BIODEGRADABLE DEVICE FOR THE BIOLOGICAL CONTROL OF AGRICULTURAL PESTS

DADES DE CONTACTE:

Research Results Transfer Office-OTRI
University of Alicante
Tel.: +34 96 590 99 59
Email: areaempresas@ua.es
http://innoua.ua.es

RESUM

Researchers from the University of Alicante have developed a device for pest control based on repellent volatile organic compounds (VOCs) incorporated into activated carbon matrices with suitable porosity. The technology enables a sustained release of repellent VOCs over several weeks, reducing dependence on chemical insecticides and the environmental impact associated with conventional plastic dispensers.

The device essentially consists of a carbon matrix, in granulated or pellet form, with the repellent incorporated into it. This matrix is enclosed in a porous and biodegradable container in the form of a sealed bag, facilitating direct field application and ensuring easy and safe handling. Moreover, its versatility allows the active compounds to be adapted to different pest species and crops, offering a sustainable and efficient approach to plant protection.

The technology, protected by a patent application, has been developed at the laboratory and pilot prototype scale, with proven efficacy against the banana weevil (*Cosmopolites sordidus*) and other agriculturally relevant weevils. Companies interested in commercial exploitation are sought.

AVANTATGES I ASPECTES INNOVADORS

ADVANTAGES OF THE TECHNOLOGY

The main advantages of this technology are as follows:

- **Prolonged and controlled release**: The porous structure of the activated carbon enables a sustained release of the volatile compound, avoiding emission peaks and ensuring high efficacy for several weeks without the need for frequent replacement.
- **Environmental sustainability**: The use of activated carbon and biodegradable wrappings eliminates dependence on conventional plastics, preventing waste generation and reducing the environmental impact on agricultural ecosystems.
- **Formulation versatility**: The system is compatible with a wide range of VOCs, both synthetic and microbial in origin (entomopathogenic and nematophagous fungi, etc.), allowing the device to be adapted to different crops and pests using the same basic design.
- **Ease of application and low operating cost**: The device does not require specialized equipment or advanced technical training, resulting in time savings and lower labor costs for farmers.

INNOVATIVE ASPECTS OF THE TECHNOLOGY

This invention introduces a **novel and efficient solution** for agricultural pest control by combining **activated carbon as the main release matrix** with **repellent volatile organic compounds**. Compared to previous developments that focused on pheromones and attractants—mostly using plastic-based or various solid matrices—this technology provides several **innovative elements**:

- **Pioneering use of activated carbon** as a release matrix for repellent volatile compounds in agricultural applications—an approach not described in previous devices focused on attractants or pheromones.

- **Integration of VOCs of biological or synthetic origin** into a porous and biodegradable material, and their use within a **porous, biodegradable wrapping**, enabling the sustained release of the volatile compound under field conditions.
- **A design that overcomes the high volatility and low persistence** of VOCs in field environments, providing an efficient and sustainable alternative that replaces conventional plastics in dispensers.
- **A modular and versatile design**, capable of accommodating different VOCs within the same technical base to adapt to various crops and pest species.

In summary, the key innovation lies in **translating the potential of repellent VOCs from the laboratory to real agricultural applications**, addressing the issues that have so far limited their use: excessive volatility, low persistence, and dependence on plastic dispensers.

APLICACIONS DE L'OFERTA

This technology lies within the field of **agrobiotechnology**, combining tools from chemistry and materials science to provide an innovative pest control system based on a carbon matrix that adsorbs volatile organic compounds and ensures their sustained release. Its versatile design allows integration into various agricultural contexts, particularly those where reducing the use of chemical pesticides is a technical, economic, or regulatory priority.

The main sectors of application include:

- **Crops sensitive to weevils**: Protection of banana, plantain, cocoa, palm, and other plantations where species such as the banana weevil (*Cosmopolites sordidus*) or the red palm weevil (*Rhynchophorus ferrugineus*) pose critical threats to productivity. The device is also suitable for other crops affected by phytosanitary problems associated with weevil infestations.
- **High value-added agriculture**: Vineyards, citrus orchards, and fruit farms where the demand for sustainable, chemical-free solutions is steadily increasing.
- **Organic and certified agriculture**: Farming systems requiring alternatives to synthetic insecticides, complying with organic production and sustainability regulations.
- **Controlled-environment production**: Greenhouses and hydroponic systems, where the localized and prolonged release of VOCs is particularly effective in maintaining stable concentrations within enclosed spaces.
- **Early crop protection stages**: Preventive application during germination and seedling establishment, critical phases in which early infestations can compromise later crop performance.

COL·LABORACIÓ BUSCADA

Companies are sought to acquire this technology for **commercial exploitation** through the following collaboration models:

- **Patent licensing agreements.**
- **Joint R&D projects** to adapt the technology to specific company needs, including formulation optimization, industrial scale-up, and adaptation to different crops and pest species.
- **Co-development of prototypes or field validation.**
- **Other collaboration modalities** that enable the commercial exploitation of the technology.

In particular, interest is sought from **companies with technical, production, and commercial capabilities** to develop, manufacture, and market repellent VOC-based devices for plant protection.

Target Company Profile:

- Companies specializing in agrochemicals and plant protection.
- Biotechnology companies focused on agricultural applications.
- Multinational corporations or large enterprises in the agricultural sector.
- Companies involved in the commercialization of carbon-based products.