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EVALUATION OF LARVICIDAL ACTIVITY OF *Caralluma indica* STEM EXTRACT

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ABSTRACT

Nowadays pharmacology researcher plants extract were used, they are a rich source of phytochemicals and they are used for the treatment of several biological activity, they are effectiveness, low toxicity, easy available and eco-friendly. In the aim of present study depends on bioactive compounds were screening and evaluation of Larvicidal activity using *Caralluma indica* stem hydroalcoholic extract. In CISHAE was presence of Tannin, Flavonoids, Steroids, Terpenoids, Alkaloids, Anthroquinone, Polyphenol and Coumarin while vitamin A, C and E. Larvicidal activity were based on concentration of *Caralluma indica* SHAE depended R^2 = 0.8769. *Caralluma indica* SHAE was rich sources of phytochemicals like phenolic and vitamins. They are concluded strong larvicidal active properties were plausibly due to the rich phytochemical contents. Overall *Caralluma indica* SHAE eco-friendly approach that may replace the chemical pesticide.

Keywords: *Caralluma indica*, Larvicidal activity, Phenolic compound, Eco-friendly approach.

INTRODUCTION

Plants are the most important source for food and medicine. Herbal medicines are used for the treatment of many infected diseases throughout ancient time of human history. Phytochemicals are non-nutritive components present in a plant that exert protective and disease/infection-preventing effects (Surh, 2003). Mosquitoes transmit mosquito-borne diseases between the animals and humans (Debboun *et al.*, 2020). The vector-borne diseases account for more than 17% of all infectious diseases that causing more than 700000 deaths annually, they can be caused by parasites, bacteria or viruses, Aedes mosquito vector that disease caused by Chikungunya, Dengue, Rift Valley fever, Yellow Fever and Zika they are viral infections (WHO, 2020). In the keep view bioactive compound screening and larvicidal activity of *Caralluma indica* stem hydroalcoholic extract (CISHAE) against 4th instar *Aedes* spp. mosquito's larvae.

Plate 1: *C. indica* Plant material collection

MATERIALS AND METHODS

Plant material collection and hydroalcoholic extraction

The whole plant of *Caralluma indica* were collected from Kathattipatti (Palaiyapatti north), Thanjavur district, Tamil Nadu, India. *Caralluma indica* plant stem powder was extracted and add with hydroalcoholic extract (70% ethanol) for 24 hours, the extract was concentrated and semi-solid extract was obtained after complete elimination of solvent. The obtained CISHAE was kept in the refrigerator for further analysis.

Phytochemical screening and Larvicidal Bioassay

Chemical tests were carried out on the hydroalcoholic extract using standard procedures to identify the constituents as described by Sofowara (1993), Trease and Evans (1989) and Harborne (1973, 1984). Qualitative analysis of Vitamins followed by methods (Pearson, 1976). Larvicidal bioassays was performed following the standard guidelines on larval susceptibility test methods (WHO, 2005). The bioassays were carried out using 20 early 4th instar *Aedes* spp. mosquitoes larvae (homogeneous population) each concentration (20 to 100 ppm) of *Caralluma indica* stem hydroalcoholic extract. Data analyzed by SPSS ver. 20, Regression equation and r^2 value was calculated by log. Concentration vs % of mortality, LCL: 95% of Lower Confidence Limits, UCL: 95% of Upper Confidence Limits. Since the significance level is $P > 0.05$.

RESULTS AND DISCUSSION

Phytochemicals are compounds found in plant kingdom that occur naturally in plants as secondary metabolites. In keep view *Caralluma indica* stem hydroalcoholic extract bioactive compound screening and evaluation of larvicidal activity were carried out.

The genus *Caralluma* More than 260 species (Family Apocynaceae) are distributed in tropical Asia and Mediterranean regions of the globe. Many species of *Caralluma* are commonly used as traditional food and medicine for the treatment of rheumatism, diabetes, leprosy, paralysis, and inflammation and have antimalarial, antitrypanosomal, anti-ulcer, antioxidant, antinociceptive, and antiproliferative activities (Harish *et al.*, 2012). The species *C. indica* have been used as food. Length is 12-18 cm. Stems fleshy, irregularly branched. Leaves are small and Flowering November-January, Flowers terminal in umbellate cymes, usually 5-8 flowered; hairs present all over the corolla except tip (shodhganga. inflibnet.ac.in/bitstrea). Habitat - Dry forests and discontinuous population in open scrub area of waste lands scrub jungles. Distribution - Tamil Nadu, Andhra Pradesh and Karnataka (Plate 1).

