

Title Toxic compounds in essential oils of coriander, caraway and basil active against stored rice pests

Author María D. López, María J. Jordán and María J. Pascual-Villalobos

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Abstract

Essential oils, distilled from seeds of *Coriander sativum* and *Carum carvii* and from leaves of five different varieties of *Ocimum basilicum*, were fractionated by column chromatography and tested in the laboratory for volatile toxicity against three stored rice pests (*Sitophilus oryzae*, *Rhyzopertha dominica* and *Cryptolestes pusillus*). The active fractions were analyzed by GC–MS. Coriander contained linalool (1617 ppm of the oil) as the main product active against the three pests. Camphor-rich fractions (over 400 ppm) were very toxic to *R. dominica* and *C. pusillus*. The caraway profile included carvone and limonene as expected but (*E*)-anethole, generally regarded as a minor product in the essential oil of this species, was also a major component, being present at 365 ppm. Carvone was the most effective (972 ppm) monoterpenoid against *S. oryzae*. In addition, (*E*)-anethole at 880 ppm was toxic to *R. dominica* while vapors of limonene (1416 ppm) and fenchone-rich (554 ppm) fractions killed adults of *C. pusillus* only. Three major essential oil profiles were present in the five varieties of *O. basilicum* analyzed: methyl eugenol/estragole, estragole and estragole/linalool chemotypes. The abundance of components had a strong influence on the outcome of the bioassays. Fractions, where combinations of products occurred with or without other minor compounds, were often more toxic than any one compound alone.