Larvicidal and insecticidal effect of *Cymbopogon citratus* (Lemongrass) on Anopholes mosquitoes in Sokoto State, Nigeria

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**ABSTRACT**

The efficiency of lemongrass extract was tested on Anopheles mosquito and its larvae. The oil was extracted using petroleum ether and soxhlet apparatus. Three different concentration of the oil viz: 10ml, 5ml and 1ml were injected on the inner wall of the set of beakers prepared for the experiment, each containing twenty adult mosquitoes or the mosquitoes larvae. The result indicated that within nineteen minute the larvae and adult mosquitoes died. These indicate that Lemongrass can serve as an insect repellent in order to minimize disease transmission by vector such as mosquitoes.

**Keywords:** Lemongrass (*Cymbopogon citratus*), insecticidal, larvaceidal potential.

**INTRODUCTION**

*Cymbopogon citratus* (Lemongrass) is native to tropical regions and grows especially around South Asia (Malaysia, Sri Lanka, Indonesia and India). It is a fast growing perennial that grow in clusters having a globular stem that eventually become leaf blade [1]. When the leaf of the herb is compressed it releases the aroma of lemon, the major chemical ingredient found in all varieties of lemongrass oil [2]. It is a resourceful herb, aromatic, insect repellent especially mosquitoes [3], decorative and of wide medicinal application. The grass has been traditionally used as food ingredient in cosmetics and as folk medicine in several regions of the world [4].

The studies aims and objectives were to assess the larvicidal and insecticidal potential of *C. citratus*.

**MATERIALS AND METHODS**

**Study Area**

The study was conducted in the departments of Biological Sciences and Biochemistry of the Usmanu Danfodiyo University, Sokoto.

**Collection of Samples**

**Grass species**-Samples of lemongrass were obtained from biological science garden of Usmanu Danfodiyo University, Sokoto. The species was authenticated by comparison with preserved specimen in the University herbarium, Sokoto.

**Mosquito and its larvae**-Anopheles mosquito and its larvae were bred in the Biological garden, Department of Biological Sciences, Usmanu Danfodiyo University, Sokoto, with the use of black plastic buckets (one third (1/3) filled with tap water). The containers were put in a dark corner and left for two weeks. After which mosquito larvae were collected in glass beakers, each beaker containing a small piece of fresh watermelon was covered with a muslin cloth using rubber band. Identification of the Anopheles species was authenticated by comparison with preserved specimen in the Entomology Laboratory of the University.
Drying and Pulverization of Grass Sample
The grass samples were sun dried in March, 2010 in the Biological garden. The sample was then pulverized into a fine powder using mortar and pestle. The powder was sieved using sieve and kept in a dried polyethene bag.

Extraction of oil
Soxlet extraction method was employed for the extraction of oil from the grass sample forty five grams of dried grass powder was weighed and one hundred miles of petroleum ether was used.

Application of the Grass Oil Extracts on Mosquitoes and Mosquito Larvae.
Set Up for the Application of Extract
Fifteen beakers, each containing twenty mosquitoes, were used to test larvaecidal potential of lemongrass oils. Similarly, fifteen beakers each containing twenty adult mosquitoes were used to test insecticidal activities of the extracted oil from the grass species.

Larvaecidal Activities of lemongrass
Fifteen beakers containing the larvae were divided into three sets of five beakers each. The beakers were labeled as a, b, c, d, and e. Three different quantity of the lemongrass oil, viz. 10ml, 5ml, and 1m were carefully introduced into the beakers by injecting the content on the wall of the beakers a, b, and c respectively. The fourth and fifth beaker served as the positive and negative control. In positive control insecticide was used while in negative control nothing was introduced.

Insecticidal Activities of lemongrass
Fifteen beakers containing anopheles mosquitoes were also grouped as that of the larvaecidal activity above. The same procedure was done for the mosquitoes too.

RESULTS

Effect of the Oil on Mosquito and Its Larvae
The potency of the oil was tested on the mosquitoes and its larvae. The mortality rate was noted at various time intervals in different concentrations of the oil samples which showed hundred per cent efficiency. The results are presented in tables 1 and 2 where 3 and 4 are the positive control of adult mosquito and mosquito larvae.

<table>
<thead>
<tr>
<th>Conc.(oil : water)</th>
<th>Time(minutes)</th>
<th>Total</th>
<th>%</th>
<th>X</th>
<th>S</th>
<th>S.E±</th>
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<td>100</td>
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</table>

<table>
<thead>
<tr>
<th>Conc.(oil: water) (ml)</th>
<th>Time(minutes)</th>
<th>Total</th>
<th>%</th>
<th>X</th>
<th>S²</th>
<th>S(S.D)</th>
<th>S.E±</th>
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<tbody>
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<td>100</td>
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Table 3: Mortality rate of mosquito larvae treated with different concentration of insecticides (wonder 1000 EC)

<table>
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<tr>
<th>Conc.(oil:water) (ml)</th>
<th>Time(minutes)</th>
<th>Total %</th>
<th>Mean</th>
<th>S(S.D)</th>
<th>S.E(±)</th>
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<td>15.10</td>
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<td>00</td>
<td>0.00</td>
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DISCUSSION

The larvicidal and insecticidal effect of the oil extract of *C. citratus* thus shows that it is highly effective having hundred percent mortality rate efficiency. The time taken for the mosquitoes to die decreases by increasing the amount of oil extract; this indicates that the higher the amount of extract the faster the mortality rate which is in line with [5]. The grass proved to be active, that within nineteen minutes of application all the larvae and mosquito were dead. Compared to previous work done shows that *Cymbopogon citratus* and *Ageratum conyzoides* against *Ae. aegypti* have achieved 100% mortality at 120, 200 and 300 mg/L concentrations respectively[6]. The biological activity of this plant extracts might be due to various compounds, including phenolic, flavonoids, saponins and alkaloids existing in plant. These compounds may jointly or independently contribute to the larvicidal activity against both species of mosquitoes [7]. However, when comp the efficiency of the camelgrass on anopheles mosquitoes indicated that with Moreover, a research conducted in Sokoto by [8] on neem seeds, bark and leaves extract having almost the same percentage with what was obtained in this research. However, decreasing the amount of the oil extract of neem seed reduces the mortality to 98 and 83% respectively after twelve hours. If such a time could take for the mosquito larvae to die, it is advisable to use a faster and more effective substitute.

CONCLUSION

Lemongrass is a safe and natural insect repellants that is just as effective as the commercial chemical product.

Recommendations

1. To popularize the economic important of this grass in Sokoto and people should be trained on the cultivation method so that mosquito breeding could be stop.
2. There is need for further research to determine the active chemical constituent responsible for the death of mosquito.

REFERENCES


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