of Pharmaceutics, National Institute of Pharmaceutical Education and Research (NIPER), Guwahati, 781101, Assam, India
[c] Department of Pharmacology, Shri Vile Parle Kelavani Mandal's Institute of Pharmacy, Dhule, 424001, Maharashtra, India
[d] SoS E&T, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, 495009, Chhattisgarh, India
[e] Department of Pharmaceutics, Rungta College of Pharmaceutical Sciences and Research, Kohka-Kurud Road, Bhilai, 490024, Chhattisgarh, India

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ABSTRACT

In the present study, the larvicidal efficacy of the juices of the weeds *Lantana camara* Linn (*L. camara*) and *Ocimum gratissimum* Linn (*O. gratissimum*) was evaluated against the larvae of the malaria vectors *Aedes aegypti, Anopheles subpictus* and *Culex quinquefasciatus*. The freshly prepared juices of leaves were prepared by grinding them and diluting them at concentrations of 25, 50, 75, and 100 ppm. Twenty larvae of each species were introduced in different sterile Petri dishes in aqueous media under a controlled environment for the assessment of biological activity. The larvicidal activity of both juices was evaluated at 6, 12 and 24 h post-exposure time points by observing the movement of each larva. The obtained data were subjected to probit analysis to determine the lethal concentrations that kill 50% and 90% (LC50 and LC90) of the treated larvae. The results revealed a noticeable larvicidal activity following 24 h of exposure. The juice of *L. camara* leaves exhibited an LC50 range of 47.47–52.06 ppm and an LC90 range of 104.33–106.70 ppm. Moreover, for the juice of *O. gratissimum* leaves, the LC50 range was 42.94–44.91 ppm and the LC90 range was 105.11–108.66 ppm. Taken together, the results indicate that the juices of *L. camara* and *O. gratissimum* leaves may be useful as effective, economical and eco-friendly larvicidal agents. However, additional studies are needed to explore the bioactive components of the weeds that exhibit larvicidal activity along with their mode of action.

1. Introduction

Malaria and dengue are accountable for millions of deaths every year across the globe especially in tropical countries (Maia and Moore, 2011). The mosquito species like *Aedes* (*Ae.*), *Anopheles* (*An.*), and *Culex* (*Cx.*) serve as the leading vectors in the propagation of these diseases (Das et al., 2003). Although several measures like liquid vaporizers and smoke provisions have been established for the prevention of mosquito-borne illnesses, the outcomes are not satisfactory (Sharma et al., 2021). The use of chemical-based larvicidal agents have been resulting in the development of resistance in larvae. Moreover, environmental hazards are the major drawbacks associated with their use (Ali et al., 2014; Chokechaijaroenporn et al., 1994; Mondal et al., 2014; Sumayyah et al., 2016). Many researchers suggest the development of larvicidal strategies that do not produce hazardous effects on human health (Namsa et al., 2011). New mosquito repellent and larvicidal agents, particularly herbal-based, are therefore urgently required as safe, economical and eco-friendly alternatives (Sharma et al., 2021; Rajasekaran and Duraikannan, 2012). Moreover, herbal-based agents have well-proven therapeutic values (Nakhate et al., 2018, 2022; Kalita et al., 2012; Imosemi, 2020; Khichariya et al., 2022; Kamdi et al., 2021; Ajazuddin, 2010).

The attention paid to plant-based products has been expanded, and over 2000 plant species that exhibit pesticide capabilities have already been discovered (Piplani et al., 2019). There is an ever-increasing demand for plant-based insecticides such as plant juice or essential oils as they are non-toxic, readily available at reasonable rates, biodegradable and demonstrate unique activities against various species of vector mosquitoes (Dhanasekaran and Thangaraj, 2014). Furthermore, unlike traditional commercial insecticides based on a single active ingredient,

* Corresponding author. Department of Pharmaceutics, Rungta College of Pharmaceutical Sciences and Research, Kohka-Kurud Road, Bhilai, 490024, Chhattisgarh, India.
E-mail address: write2ajaz@gmail.com (Ajazuddin).

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