



# Imperium™

## /// Formulation matters – why bottle bioassay tests don't tell the Imperium™ story

*Imperium is the first and only Type II pyrethroid registered in the U.S. for wide area mosquito control. It provides superior efficacy using up to 80x less active ingredient than competitive products and it has an all-crop tolerance. However, if you're relying on a bioassay bottle test to determine whether or not it will work for your aerial mosquito control applications, you're not getting an accurate picture of what Imperium can do for you and your community. Read the following frequently asked questions to learn why.*

### **Q: Bioassay bottle tests have long been the standard for determining product efficacy. Why shouldn't I trust it for Imperium?**

**A:** Bottle bioassay tests were originally developed to evaluate the efficacy of residual sprays. In fact, when the methodology was first established over 50 years ago it was designed for evaluation of indoor residual spray (IRS) applications. Imperium is a wide-area space spray. Residual sprays are utilized at volumes nearly 100x higher than that of ultra low volume (ULV) applications, and they are not labeled for use as wide-area space sprays.

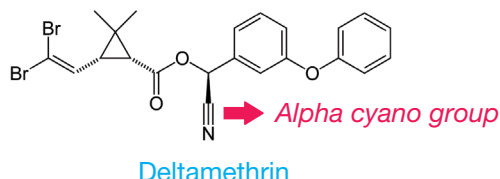
Imperium – like other ULV mosquito adulticides – is not a residual formulation. In a bottle test, dried active ingredient (a.i.) residue that remains is what may kill mosquitoes. If little to no a.i. residue remains in a bottle, which would be the case with Imperium (or any space spray that is formulated correctly as a non-residual product), then it likely will not kill mosquitoes in a bottle test. Furthermore, when used operationally, all space spray adulticides have their contact effect with mosquitoes as a liquid droplet, not as a dried residue. Therefore, the route of exposure in bottle bioassays is fundamentally flawed for assessment of space spray effectiveness.

### **Q: Are you saying bottle bioassay tests are not effective?**

**A:** Not necessarily. In the case of residual sprays, they can be a quick, snapshot view of a mosquito population's susceptibility to a dried residue of a given active ingredient. However, they are one-dimensional in that they only look at an a.i. and not the formulation in which it is used. In a bottle test, if dried residue of an active ingredient results in mortality the mosquito is considered susceptible to the a.i. while survival would be an indication of insecticide resistance. In the case of Imperium, however, the patented formulation technology is what truly provides superior efficacy in the field, not simply the active ingredient. As a result, the limitations of a bottle test prevent it from providing an accurate picture of product efficacy. It's also important to keep in mind that the residual in a bottle test typically is exposing the mosquito to a sub-lethal amount of a.i. not typical in a full, formulated product that exhibits action through direct spray contact.

**Q: Deltamethrin – the a.i. in Imperium – is a pyrethroid and there is known resistance to pyrethroids. What makes Imperium better?**

**A:** Imperium features a Type II pyrethroid, the only one of its kind in the market. It is proven to effectively control mosquitoes resistant to other pyrethroids, which are Type I. But, again, the formulation in which it's carried and HOW the mosquitoes are exposed is equally important to WHAT they're being exposed. That's why – in order to see how great Imperium really is – it must be tested in real-world conditions just as it will be utilized operationally.



**Q: What is the best way to test Imperium?**

**A:** The best way to see how Imperium will perform in the communities that you protect is to try it in a field test. While Imperium is designed for aerial applications, you can also use a handheld fogger for the test and get the same results since droplet size is standardized to deliver the optimum volume mean diameter for ULV applications. For assistance developing a field trial protocol for your district, or resources needed to execute a study, please contact Bayer at 1-800-331-2867.

**Q: Will a wind tunnel test work for Imperium?**

**A:** A wind tunnel test – sometimes used for simulating wide area space spray conditions – will definitely give a better representation than a bottle test, but they are expensive and not everyone has access to them. A field trial is still the best way to get as close to real-world operational conditions and truly assess the efficacy of an adulticide against native mosquito populations.

**Q: I've been told that heavier is better when it comes to aerial spray formulations because it helps ensure the product doesn't evaporate before hitting the kill zone. Should I be concerned that Imperium has a lighter formulation with less a.i.?**

**A:** This is a common misconception, but in the case of Imperium, lighter is mightier. A heavier product will actually fall through the kill zone faster, which means it has less time to kill mosquitoes and more product is ultimately deposited on the ground. Imperium is a light, water-based formulation that is protected from evaporation by Bayer proprietary FFAST® technology, which enables it to float through the air much longer, thus hitting more mosquitoes throughout the kill zone. It is also low odor, leaves no visible residue and is noncorrosive to equipment. Furthermore, unlike other ULV space sprays, Imperium contains no Volatile Organic Compounds (VOCs) which further prevents evaporation resulting in more stable droplets.

**Remember, the formulation determines the performance and residual or non-residual qualities of a product, not the active ingredient. The patented formulation of Imperium is the solution for your operational needs in non-residual ULV applications.**

*Contributed by: Dr. Kurt Vandock, Head of Community Health, Bayer*

**ALWAYS READ AND FOLLOW LABEL INSTRUCTIONS.**

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