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ABSTRACTS BOOK

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Innovative biopesticides to control grapevine fungal pathogens

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Abstract

The essential oil components (EOCs) are widely used as natural bioactive molecules of plant origin with antimicrobial activity. However, their high volatility, high reactivity and low water solubility limit their applications. One way to overcome these drawbacks is to develop controlled release systems of these natural antimicrobials against fungal plant pathogens. In this sense, the development, synthesis, and characterization of EOCs encapsulated in mesoporous silica microparticles capable of releasing the natural bioactive molecules in a controlled manner, can significantly increase their antimicrobial activity compared to free bioactive molecules. A key innovative aspect of this project is the development of functionalized materials with molecular gates consisting of mesoporous silica materials loaded with natural bioactive molecules and functionalized with saccharide derivatives or sugars. This will reduce the high volatility of natural bioactive molecules and increase their fungicidal activity through preferential delivery of molecules by opening the biomolecular gates in the presence of amylases excreted by fungi. In this study, the effect of *in vitro* treatments with new formulations of different EOCs on the mycelial growth and conidial germination of representative grapevine fungal pathogens: *Botrytis cinerea* (causal agent of grey mold disease), *Dactylonectria torresensis* and *Ilyonectria liriodendri* (causal agents of black-foot disease), and *Phaeoacremonium minimum* and *Phaeomoniella chlamydospora* (causal agents of Petri disease), was evaluated. The goal is to obtain new innovative biopesticides using natural resources in the context of sustainable agriculture.

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