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Identifying and testing the attractiveness of volatile chemical compounds from mango juice that attract malaria vectors in toxic sugar bait

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Introduction

- Malaria is one of the most life threating disease in developing world.
- Key methods for controlling malaria vectoring mosquitoes include insecticide-treated bed nets (ITNs) and indoor residual spraying (IRS)
- Controlling malaria vectoring mosquitoes requires new interventions that can work synergistically with these existing control tools
- One promising intervention is attractive toxic sugar baits (ATSB), which exploit mosquito sugar feeding behaviour
- This study aimed to identify the volatiles from mango juice ATSB that attract *An. gambiae*. We collected mango volatiles and investigated the behavioural response of *An. gambiae* females to them in a Y-tube olfactometer.

Methods

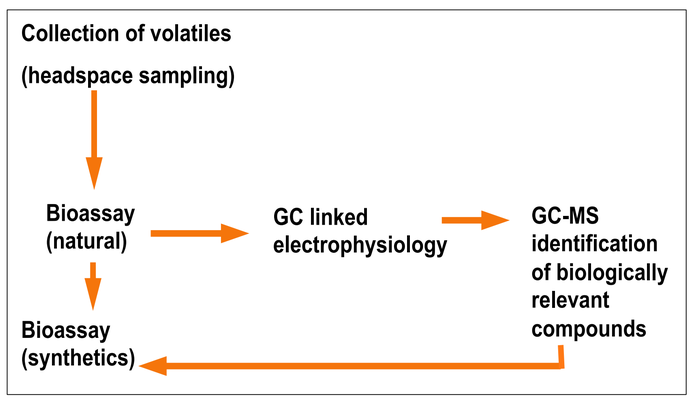


Figure 1. The suite of experimental techniques used in this study

Figure 2. Mango juice preparation

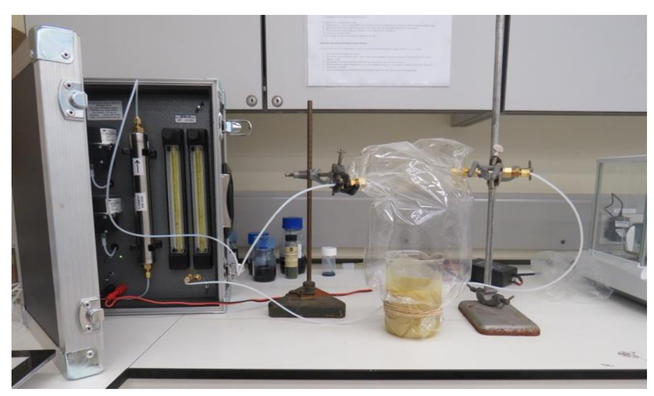


Figure 3. Air entrainment using a PYE volatile collection kit

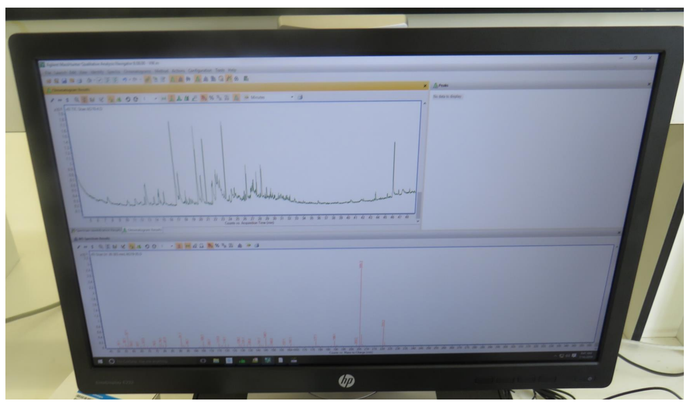


Figure 6. GC-MS were used to identify EAG active compounds

