

USO DI MOLECOLE ISOLATE DA BATTERI PRESENTI NEL DIGESTATO PRODOTTO DA IMPIANTI A BIOGAS COME IMMUNOSTIMOLANTI DELLE RISPOSTE DI DIFESA VEGETALI

KEYWORDS

- ❑ BIOLOGICALS
- ❑ BIOSIMULANT
- ❑ DIGESTATE
- ❑ DEFENSE OF PLANTS
- ❑ CIRCULAR ECONOMY

AREA

- ❑ CHEMISTRY & BIOTECHNOLOGY

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Patent Type

Brevetto invenzione

Ownership

Sapienza University of Roma (80%),
Agrolio SRL (20%)

Inventors

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Industrial & Commercial Reference

Phytosanitary, floriculture, plant nursery.
Plant protection, Integrated agriculture,
Recycling of agroindustrial waste

Time to Market

TRL 4 – technology validated in lab -
TTM: 18 mesi

Availability

Licence, Research, Collaboration
Experimentation and Start-up.



Abstract

Plant diseases cause significant losses in crop productivity. Furthermore, the extensive use of pesticides unfortunately causes serious problems for human health and the environment. The invention concerns the valorisation of molecules present in the waste from the production of Biogas, called Digestate in a green crop protection product with high added value. The use of isolated molecules in agriculture will reduce the costs related to the protection of crops using pesticides. Biogas and bioenergy production chains will be able to convert their waste into biopharmaceuticals, developing an internal production sector or they will be able to sell the waste to other phytopharmaceutical companies, favouring industrial symbiosis, in a circular economy perspective.

Publications

- ❖ -Sciubba F Chronopoulou L, Pizzichini D, Lionetti V, et al. Olive Mill Wastes: A Source of Bioactive Molecules for Plant Growth and Protection against Pathogens. *Biology*. 2020 6;9(12):450.
- ❖ -Swaminathan S, Lionetti V, Zabotina OA. Plant Cell Wall Integrity Perturbations and Priming for Defense. *Plants* 2022 Dec 15;11(24):3539.



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ARTEM _ UFFICIO VALORIZZAZIONE E TRASFERIMENTO TECNOLOGICO
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Technical description

The following invention describes an experimental process aimed at isolating bioactive molecules from biogas production waste, called digestate. Furthermore, the invention demonstrates how the pre-treatment of plant tissues with the isolated biological molecules mimics a phytopathogenic attack by activating the natural defense of plants. The immune system is sensitized and ready to effectively counteract subsequent microbial attacks. This strategy avoids the spread of harmful chemicals in the environment and limits the selection and spread of strains of the pathogen that are less sensitive or insensitive to a given chemical active ingredient by pursuing a circular economy policy.



Technology & Benefits

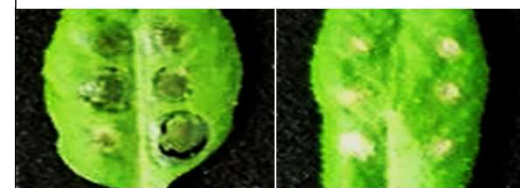
Chemical pesticides are currently widely used to treat plant diseases, but they pose a serious risk to the well-being of the environment, are harmful to health and extremely expensive. The exploitation of the digestate as a bioresource for the production of a low-cost "green" crop protection product and biostimulant provides an eco-sustainable alternative to chemical pesticides at the same time enhancing the biorefinery waste. The digestate becomes a source of bioactive molecules capable of pre-stimulating the immune system of vegetable crops, making them more ready to resist phytopathogenic microorganisms and therefore more productive. Thanks to the recovery of the digestate, the costs of phytosanitary management and production waste will be contained, creating a circular economy for more sustainable agriculture



Applications

The recycling of digestate into plant immunostimulants will favour environmentally friendly agro-food, flower and plant nursery processes and the proliferation of eco-innovative sectors based on green technologies, contributing to economic and environmental sustainability. Pesticide companies will be able to produce the product on a large scale and offer it to the agricultural market. The product will improve both the quality and quantity of agricultural production for food purposes. Nursery companies will be able to use the green preparation by lowering their production costs. Furthermore, the Biogas and Bioenergy chains from biomass of vegetable origin will be able to autonomously convert their waste by developing an internal production sector or sell the waste to other companies, favouring industrial symbiosis.

MIGLIORATA DIFESA DELLE PIANTE



Senza pretrattamento

Molecole isolate



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