

# Chemical Composition and Phytotoxicity of Volatile Essential Oil from Intact and Fallen Leaves of *Eucalyptus citriodora*

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Z. Naturforsch. **61c**, 465–471 (2006); received November 30, 2005/January 11, 2006

A total of 23 volatile constituents was identified and characterized by GC and GC-MS in the volatile essential oil extracted from intact (juvenile and adult) and fallen (senescent and leaf litter) leaves of lemon-scented eucalyptus (*Eucalyptus citriodora* Hook.). The leaves differed in their pigment, water and protein content, and C/N ratio. The oils were, in general, monoterpenoid in nature with 18 monoterpenes and 5 sesquiterpenes. However, a great variability in the amount of essential oils and their individual constituents was observed in different leaf tissues. The amount was maximum in the senescent leaves collected from the floor of the tree closely followed by that from juvenile leaves. In all, 19 constituents were identified in oil from juvenile and senescent leaves compared to 23 in adult leaves and 20 in leaf litter, respectively. Citronellal, a characteristic monoterpene of the oil reported hitherto was found to be more (77–78%) in the juvenile and senescent leaves compared to 48 and 54%, respectively, in the adult leaves and leaf litter. In the adult leaves, however, the content of citronellol – another important monoterpene – was very high (21.9%) compared to other leaf types (7.8–12.2%). Essential oil and its two major monoterpenes viz. citronellal and citronellol were tested for their phytotoxicity against two weeds (*Amaranthus viridis* and *Echinochloa crus-galli*) and two crops (*Triticum aestivum* and *Oryza sativa*) under laboratory conditions. A difference in the phytotoxicity, measured in terms of seedling length and dry weight, of oil from different leaves and major monoterpenes was observed. Oil from adult leaves was found to be most phytotoxic although it occurs in smaller amount (on unit weight basis). The different toxicity of different oil types was due to the relative amount of individual monoterpenes present in the oil, their solubility and interactive action. The study concludes that oil from senescent and juvenile leaves being rich in citronellal could be used as commercial source of citronellal whereas that from adult leaves for weed management programmes as it was the most phytotoxic.

**Key words:** Monoterpenes, Growth Inhibition, Chlorophyll Content