

## Ethnobotanical uses and phytochemical analysis of *Cyperus Articulatus* from Meru Kenya

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### Introduction

Thermal expulsion and direct burning of aromatic plants before sleeping continue to play a very important role in household protection against mosquito vectors of dangerous diseases such as malaria, yellow fever, dengue fever and elephantiasis. It is for this reason that this research was carried out in Tharaka to find out if *Cyperus articulatus* could repel mosquitoes and treat malaria, stomach-ache and skin rash as claimed by the traditional medicine practitioners in Meru.



**Fig 1:** (a) *C. articulatus*. (b) tubers of *C. articulatus*

### Objectives

- To conduct an ethnobotanical survey of *Cyperus articulatus* in Meru.
- To extract tubers of *Cyperus articulatus* using organic solvents and determine their components.
- To do bioassays using the plant extract using: *Staphylococcus aureus*, *Streptococcus pneumoniae* and *Salmonella typhi* bacterial strains.
- To do a mosquito repellent test using adult *Aedes aegyptii* mosquitoes

### Materials and methods

An ethno-botanical survey was Carried out in Meru county in Kenya- October 2010.

Questionnaires were administered to the traditional medicinal practitioners (TMPs) during a one day workshop that was conducted in Kenya Methodist quest house in Marimanti.



**Fig.2:** Workshop in Marimanti

### Plant material collection

Plant materials were collected from Meru under strict supervision to ensure the correct plants were harvested.



**Fig 3:** Digging tubers of *C. articulatus*  
 The 100% DCM extract was analyzed by GCM/S at Surrey University in the UK. The GC/MS used is shown as fig 4.



**Fig 4** GCM/S

Mosquito repellent test was done using adult *Aedes aegyptii* mosquitoes reared at the School of biological Sciences University of Nairobi. The test was done using a human fore hand and mosquitoes in a cage as shown below

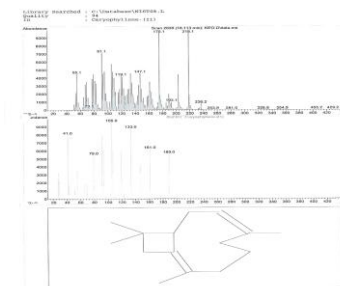


**Fig5:** Human hand inside a cage with mosquitoes

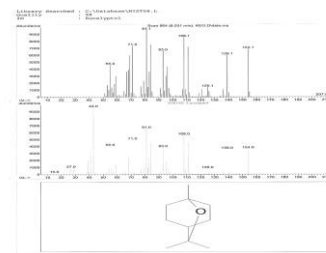
### Results

Mixture of dichloromethane extract had 59 compounds; 48 (82.76%) were terpenes. 27 sesquiterpenes (45.76%), 20 monoterpenes (33.90%), 1 triterpene (1.69%) and 11 non terpenes (18.64 %). Structures of the major terpenes and MS patterns are shown below.

sesquiterpenes



**Fig. 6:** MS fragmentation and structure of caryophyllene



**Fig.7:** MS fragmentation and structure of eucalyptol

The DCM extract showed positive activity towards the three bacterial strains. Inhibition areas were as shown in figure 7. It also repelled the *Aedes aegyptii* adult mosquitoes.

### Inhibition area for the *Streptococcus pneumoniae*



### Inhibition area for *Staphylococcus aureus*



**Fig.8:** Inhibition areas for *S.pneumoniae* and *S.aureus* with DCM extract

### Conclusions and recommendations

The essential oil mixture in the root tubers of *C. articulatus* extracted with DCM solvent, was composed of 59 different compounds. It had good repellancy against mosquitoes and good anti-bacterial effects against *Streptococcus pneumoniae* and *Staphylococcus aureus*.

*C. articulatus* is resource from which some products can be formulated.