

Original Research Article

Effect of Musa Paradisiaca Peels Extract in Mosquitoes Trapping

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Received: 23.05.2024

Accepted: 29.06.2024

Published: 04.07.2024

Journal homepage:<https://www.easpublisher.com>**Quick Response Code**

Abstract: This study evaluate the effectiveness of Musa Paradisiaca Peels extract in the trapping of mosquitoes. The objective was to apply Musa Paradisiaca Peels extract as a way of controlling mosquito's infestation that cause malaria among study population in Otuogidi community in Ogbia, Bayelsa state. The experimental design adopted for this study was five (5) samples (A, B, C, D and E) of small basins were collected with different concentration of Musa Paradisiaca Peels extract (4ml, 6ml, 8ml, 10ml and control variables) in different locations within Otuogidi community. The study took five (5) days for the examination, each day with different results. Data was analyzed using ANOVA and presented in frequency distribution tables. The results obtained from the study within the periods (5) days are as follows: 4ml was able to trapped 10 mosquitoes, 6ml trapped 15 mosquitoes, 8ml trapped 18 mosquitoes and 10ml trapped 25 mosquitoes compared with the control that trapped none. According to results obtained, it was concluded that, Musa Paradisiaca has lethal properties capable of trapping mosquitoes at increased dosages. Therefore, we recommend that individuals and communities should adopt the simple method of Musa Paradisiaca to trap mosquitoes as a simple way of curbing the morbidity and mortality death rate cause by malaria parasites in Bayelsa state.

Keywords: Mosquitoes, Musa Paradisiaca, Trapping, Peels, Plantain.

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INTRODUCTION

Mosquitoes are community insect found in our environment most especially during the wet season in night hours. Mosquitoes depend on human and animal blood and they also feed on plants fruits juice including nectars for survival. Mostly the female anopheles mosquitoes feed on human blood for nutrients to produce eggs (Freudenrich and Craig, 2013). The different major groups of mosquitoes capable of transmitting disease in Nigeria include the Aedes, Culex, and female anopheles. There are about 45 species of mosquitoes estimate as vectors or carries of malaria and filariasis (Park, 2007). According to Christopher (2001) the highly distributed vectors of human malaria in Africa are Anopheles Gambiae, A-melas, A- Arabiensis, A- Funestus, A- menis, A- nili, etc. Mosquito related diseases transmitted to humans and animals through their tormenting bites includes malaria, dengue hemorrhagic fever, Japanese encephalitis, yellow fever and filariasis.

Musa Paradisiaca and M- acuminate are species of plantain that belong to the family Musaceae. They are starch rich when unripe and when ripped the starch fruit turns into simple sugar (Sucrose, Glucose and Fructose). M- Paradisiaca is a source of starchy staple foods for millions of people in Nigeria and the unripe M-Paradisiaca has been documented as hypoglycemic plant, and it has been noted for its low sugar, as such used in the management of diabetic compliment (Egbebi and Bademosi, 2011). According to Sharma *et al*, (2007) M-Paradisiaca is an herbaceous flowering plant to the family of Musaceae and is a hybrid between M-Acuminata and M-Paradisiaca belong to the genus Musa, mainly grown in the tropical and subtropical countries like the Philippines. It is widely used all over the world for fo9lkloric, edibility, clothing and medicinal purposes as well as for its nutritional values rich in calcium, vitamins A, B₁, B₂, B₃, B₆, C and minerals like potassium and phosphorus.

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There are various constituents of M-Paradisiaca peels extract such as potassium, nitrogen, sodium, calcium, iron, aluminum, magnesium, phosphorus manganese, zinc, copper, and water content. These are used in different form such as afro feeds for animal in the tropics. The unripe fruit of M-Paradisiaca and M-Sapientum is traditionally used to control diarrhea, dysentery, intestinal lesions in ulcerative colitis, diabetes in sprue, uremia gout, hypotension, cardiac disease etc (Ghani, 2003; Khare, 2007). M-Sapientum is also used in the treatment of excess flow of menstruation (Partha, 2007). The mosquitoes are vectors of medical importance because they transmit diseases to man and causes annoyance through tormenting bites which makes human restless in the day and night (Abiodun, 2008). The loss to human productivity hours resulting from morbidity has the control of the vector necessary from the cradle of civilization to the modern era. Festus (2003) observed that there are basically five (5) methods of controlling or exterminating mosquito vectors in our society. The use of M-Paradisiaca peels extract have also been advanced technologically in trapping mosquitoes. It is one of the most important crops of the tropical plant, also a perennial crop that belongs to the family of Musaceae (Oladiji *et al.*, 2010), (Swennen, 1990).

