



Seeking: Methods to increase insecticide uptake

Description

OVERVIEW

This organization is looking for more effective methods to move insecticide molecules across the biological barriers of the insect cuticle and/or gut to increase insecticide uptake. New technologies as well as new formulations or methods of transport are of interest. Your proof of principle, effectiveness, and toxicity data will help determine the acceptability of your proposed solution.

BACKGROUND

Moving molecules across an insect's biological barriers, insect gut and/or cuticle is difficult. Typically >90% of the insecticide consumed by an insect is excreted by the insect. Only a small fraction of insecticide sprayed on an insect translocates to inside the insect. Even though pesticide molecules currently are small, an insect presents several biological barriers to effective pesticide uptake: chitin, cuticle, and gut membranes. The aim of this search is to identify new technologies that may increase the movement of pesticide molecules past these barriers in order to kill the pest insect. Ideally, you would propose a methodology that could handle molecules of any reasonable size, charge or hydrophobicity.

Currently, pesticide application are often made with stickers and spreaders, surfactants, oils and other polymers that increase the spread and stick of the pesticide containing solution across applied surface. Insects come in contact with pesticide by either direct contact with the spray or surface, consumption of the treated surface or fluids within the plant. An insect has a shell made of chitin but there are holes in the chitin called spiracles that allow the insect to breath. Could these spiracles be an access point for pesticides? Are there other technologies that allow pesticides to penetrate the insect cuticle? Are there technologies to speed up the adsorption process? Is there an unconventional way to increase the permeability of chitin or gut and enhance delivery across it? Any method you propose should increase the bio-availability of pesticide to the insect.

Please indicate to which insecticide killing mechanism the technology would enhance the insecticide uptake:

(1) If the insecticide killing mechanism is through direct contact with insects, the technology should help insecticides to penetrate insect cuticle layers and/or spiracles.

(2) If the insecticide killing mechanism is through insect ingestion, the technology should (a) reduce digestive enzymatic functions assuming the digestion causes inactivation of insecticides. (If the digestion results in activation of insecticides, the technology should help increase these enzymatic activities); (b) improve the penetration of insecticides through midgut epithelial cell membranes.

CONSTRAINTS

Your solution should have accompanying proof-of-principle, effectiveness, and toxicity data.

POSSIBLE SOLUTION AREAS

Peptide research.

Pharma and drug research.

Entomology

Any research focused on crossing biological barriers.

Desired Timeframe

Within 12 months

Field Of Use and Intended Application

Pesticides and Insect control strategies

Desired Outcome

Methods that increase the effectiveness of pesticides on insect populations. The technology will be applied by conventional farm equipment, tractor sprayers and airplanes, but will result in lower application rates of pesticides thus reducing the impact on the environment.

Previously Attempted Solutions

Surfactants that reduce surface tension,, Oils, microemulsions, nanotechnology.

Region

North America

Years in Business

More Than 10 Years

Annual Revenue

More Than \$500 Million

Company Type

Intermediary/Broker

Licensing Terms

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