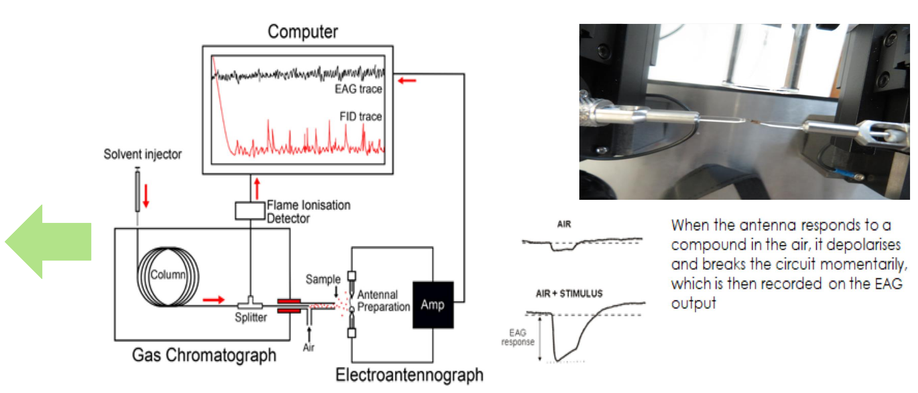


Figure 5. The sketch of GC-EAG illustrating its set up

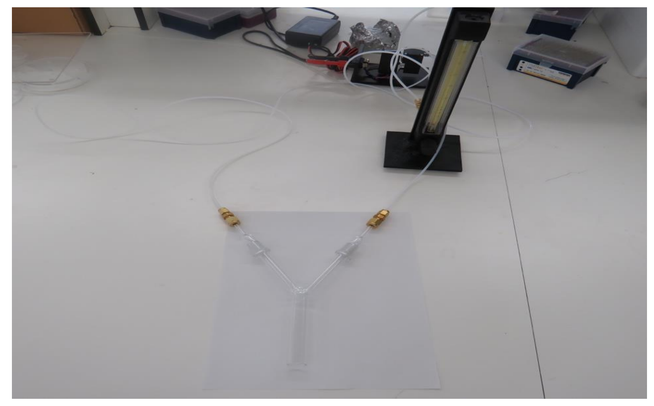
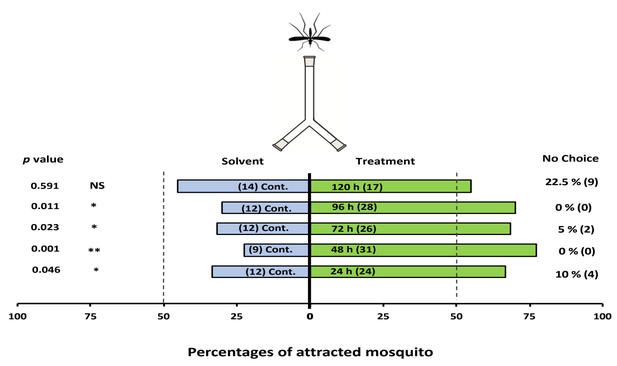
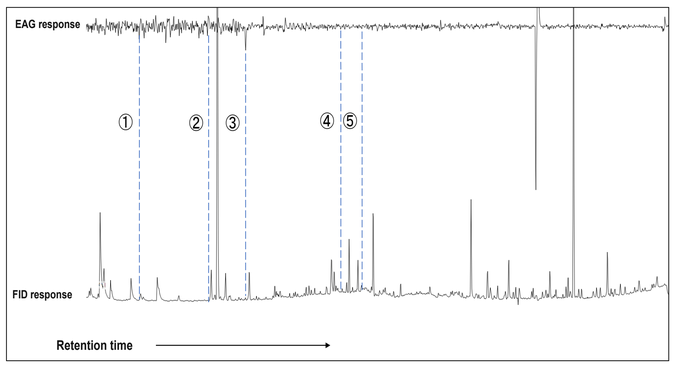


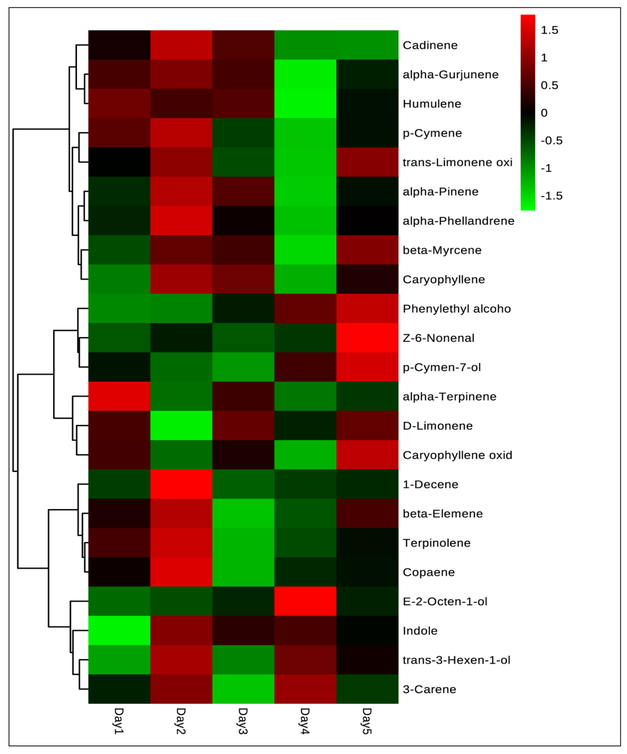
Figure 4. A Y-tube olfactometer used in the behavioral bioassay experiments.

Results

- Female *An. gambiae* were strongly attracted to mango volatiles collected at 24-96 h.
- The EAG-active volatiles for *A. gambiae* were identified as: (**1**) (*E*)-hexen-1-ol; (**2**) myrcene; (**3**) terpinolene; (**4**) (*E*)-caryophyllene and (**5**) humulene.
- GC-MS Analysis of headspace collections from mango juice revealed 23 detectable volatiles in 7 chemical classes.







Conclusion

Our study has identified the key compounds in mango juice baits that are responsible for attraction of *An. gambiae* mosquitoes. The attractive 3-component blend of mango terpenoids could be used to develop a synthetic semiochemical lure for use in ATSB traps that can be deployed for long-lasting outdoor monitoring and control of the malaria vector *An. gambiae*. Our findings contribute to the understanding of mosquito attraction to plant odours and identify candidate chemical compounds from which to develop a synthetic semiochemical lure based on mango fruit for use in ATSB control strategies.