

# In2Care<sup>®</sup> 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, CHIKV 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<sup>®</sup> 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<sup>®</sup> Mosquito Traps can be placed both in- and outdoors at a recommended density of 1/400 m<sup>2</sup> (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<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> 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.

The In2Care<sup>®</sup> Mosquito Trap deploys 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 with few organisms), which is enough to kill larvae because this active works in extremely low concentrations of <10 ppb. In this way, In2Care<sup>®</sup> Mosquito Traps offer an effective mosquito control option without drastic use of chemicals in the entire environment.

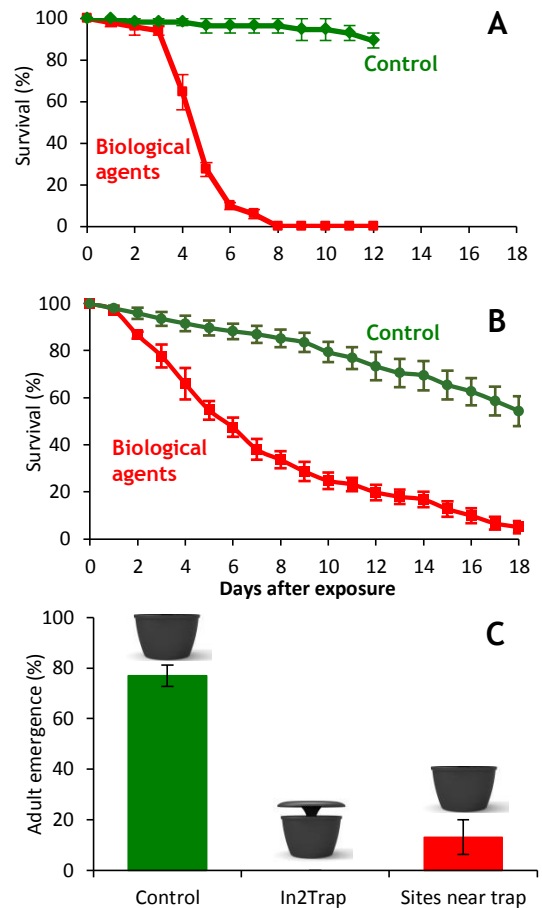
## Published & Field validated Results

The In2Care<sup>®</sup> Mosquito Trap was developed with *Aedes* mosquitoes collected from field locations in the Caribbean. Scientific validations in the laboratory showed that half the mosquitoes survive for 4 days after gauze exposure (graph A). Under realistic conditions, whereby a trap is placed in a large cage and mosquitoes are free to enter it when they like, the killing impact takes longer (graph B). This does, however, allow contaminated mosquitoes to disseminate larvicide to other breeding sites before they die. This induces 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, whereas >75% of the larvae in control tests become adult (graph C). In the trap itself, 100% of the larvae die, mostly in the L<sub>4</sub> or pupal stage. More results can be found in our peer-reviewed *Parasites & Vectors* publication: [www.parasitesandvectors.com/content/7/1/200](http://www.parasitesandvectors.com/content/7/1/200).

The 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 resistance-breaking potential of this netting has been published in the prestigious academic journal *PNAS*: <http://www.pnas.org/content/112/39/12081.full.pdf>.

### Field validations

A large-scale field trial has been executed early 2015 by the Insect Vector Control Division of the Ministry of Health of Trinidad & Tobago. Results demonstrated active auto-dissemination and larval control, and a sustained decline in mosquito densities. The Trinidad MoH has plans to use the traps in selected problem areas such as public schools, hospitals and air/seaports. A scientific field test with 200 In2Care<sup>®</sup> Mosquito Traps has been executed by the Mosquito Research & Control Unit of the Cayman Islands. Results confirmed active larvicide dispersal, effective larval control and significant reductions in the adult *Aedes* mosquito population. This study finished late 2015 and its results will be published in a scientific journal.



### How to use

When deployed properly in a large enough area, In2Care<sup>®</sup> Mosquito traps will effectively reduce the numbers of *Aedes* mosquitoes and the risk of catching Dengue, CHIKV or Zika virus. Optimal impacts are achieved when removing as many other breeding sources as possible. It will take some time (2 weeks) before trap effects will be noticeable, as the next mosquito generation is affected.

Mosquitoes are not actually trapped but are contaminated. Because of the slow-killing action, you will see live larvae present in the traps, but these will die before they pupate into adults. We recommend trap placement where mosquitoes are likely to breed: in shaded, vegetated places near habitation and water sources. We offer support for appropriate risk mapping of your area and trap density calculations. In higher risk areas we recommend 1 trap per 400m<sup>2</sup> or 470 yards<sup>2</sup> (10 traps per acre). Trap maintenance includes topping up with water when needed and refreshing the gauze and odour lure every 4-6 weeks using In2Care<sup>®</sup> Trap refill sachets.



The In2Care® Mosquito Trap includes:

- A long-lasting trap reservoir
- Interface with central tube
- Trap lid with click-on mechanism
- Trap floater (to carry the gauze strip)
- Refill sachets with gauze strip, bioactives & attractant tablets (for 4-6 week replacements)

We can provide:

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



In2Care® Mosquito Traps have been registered and are currently being sold in several countries in the Americas by our authorized distributor Univar Environmental Sciences.

For sales information, phone: +1-305-882-1375  
or go to our online list of dealers: [univares.com/procenters/central-america](http://univares.com/procenters/central-america)  
and [univares.com/procenters/caribbean](http://univares.com/procenters/caribbean)



## About In2Care

In2Care BV is a private limited company registered and based in the Netherlands. Combined, we have more than 30 years of research experience in the field of medical entomology. Our core expertise lies in the translation of scientific knowledge into novel and low tech insect control products. In2Care has in-house R&D capacity including mosquito rearings, and field sites around the world where we evaluate the efficacy of our innovations. We have test protocols available for entomological field validations and can be consulted for advice and customized vector control approaches. We go beyond product development to deliver novel, green, 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,  
Green,  
Affordable,  
User-friendly

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