Essential oils as phytochemical nematodicides with activity against plant parasitic nematodes

Jorge M. S. Faria[1,2]
fariajms@gmail.com

Maria L. Inácio[1,3]
lurdes.inacio@iniav.pt

[1] INIAV, I.P., Instituto Nacional de Investigação Agrária e Veterinária, Quinta do Marquês, 2780-159 Oeiras, Portugal.

[3] GREEN-IT Bioresources for Sustainability, ITQB NOVA, Oeiras, Portugal

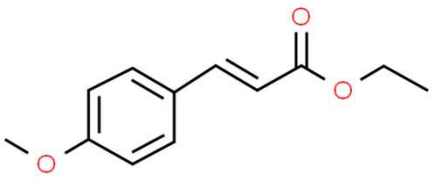
Cláudia S. L. Vicente[1,2]
cvicente@uevora.pt

[2] MED, Mediterranean Institute for Agriculture, Environment and Development, Institute for Advanced Studies and Research, Évora University, Pólo da Mitra, Ap. 94, 7006-554 Évora, Portugal.

Synthetic pesticides used against plant parasitic nematodes (PPNs) have been discontinued due to serious environmental and public health concerns. Essential oils (EOs) are promising alternatives given they are easily accessible, show high biological activities, have low environmental impacts, and are subjected to less strict regulatory approval mechanisms.

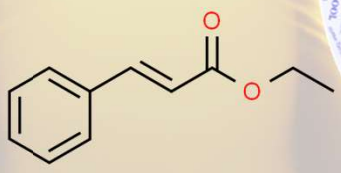
We reviewed the chemical composition of EOs with direct biological activity against the root-knot nematodes (RKNs), plant cyst nematodes (PCNs), and the pinewood nematode (PWN). The compositions (≥10%) of the top 10 most active EOs were compared.

Phenylpropanoids

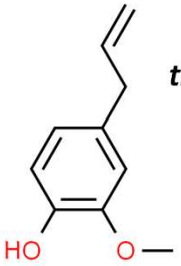


Ethyl *p*-methoxycinnamate

trans-Cinnamaldehyde



Ethyl cinnamate



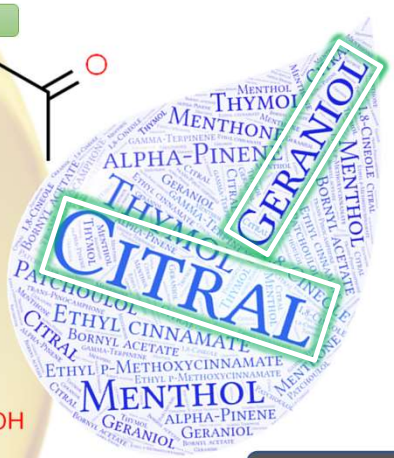
Eugenol

RKN

Aliphatic compounds

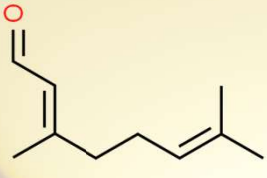
2-Undecanone

Propyl trisulfide

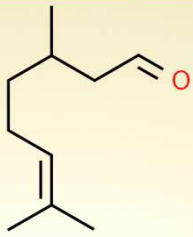


PCN

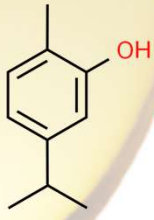
Oxygen-containing monoterpenes



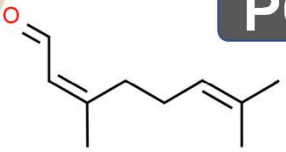
Geranial



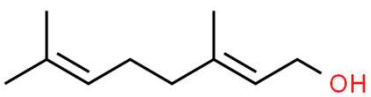
Citronellal



Carvacrol



Neral



Geraniol

PWN

EOs rich in chemicals with electronegative elements, namely oxygen (O) or sulphur (S) seem to have a generalized nematicidal activity.

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