Musa Paradisiaca has a high fibre content which is capable of lowering cholesterol and its high potassium content helps in preventing elevated blood pressure and muscle cramp (Ng and Fong, 2000). M-Paradisiaca are starchy staple foods that can be fried, baked, roasted and boiled to consume alone or together with other foods and 70 million people in the world of Africa today are estimated to derive more than one quarter of their food energy requirements from M-Paradisiaca (Udoh *et al.*, 2005). M-Paradisiaca peels are bye products that is been discarded as waste when or after the edible parts of the fruits has been eaten, which constitute nuisance to the environment, especially the places where consumption is common (Omole *et al.*, 2008).

Because of the different tormenting bites of mosquito, people are interested and were challenged to exterminate or eliminate the subjects by using different types of weeds like fruits peels, leaves, roots etc. to fight mosquitoes in different chemical control measures. Introducing Musa Paradisiaca peels extract as a control measure in trapping adult mosquitoes becomes necessary because the fluid has an oily content which enable the extract assumed to be active when used with water to trap mosquitoes and due to their breeding habit, once it comes in contact with the mixture, it will then trap the mosquitoes.

Mosquito has been incriminated in transmitting diseases to humans throughout the world and they are been responsible for mortality and morbidity of millions every year, thus becoming a problem to the existence of man. Mosquito infested area is likely to develop prevalence cases which may lead to an epidemic. Thus, effort to reduce their population is an ongoing fight in the field of human technology. The use of M-Paradisiaca peels extract has been technologically advance as a control measures in different parts of the world but it effectiveness in the society particularly trapping mosquitoes in Otuogidi is yet to be ascertained. With all these prevailing problems, we therefore intend to carry out this study to assess the effectiveness of the peels extract in trapping mosquito.

M-Paradisiaca peels extracts are used in various forms when dried such as softening foodstuff, soap production; fertilizers when decayed and other forms insecticides (Gunaseelan, 2004).

According to Zhou, (2014) cadmium sulfide (CDS) nanoparticles (NPs) were synthesized by using Paradisiaca peels extract as a convenient, non-toxic, eco-friendly green capping agent.

Gold nanoparticles were synthesized by using M-Paradisiaca peels extract as a simple, non-toxic, eco-friendly green material. The reaction mixtures displayed vivid colors and UV-vis Spectra characteristic of gold nano particles (Bankar *et al.*, 2010).

MATERIALS AND METHODS

Study Design

The research was carried out in Otuogidi in Ogbia Local Government Area of Bayelsa State, Nigeria. The Musa Paradisiaca Peels were sought for at the Ogbia and collected, washed properly with tap water and blend with a grinding machine to produce mesh products. It was mixed with little distilled water, stirred properly and allowed to stand for at least 24 hours, it was filtered to remove mesh product out from the liquid and put into a labeled bottled and stored in refrigerator until it was ready for use. The samples were divided into five (5) groups, which includes A, B, C, D and E, for analysis and observation in the school of Public Health Sciences.

Preparation of Musa Paradisiaca Peels Extract

Preparation of the Peels extracts in the control of mosquitoes includes:

- Freshly harvested mature plantain that is less than 24 hours was used.
- The plantain was cut with sharp knife for finger tips to drain the fluid into a cup with 1ml of water serves as diluents to prevent dryness. Measure 2ml to 10ml of plantain fluid with syringe of 10ml to put into 500ml or half litre of

water in five buckets and then allowed the mixture to rest for 5 minutes to enable the oil content cover the surface tension in the water.

- Expose the mixture to an infected area of mosquitoes. (Osomu, 2013). This research work used five (5) basins labeling A, B, C, D and E and each of the small basins with five hundred milliliter (500ml of water. The five (5) basins contained water and Musa Paradisiaca Peels extract in different quantities of 4ml, 6ml, 8ml and 10ml respectively and this was used to determine the concentration strength and lethal effect. The small basins which contain the water and Musa Paradisiaca Peel’s fluid were the control variables.

