

In2Care[®] Mosquito Trap

Easy to use

Robust and user-friendly design that does not need a power source.

Novel

Multi-impact tool with new bioactives - using mosquitoes to kill their own offspring

Effective

Lab and field data show that traps can effectively control *Aedes* mosquitoes.

A novel tool to combat *Aedes* mosquitoes that transmit Dengue, Chikungunya and Zika virus

Dengue, Chikungunya and Zika virus are rapidly spreading mosquito-borne viral diseases. They are difficult to diagnose and treat, and mosquito control is the only option to stop transmission.

Aedes mosquitoes are difficult to control as they lay their eggs in very small breeding sites and have become resistant to chemical insecticides. The In2Care[®] Mosquito Trap attracts and kills *Aedes* females with novel green ingredients that target both mosquito larvae and adults. It is the first to exploit the concept of 'auto-dissemination', resulting in an effective kill of mosquito larvae in breeding sites surrounding the trap.

In2Care[®] Mosquito Traps can be placed both in- and outdoors at a recommended density of 1/400 m² (10 traps per acre) and be maintained every 4-6 weeks using refill sachets. The product lends itself perfectly for use in vector control programs, particularly in hotspot/problem areas, and by pest control companies that offer mosquito control services to resorts, hotels, etc. These user-friendly traps can also be used by the general public and enable effective vector control via community participation.



Exploiting mosquito behaviour

Aedes aegypti mosquitoes originate from Africa, but have spread worldwide rapidly and can transmit Dengue, Chikungunya and Zika virus to humans. They are attracted to small container-like breeding sites and have a unique egg-laying behaviour; distributing their eggs over several breeding sites to minimise risks for their offspring.

The In2Care[®] Mosquito Trap exploits this behaviour by contaminating the female mosquito body and using her to spread larvicide to multiple breeding sites around the trap. With this "auto-dissemination" method the trap can kill virtually all mosquito larvae in its surroundings before these become biting adults.



How does it work?

The In2Care[®] Mosquito Trap is made of durable plastic and uses water with an odour lure to attract egg-laying *Aedes* mosquitoes. Once inside, mosquitoes contact the specially treated gauze near the water surface and get contaminated with a larvicide and a fungus. We exploit the fact that *Aedes* like to divide their eggs over multiple sites; by letting them fly out of the trap whilst carrying larvicide on their legs. They transport the larvicide and contaminate several breeding sites around the trap. In this way, we can kill larvae in small and hard to find breeding sources. The mosquito also gets infected with an insect-specific fungus that can block Dengue virus replication and kills her before she can spread disease.



A multi-impact tool:

- ✓ Kills all larvae inside the trap
- ✓ Kills larvae in surrounding breeding sites
- ✓ Kills exposed mosquitoes
- ✓ Stops Dengue virus development

An environmentally friendly solution

Insecticide resistance has become a major problem in countries infested by *Aedes* mosquitoes. Area-wide insecticide fogging is still being used but is showing limited efficacy and major impacts on non-target organisms. This necessitates a switch to more sustainable, environmentally friendly vector control. The In2Care[®] Mosquito Trap is the first trap that uses a biological control agent to kill mosquitoes. It deploys an US-EPA-approved fungus that kills the mosquito several days after infection and can prevent the insect from transmitting disease by blocking Dengue virus replication. The trap larvicide is an US-EPA-approved and WHO-recommended ingredient that can even be used in drinking water and has not shown any issues with resistance. Both bioactives have short half-lives and are classified as low risk for non-target organisms.

In2Care[®] Mosquito Traps deploy a small dose of bioactive mixture in an enclosed point-source environment that is specifically attractive to mosquitoes. Only tiny amounts of larvicide will get spread to other breeding sites (mostly small man-made containers), which is enough to kill mosquito larvae (as <10 ppb PPF works well) but not enough to cause risk for non-target organisms like fish or mammals. In this way, our traps offer an effective mosquito control option without drastic use of chemicals in the entire environment.

