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Use of Cow urine and Cow urine distillate as larvicidal agents - An approach for mosquito control

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ABSTRACT

Mosquitoes constitute a major public health menace, serves as a vector for transmitting diseases to humans. In the present study, the larvicidal effect of different concentrations of Cow urine (CU) and Cow urine distillate (CUD) were tested against *Culex quinquefasciatus* larvae up to three days. All the tested concentrations showed larval mortality. Larval mortality was 100% within 24 hours in case of 15% Cow urine and 10% and 15% of Cow urine distillate. In case of 5% CUD, complete larval mortality was observed in second day. About 95% of mortality was observed in case on 5% CU on 3rd day. It was found that CUD is more effective in causing larval mortality than CU and the larvicidal activity was dose dependent. The larvicidal activity could be due to the active inhibitory principles present in CU and CUD. It is suggested that the CU and CUD possess larvicidal properties that could be developed and used as natural insecticides for mosquito control.

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KEYWORDS

Larvicidal activity;
Cow urine;
Cow urine distillate;
Culex quinquefasciatus;
Mosquito larvae.

INTRODUCTION

Mosquitoes constitute a major public health menace. Several mosquito species belonging to genera Anopheles, Culex and Aedes are vectors for the pathogens of various diseases like malaria, filariasis, Japanese encephalitis, dengue and dengue haemorrhagic fever, yellow fever and chikungunya^[1]. One of the approaches to prevent mosquito borne disease is by killing mosquito at larval stage. The current mosquito control approach is based on synthetic insecticides but they have created many problems like insecticide resistance,

pollution, toxic side effect on human beings^[2,3]. This has necessitated the need for a research and development of environmentally safe, biodegradable indigenous method for vector control. Right from ancient period, various products of cow have been employed in medicine. Cow urine enhances the immunocompetence and improves general health^[4,5]. Cow urine and its derivatives possess many potent biological activities. Cow urine has been shown to possess antifungal activity in terms of reduction in vegetative growth of test fungi^[6]. The effect of cow urine on fungal spore germination has been studied^[7]. Cow urine distillate has shown dose depen-

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dent antifungal activity against fungi causing opportunistic infections^[8]. The efficacy of cow dung and cow urine separately and in combination in the control of root-knot nematode in tomato exhibited potent nematicidal activity^[9]. The antagonistic effects of kamadhenu ark against the cadmium toxicity in liver of *Mus musculus* was studied^[10]. Hepatoprotective activity of Panchagavya Ghrita against carbon tetrachloride induced hepatotoxicity in albino rats was studied^[11]. The antigenotoxic and antioxidant properties of cow's urine distillate and redistillate were studied in vitro^[5]. The antitoxic and bioenhancing role of *Kamdhenu Ark* (cow's urine distillate) in fertility rate of male mice affected by cadmium chloride toxicity was studied^[12]. The results of nematicidal activity of Cow urine and Cow urine distillate showed a dose dependent activity in terms of causing paralysis and death of worms^[13]. In the present study, we tested the effectiveness of different concentrations of Cow urine and Cow urine distillate as naturally available and eco-friendly larvicidal agents against *Culex quinquefasciatus* larvae.

MATERIALS AND METHODS

Collection of Cow urine and preparation of Cow urine distillate

Urine was collected in a clean sterile container from the local variety called *Malnad Gidda*, an indigenous variety of cow. The urine was brought to the laboratory without making delay and was subjected to filtration using Whatman filter paper. Cow urine distillate was prepared by subjecting the filtered cow urine to distillation process. The cow urine, taken in a round bottom flask, was kept on a heating mantle. The flask was connected to water cooled condenser in one end and the other end of the condenser was attached to a beaker which is inserted into a container for collecting the distillate^[14]. The distillate was collected in a clean and sterile container. The cow urine and the distillate were used in various concentrations namely 5, 10 and 15% to determine larvicidal potency.

Larvicidal activity

Larvae of *Culex quinquefasciatus* mosquito were collected from water stagnated area, and identified in the Dept. of Entomology, UAS, Shivamogga,

Karnataka, India. The larvae were maintained under suitable temperature (27°C) and humidity. Twenty larvae were placed in each of the sterile and labeled beakers containing 100 ml of water containing different concentrations of Cow urine and Cow urine distillates (5, 10 and 15%). A control was kept without adding cow urine and cow urine distillate. After adding the larvae, the beakers were kept in the growth room maintained at room temperature. The larvicidal effects of the various dilutions of Cow urine and Cow urine distillate were determined by counting the number of dead larvae on each day for up to three days. Each test was repeated thrice, the percentage of larval mortality for each concentration was calculated^[15].

RESULTS AND DISCUSSION

TABLE 1 : Larvicidal effect of various concentrations of CU and CUD

Treatment	Concentration (in %)	Mortality of larvae (in %)		
		1 st day	2 nd day	3 rd day
Cow urine	5	20	60	95
	10	40	100	-
	15	100	-	-
Cow urine distillate	5	50	100	-
	10	100	-	-
	15	100	-	-
Control		-	-	-

The larvicidal potential of CU and CUD is depicted in TABLE 1. Cow urine distillate at concentrations namely 10% and 15% caused 100% larval motility in 24 hours. 5% CUD caused complete motility on 2nd day. Cow urine at concentration 15% caused 100% mortality in 24 hours while 10% CU has shown total mortality on 2nd day. Cow urine at 5% concentration showed only 95% mortality on 3rd day. From the results, it is clear that CUD is more potent in causing mortality of larvae than CU and the activity is dose dependent. The larvicidal activity of CU and CUD is possibly due to the presence of chemical constituents present.

CONCLUSION

Search for natural insecticides, which do not have any ill effects on the non-target population and are eas-

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ily degradable, remains to be one of the top priority issues for the developing countries. The present investigation has shown the potency of CU and CUD against mosquito larvae. Thus, Cow urine and its distillate could be used as cheaper, natural and eco-friendly insecticide and could be used as an alternative to chemical insecticides.

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