

## **Attraction of *Anopheles gambiae* to odour baits augmented with heat and moisture.**

### **Abstract**

#### ***BACKGROUND:***

The search for a standard human surrogate in the form of a synthetic mosquito attractant has been the goal of many laboratories around the world. Besides alleviating the occupational risk subjected to volunteers participating in vector surveillance and control, discovery of potent attractants underpins the development and deployment of mass trapping devices for controlling mosquito-borne diseases.

#### ***METHODS:***

A dual-port olfactometer was used to assess behavioural responses of female *Anopheles gambiae* mosquitoes towards synthetic versus natural (whole human emanations and worn socks) attractants. The synthetic attractants included a standard blend consisting of ammonia, carbon dioxide and water; and Ifakara blend 1 (IB1) consisting of various aliphatic carboxylic acids. Natural attractants were obtained from two males known to be less and highly attractive (LA and HA, respectively) to the mosquitoes. Mosquito responses to the volunteers' worn socks were also investigated. The effect of heat (25-27 degrees C) and moisture (75-85%) on the mosquito behavioural responses was determined.

#### ***RESULTS:***

A significantly higher proportion of mosquitoes was attracted to each volunteer when compared to the standard blend. Whereas the proportion of mosquitoes attracted to person LA versus IB1 (49% versus 51%, respectively;  $P = 0.417$ ) or his worn socks did not differ (61% versus 39%, respectively;  $P = 0.163$ ), far more mosquitoes were attracted to person HA relative to IB1 (96% versus 4%;  $P = 0.001$ ) or his worn socks (91% versus 9%;  $P = 0.001$ ). Person HA attracted a significantly higher proportion of mosquitoes than his worn socks, the standard blend and IB1 when these were augmented with heat, moisture or both ( $P = 0.001$ ). Similar results were obtained with person LA except that the proportion of mosquitoes attracted to him versus his worn sock augmented with heat ( $P = 0.65$ ) or IB1 augmented with heat and moisture ( $P = 0.416$ ) did not differ significantly.

#### ***CONCLUSIONS:***

These findings indicate that olfactory cues are key mediators of the mosquito host-seeking process and that heat and moisture play a minor role. The need for a standard, highly stringent positive control for screening synthetic attractants is strongly highlighted.