Method of Data Analysis

- The collected fluid samples A, B, C, D and E, were analyzed using ANOVA as shown below and results presented in tables.

$$F = \frac{V_b}{V_w}$$

= between_group_variance / within_group_variance

Where:

- V_w = Within group variance which is mean of the variance of each of the groups is computed separately
- V_b = The difference between the total groups variance within the groups of variance called between groups variance is computed
- V_t = The total group variance of the various group is computed

RESULTS

Table 1: Musa_Paradisiaca effects on mosquitoes

	Days	Group A concentration in 4ml/500ml	Group B concentration in 6ml/500ml	Group C concentration in 8ml/500ml	Group D concentration in 10ml/500ml	Group E concentration (control variables)
Number of mosquitoes trapped.	1	2	0	2	4	0
	2	0	3	1	5	0
	3	3	3	4	0	0
	4	2	4	6	8	0
	5	3	5	5	8	0
	Total	10	15	18	25	0

Table 2: Percentage distribution pattern of trapped mosquitoes with single extract treatment

Groups of Sample	Total concentration of extract	Number of trapped mosquitoes	% of trapped mosquitoes	t	p-value
A	4	10	14.71%	3.255	0.03
B	6	15	22.06%		
C	8	18	26.47%		
D	10	25	36.76%		
E	0	0	0.0%		
Total	28	68	100%		

DISCUSSION

The prevalence of malaria growth in Africa today varies from one region to the next due to climate change, attitude toward the use of insecticides and altitudes. The P- falciparum has been noted for its virulent and deadly parasitic effect on humans. Recent studies shows the prevalence of malaria in Cameroon to be 30% with an increase morbidity and mortality associated with this disease (Ngum *et al.*, 2023). The effect of Musa Paradisiaca extract on mosquitoes assessed in this study shows that in: **Group A:** 10 mosquitoes were trapped with the concentration of 4ml extract peels fluids per 500ml of surface water from the stream over a period of 5 days.

Group B: 15 mosquitoes were trapped with 6ml concentration of peels fluids per 500ml of surface water from the stream over a period of 5 days. **Group C:** 18 mosquitoes were trapped with 8ml concentration peels fluids per 500ml of surface water from the stream-over a period of 5 days. **Group D:** 25 mosquitoes were trapped with 4ml concentration of Musa Paradisiaca peels fluids per 500ml of surface water from the stream over a period of 5 days. **Group E** serve as control variable that has neither lethal effect nor any sign of trapped mosquitoes throughout the experimental period. Sporozites from the female anopheles mosquito are injected into the blood stream and affect the hepatocellular cells of adults and children’s liver to cause both anemia, hyperthermia, convulsion, severe headache, pains and death if untreated. Malaria has been observed of affecting 41.1% of children age 6-8yrs and

38% of age 0-11yrs in Tworn Brass, Bayelsa state (Dotimi *et al.*, 2020). Recent study conducted in Aluu and Azikoro communities in Bayelsa and Rivers state indicate a prevalence rate of 12.3% and 10.8% cases of malaria among study population (Chijioke *et al.*, 2023).

In this study, it was observed that the highest numbers of mosquitoes were trapped in Group D (36.8%) which has the highest concentration of *Musa Paradisiaca* of 10ml/500ml of surface water from the stream. The result obtained from this study with a t-statistics value of 3.255 and p-value of 0.03 shows significant difference between the test groups and the control. We therefore reject the null hypothesis and fail to reject the alternate hypothesis that says there is a significant relationship between concentration/dose strength of *Musa Paradisiaca* Peels extract and its trapping capability of mosquitoes. Malaria species include P-ovale, P- vivax, P- malarae and plasmodium falciparum responsible for the spread of malaria parasite as a protozoan to humans. The P- falciparum has been noted for its most malignant form of severity among children in Africa.

The result revealed that, *Musa Paradisiaca* Peels extract has a lethal effect on mosquitoes with increasing concentration. Our findings is in agreement with Osomu *et al.* (2013) that, *Musa Paradisiaca* Peels extract has high lethal effect on mosquitoes with an increased concentration and the degree of trapped mosquitoes are very effective during the season of the new moon of a month. Findings from Ezenwaka *et al.*, (2023) has shown culex (83.93%) as more common compared to anopheles (16.07%) species in Ogbia LGA of Bayelsa state.

CONCLUSION

Musa Paradisiaca has lethal properties capable of trapping mosquitoes especially at higher concentration. The botanical fluid substance are less hazardous to mosquitoes when administered in lower dose and the degree of effectiveness is concentration/dose dependent. We are therefore recommending the use of *Musa Paradisiaca* Peels extract due to its lethal effect on mosquitoes that transmit the malaria parasite.

Conflict of interest: None declared.

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Cite This Article: Okpanra N Stanley, Lokobo J Abraham, Solomon M Uvoh, Samuel N Keme, Avula J Imanuma (2024). Effect of *Musa Paradisiaca* Peels Extract in Mosquitoes Trapping. *EAS J Parasitol Infect Dis*, 6(4), 22-26.
