Chile: Nanotechnology to combat grape moth

A team of researchers in Chile has managed to develop microscopic biopolymers equipped with pheromones that are capable of disorienting the grape moth ("Lobesia botrana"), one of the greatest threats to agriculture in the country.

The moth, which is six-millimeter long, attacks grapes and other fruits that are grown, mainly for export or to prepare wine, in the case of vines, such as blueberries and plums.

According to the researchers from the Center for Applied Nanotechnology of the Universidad Mayor, led by Dr. Fabián Avila, this technology, which degrades without contaminating the soil, could be transferred to initiatives to combat other problems in agriculture, such as drought.

It is a contraption that is smaller than a bacterium, made with biodegradable products derived from crustacean shells and marine algae, which can store pheromones capable of disorienting male and female moths during their mating period.

"If the male and the female moths do not meet, they won't have any offspring. It is a friendly barrier, because there are no chemicals," said Dr. Avila, who added that one of the issues they had to solve was that the contraption had a short life.

In his opinion, this will force them to install more dispensers in crops, with higher costs, and also generate devices with higher concen-trations of pheromones.

Technology in crop areas

The project aims to incorporate environmentally friendly technology in cultivation areas to reduce the use of chemical pesticides.

Polymers, both natural and synthetic, are formed by the union of hundreds of thousands of small molecules, which constitute chains of different forms, from stairs to three-dimensional networks.

"What we do is manipulate these elements and give them a structure capable of containing a greater amount of the sexual pheromone, so that it emits constant concentrations to the environment for a longer time," Avila said.

"They are natural polymers, but modified in the laboratory and molded to our convenience. We manage the structure at the atomic level to

create much more uniform platforms, defining how much pheromone they will contain and how we will release it," he said.

In their uniform cavities on a microscopic scale, polymers based on biodegradable elements could capture anything from the minerals a plant needs to grow to the water that a tree in an area of water scarcity needs, according to the researchers.

This without the use of harmful chemicals that can affect the products, the natural environment or human populations.

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