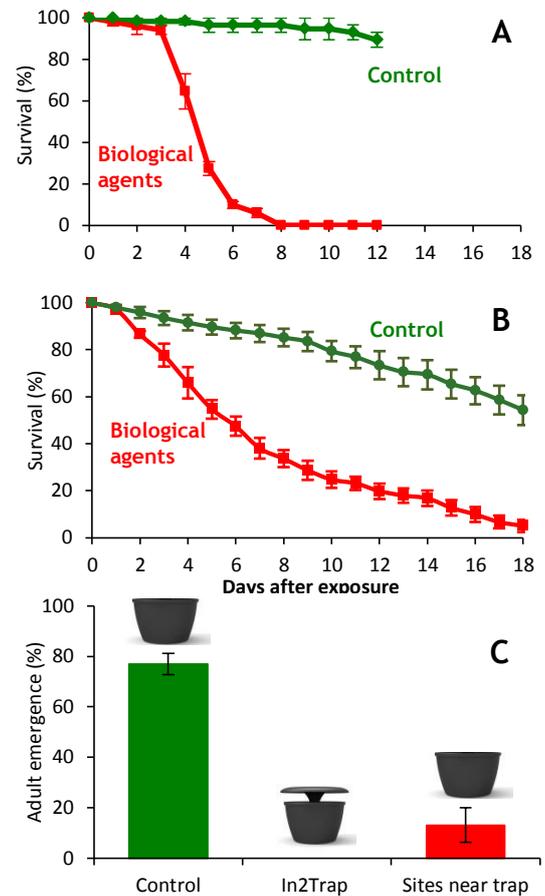
Published & Field validated Results

In2Care[®] Mosquito Traps were developed with *Aedes* mosquitoes collected in the Caribbean. Scientific lab validations showed that half the mosquitoes survive for 4 days after gauze exposure (graph A). In large cage tests, whereby mosquitoes were free to visit the trap or 4 other sources when they like, the killing impact took longer (graph B). This does, however, allow contaminated mosquitoes to disseminate larvicide to other sites before they die. This induced a massive reduction in adult mosquitoes produced in breeding sites near the trap; after one day release only 1 in 10 larvae survives to adulthood (graph C). In the trap itself, 100% of the larvae die, mostly in the L₄ or pupal stage. More results can be found in our peer-reviewed publication: www.parasitesandvectors.com/content/7/1/200.

In2Care[®] Traps deploy a very special type of gauze developed by In2Care. It holds bioactives via electrostatic binding forces, which enables a high dose transfer when mosquitoes make contact. The improved bioavailability and resistance-breaking potential of this netting has been published in the *Proceedings of the National Academy of Sciences USA (PNAS)*: <http://www.pnas.org/content/112/39/12081.full.pdf>

Field validations

A field trial executed in 2015 by the Insect Vector Control Division of the Ministry of Health of Trinidad & Tobago demonstrated active auto-dissemination and larval control, and a sustained decline in mosquito densities. Trinidad MoH is now using In2Care[®] Traps in selected problem areas (public schools & hospitals). A scientific field test with 200 In2Care[®] Traps executed by the Mosquito Research & Control Unit of the Cayman Islands also showed active larvicide dispersal, effective larval control and reductions in the adult *Aedes* mosquito population. An US-EPA approved semi-field study by the Manatee County Mosquito Abatement District in Florida confirmed trap impacts on larvae and adults of local strains of *Aedes aegypti* and *albopictus* under ambient climate conditions. The Puerto Rico CDC is currently (2017) undertaking a large-scale randomized clustered trial in 10 residential areas (17.5 acres each) to quantify the impact on adult *Aedes* populations.



How to use

We recommend placement where mosquitoes are likely to breed: in shaded, vegetated places near habitation. In high risk areas we recommend 1 trap per 400m² (10 traps per acre). We offer support for appropriate risk mapping of your area and unit density calculations. Unit maintenance (topping up with water) is recommended at regular intervals depending on climate and monitoring demands, and reactivation with a fresh refill sachet is recommended every 4-6 weeks.



Mosquitoes are not trapped but are contaminated. Because of its slow-killing action, you will see live larvae in the trap water, but these will die before they pupate into adults. When deployed properly in a large enough area, In2Care[®] Mosquito Traps will effectively reduce the numbers of *Aedes* mosquitoes and the risk of infection with Dengue or Zika virus. Optimal impacts are achieved when removing as many other breeding sources as possible. For non-isolated sites we recommend additional barrier treatments. Effects will become most noticeable after the first 2 weeks of deployment because the next mosquito generation is affected.

The In2Care® Mosquito Trap includes:

- Durable 5L water reservoir
- Lid with click-on mechanism
- Floater (to carry the gauze strip)
- Green time indicator cap (servicing reminder)
- Optional fixation tools
- Refill sachets (gauze, bioactives & attractant tablets) for reactivation every 4-6 weeks

We can provide:

- ❖ Customized deployment support
- ❖ Unit servicing and monitoring support tools
- ❖ Field trial protocols
- ❖ Registration dossiers for product registrations



In2Care® Dissemination Units have been registered and are being sold in >25 countries in the Americas by our authorized distributor Univar Environmental Sciences. Our units have been approved for professional use in US states with confirmed local transmission of Zika virus by a Section 18 Emergency Exemption of the US-EPA pending full registration. In Asia and the Pacific, our local distributors are currently registering the product in >15 countries.

For more information on registration, local distributors and sales options, please contact us via customer.support@in2care.org

About In2Care

In2Care BV is a private limited company registered and based in the Netherlands. The core expertise of our team of medical entomologists and product developers lies in the translation of scientific knowledge into novel and user-friendly insect control products. In2Care has in-house R&D capacity including mosquito rearings, and collaborates with renowned scientific institutes to validate the efficacy of our innovations. We have filed study protocols available and can be consulted for advice and customized vector control approaches. We go beyond product development to deliver novel, sustainable, affordable and user-friendly solutions to combat mosquitoes that transmit some of the worst infectious diseases in the world.

Because we are into care



Our values -
Novel,
Sustainable,
Affordable,
User-friendly

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