

Nematicidal activity of essential oils and volatiles derived from Portuguese aromatic flora against the pinewood nematode, *Bursaphelenchus xylophilus*

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Abstract: Twenty seven essential oils, isolated from plants representing 11 families of Portuguese flora, were screened for their nematicidal activity against the pinewood nematode (PWN), *Bursaphelenchus xylophilus*. The essential oils were isolated by hydro-distillation and the volatiles by distillation-extraction, and both were analysed by GC and GC-MS. High nematicidal activity was achieved with essential oils from *Chamaespartium tridentatum*, *Origanum vulgare*, *Satureja montana*, *Thymbra capitata*, and *Thymus caespititius*. All of these essential oils had an estimated minimum inhibitory concentration ranging between 0.097 and 0.374 mg/ml and a lethal concentration necessary to kill 100% of the population (LC₁₀₀) between 0.858 and 1.984 mg/ml. Good nematicidal activity was also obtained with the essential oil from *Cymbopogon citratus*. The dominant components of the effective oils were 1–octen-3-ol (9%), *n*-nonanal, and linalool (both 7%) in *C. tridentatum*, geranial (43%), neral (29%), and β -myrcene (25%) in *C. citratus*, carvacrol (36% and 39%), γ -terpinene (24% and 40%), and *p*-cymene (14% and 7%) in *O. vulgare* and *S. montana*, respectively, and carvacrol (75% and 65%, respectively) in *T. capitata* and *T. caespititius*. The other essential oils obtained from Portuguese flora yielded weak or no activity. Five essential oils with nematicidal activity against PWN are reported for the first time.

Key words: medicinal and aromatic plants, biological control, *Bursaphelenchus xylophilus*, essential oils, nematicidal activity, pinewood nematode, Portugal, volatiles, *Artemisia absinthium*, *Artemisia dracunculoides*, *Calamintha baetica*, *Chamaespartium tridentatum*, *Chamomilla recutita*, *Cistus ladanifer*, *Crithmum maritimum*, *Cryptomeria japonica*, *Cymbopogon citratus*, *Foeniculum vulgare*, *Juniperus brevifolia*, *Laurus azorica*, *Laurus nobilis*, *Lavandula dentata*, *Lavandula luisieri*, *Lavandula stoechas*, *Lavandula viridis*, *Mentha pulegium*, *Myrtus communis*, *Origanum vulgare*, *Pittosporum undulatum*, *Salvia officinalis*, *Satureja montana*, *Thymbra capitata*, *Thymus caespititius*, *Thymus mastichina*, *Thymus zygis*.

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