

Fast purification and characterisation of semiochemical compounds from essential oils of *Matricaria chamomilla* L. and *Nepeta cataria* L. using column chromatography fractionation and Ultra Fast GC analysis

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Essential oils and their constituents with semiochemical properties are more and more used for insects control in integrated pest management programmes. The present study describes both, a fast, simple and reproducible original method for obtaining purified essential oil extracts of interest in chemical ecology, and fast GC analyses for their characterisation.

The chemical compositions of *Matricaria chamomilla* L. and *Nepeta cataria* L. essential oils were determined by GCMS on an apolar stationary phase by comparison of the characteristic fragmentation patterns with those of the Wiley 275.L database. The GCMS chromatograms were compared with the chromatograms obtained by Ultra Fast GC equipped with a direct resistively heated column (5% phenyl, 5m x 0.1mm, 0.1µm film thickness). Analytical conditions were optimised to reach a good peak resolution (split ratio 1:100), with analysis times between 1.5 min and 3 min versus 30-45 min required by conventional GC.

Essential oils were then fractionated by column chromatography packed with silicagel. The elution solvent was n-pentane. The chemical composition of the multiple fractions obtained was rapidly determined by Ultra Fast GC. Three main fractions with high degree of purity in E-beta-farnesene were isolated from the *Matricaria chamomilla* oil. One fraction enriched in Z,E-nepetalactone [(4aS,7S,7aR)-nepetalactone (stereoisomery verified by ¹H and ¹³C NMR, VARIAN 100, 400 and 600 MHz)] and one fraction enriched in beta-caryophyllene were obtained from the *Nepeta cataria* oil. E-beta-farnesene and Z,E-nepetalactone are respectively the main alarm and sexual pheromones of many aphids species. The beta-caryophyllene is a molecule of interest having biological activity against aphid's reproduction. These compounds could also act as attractants of aphid's predators and parasitoids.

Solvent-free purified compounds from fractionations were obtained by evaporation of n-pentane in a water bath at 40°C. The recovery of this method was 99.1% ± 0.6% for E-beta-farnesene.

Nowadays, biological tests are carried out on aphid's predators (*Episyrphus balteatus* De Geer, Diptera: Syrphidae) and parasitoids (*Aphidius ervi* Haliday, Hymenoptera: Braconidae).