

Enhancing the efficacy of bioactive molecules in the Mediterranean fruit fly control by nanocarriers  
with exopolysaccharides from cyanobacteria

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**Abstract**

In the last decades, the increasing demand for food has caused the misuse of pesticides which are harmful to the environment and humans. A valid alternative is represented by nanopesticides that can be engineered to reach a selected target with controlled release of the active principle. In particular, nanotechnologies can enhance the bioavailability of poorly soluble compounds. In this work, capsaicin, an alkaloid extracted from chili peppers, and hydroxytyrosol, a phenolic compound obtained from extra-virgin olive oil by-products, were loaded into innovative nanovectors. These were designed ad hoc combining exopolysaccharides from the cyanobacteria *Neocyanospira capsulata*, and a lipid component, i.e. egg phosphatidylcholine. The newly formed nanosystems were characterized by physico-chemical techniques and tested against the Mediterranean Fruit Fly *Ceratitis capitata* Wiedemann, 1824 (Diptera, Tephritidae). This pest is diffused in the Mediterranean region, where it causes high economic loss, and can be used as model insect. We found that nanoformulations were able to increase the ovicidal effect of hydroxytyrosol. Moreover, the formulation encapsulating either hydroxytyrosol or capsaicin was able to reduce the number of females landing on treated apricots.