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New natural crop protectants from aromatic plants and horticultural crop wastes

Residuos de plantas aromáticas y hortícolas como fuente de nuevos bioplaguicidas

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European agri- and horticulture is facing serious pest and pathogen problems. Currently, the use of synthetic pesticides is the main method of plant protection. However, the excessive use of pesticides has led to the development of pesticide resistance, environmental pollution, toxicity to non-target organisms, and risks for human health. In this context, natural crop protectants are needed in an increasingly restrictive pesticide market; and they can be obtained from renewable natural resources such as waste products from European agriculture, wild/cultivated spices, and ornamental plants. In the framework of Spanish national CTQ2012-38219-C03-01/RTA2012-00057-C03-03 and European COST Action FA1101 grants, we conducted an extensive chemical and biological bioprospection of essential oils (*Rosmarinus officinalis*, *Salvia lavandulifolia*, *Thymus mastichina*, *Lavandula x intermedia*, *Mentha* sp.) and their respective solid residues generated during the production process. Wastes from spice production (saffron, *Crocus sativus*) and flower industry including 20 different species of the genus *Crocus*, were also studied. Chemical characterization of extracts and essential oils was performed using HPLC-MS / NMR and GC-MS, respectively. Biocidal screening was conducted against selected insect pests (*Spodoptera littoralis*, *Leptinotarsa decemlineata* and *Myzus persicae*) and root-knot nematode (*Meloidogyne javanica*). We also evaluated their phytotoxic effects on lettuce, tomato and rye grass. Different levels of biopesticide activities were detected depending on the extract and target species. Structure-activity studies (SAR) were also studied. New natural crop protectants sources are suggested and future approaches are discussed.