

Evaluation of low density polyethylene and nylon for delivery of synthetic mosquito attractants

Abstract:

Abstract Background Synthetic odour baits present an unexploited potential for sampling, surveillance and control of malaria and other mosquito vectors. However, application of such baits is impeded by the unavailability of robust odour delivery devices that perform reliably under field conditions. In the present study the suitability of low density polyethylene (LDPE) and nylon strips for dispensing synthetic attractants of host-seeking *Anopheles gambiae* mosquitoes was evaluated. **Methods** Baseline experiments assessed the numbers of *An. gambiae* mosquitoes caught in response to low density polyethylene (LDPE) sachets filled with attractants, attractant-treated nylon strips, control LDPE sachets, and control nylon strips placed in separate MM-X traps. Residual attraction of *An. gambiae* to attractant-treated nylon strips was determined subsequently. The effects of sheet thickness and surface area on numbers of mosquitoes caught in MM-X traps containing the synthetic kairomone blend dispensed from LDPE sachets and nylon strips were also evaluated. Various treatments were tested through randomized 4 × 4 Latin Square experimental designs under semi-field conditions in western Kenya. **Results** Attractant-treated nylon strips collected 5.6 times more *An. gambiae* mosquitoes than LDPE sachets filled with the same attractants. The attractant-impregnated nylon strips were consistently more attractive (76.95%; n=9,120) than sachets containing the same attractants (18.59%; n=2,203), control nylon strips (2.17%; n=257) and control LDPE sachets (2.29%; n=271) up to 40 days post-treatment (P<0.001). The higher catches of mosquitoes achieved with nylon strips were unrelated to differences in surface area between nylon strips and LDPE sachets. The proportion of mosquitoes trapped when individual components of the attractant were dispensed in LDPE sachets of optimized sheet thicknesses was significantly higher than when 0.03 mm-sachets were used (P<0.001). **Conclusion** Nylon strips continuously dispense synthetic mosquito attractants several weeks post treatment. This, added to the superior performance of nylon strips relative to LDPE material in dispensing synthetic mosquito attractants, opens up the opportunity for showcasing the effectiveness of odour-baited devices for sampling, surveillance and control of disease vectors.