In CISHAE was presence of Tannin, Flavonoids, Steroids, Terpenoids, Alkaloids, Anthroquinone, Polyphenol and Coumarin while vitamins are present in vitamin A, C and E. Overall CISHAE was rich in phenolic based phytochemical were present like flavonoids, Tannin, Coumarin.

Table 1: Qualitative analysis of phytochemicals in *Caralluma indica* stem hydroalcoholic extract

***Caralluma indica* SHAE**	**Results**
Secondary metabolites	
Tannin	++
Flavonoids	++
Steroids	+
Terpenoids	+
Alkaloids	+
Anthroquinone	+
Polyphenol	++
Coumarin	++
Vitamins	
Vitamin A	+
Vitamin C	+
Vitamin D	-
Vitamin E	+

(+) Presence, (++) High concentration, (-) Absence

Phytochemicals have strong bioactive potential and of great interest due to their beneficial effects on health of human beings and they give health benefits to the consumers (Cieslik *et al.*, 2006). Phenolics exhibit several beneficial properties and its antioxidant properties are important in determining their role as protecting agents against free radical mediated disease. Flavonoids are the largest group of plant phenols and also the most studied one (Dai and Mumper, 2010). Flavonoids have gained recent attention because of their broad biological and pharmacological activities. The flavonoids have been reported to exert multiple biological properties, but the best-described property of almost every group of flavonoids have the capacity to act as powerful antioxidants (Teiten *et. al.*, 2013).

Larvicidal activity of *Caralluma indica* SHAE against *Aedes* spp. mosquitoes larvae

Vectors are living organisms that can transmit infectious pathogens between the animals. Mosquitoes were transmit diseases causing millions of human deaths in every year, plant extract was new eco-friendly approach that may replace the chemical drug (Danga *et al.*, 2014). In present study carried out *Caralluma indica* SHAE was evaluated on Aedes mosquito's 4th instar larvicidal activity was represented in table 2. CISHE larvicidal activity was directly proposal to concentration dose dependent R^2 = 0.8769 strong relationship to CISHAE concentration vs % of Mortality (Figure 1). Ben Nasr et al. (2021) have a leaves of *Mercurialis annua* extract was larvicidal properties concluded. Similarly *Caralluma indica* SHAE their environmental impact, CISHAE was LC_{50} = 53.22 (65.22 - 43.01) ppm.

Table 2: Larvicidal activity of 24 hours exposed *Caralluma indica* SHAE against *Aedes* spp. mosquitoes 4th instar larvae

Concentrations (ppm)	Total exposed	% of Mortality	Probits
Control	20	Nil	Nil
20	20	15	3.96
40	20	25	4.33
60	20	45	4.87
80	20	75	5.67
100	20	90	6.28
Lethal concentration			
LC_{50} (ppm)	**95% Confidence Limits (UCL – LCL) ppm**		**R^2**
53.22	65.22 - 43.01		0.8769
Chi-Square Tests			
Chi-Square	**Df**		**Sig.**
4.177	3		0.243

Significance level is greater than 0.05, no heterogeneity factor is used in the calculation of confidence limits

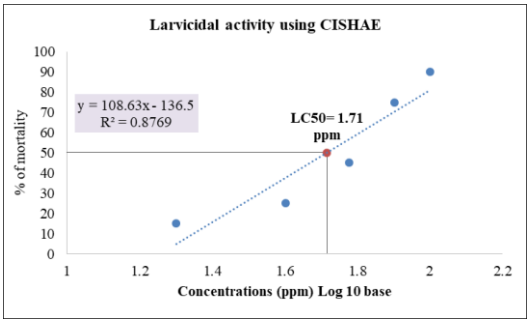

Figure 1: Graphically representation of Larvicidal activity using CISHAE

CONCLUSION

Caralluma indica SHAE was rich sources of phytochemicals like phenolic and vitamins. They are concluded strong larvicidal active properties were plausibly due to the rich plant secondary metabolites. Overall *Caralluma indica* SHAE eco-friendly approach that may replace the chemical pesticide.

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