

Extraction methods effects on composition and toxicity of Eucalyptus essential oil

ABSTRACT

The current investigation was designed to determine the influence of three extraction methods on the composition and insecticidal activity of essential oils extracted from *Eucalyptus globulus* and *E. camaldulensis*. The evaluated extraction methods were steam-distillation, steam water-distillation and hydro-distillation. Fumigant toxicity of the extracted essential oils was evaluated against *Sitophilus oryzae*. The GC and GC-MS methods were used for analyzing the oil chemical composition. Both *E. globulus* and *E. camaldulensis* showed significant differences in oil yield (w/w, based on dry weight) with direct steam distillation resulting in low oil yields (0.8%; 0.35%) compared to water distillation (2.35%; 2.22%) and water + steam distillation (2.03%; 1.53%). We identified nineteen compounds in the essential oils of these species. 1, 8-Cineol (27.67-82%), α -Pinene (4.67-8.13%) and Limonene (2.49-10.53%) were the major components of the oils and the highest amount of 1, 8-Cineol (82%) was obtained with water distillation, while steam-distillation resulted in the lowest amount of Cineol (27%). The results of the toxicity study of the essential oils demonstrated that the highest toxicity (LC₅₀ = 24.89 μ L/L air) was observed against *S. oryzae* populations treated with oils extracted by water distillation. In conclusion, the extraction of Eucalyptus essential oils by hydro-distillation had some priorities over the oil extractions by the other methods because hydro-distillation extracted oil had the highest fumigant activity, high and fast-oil yields as well as high percentage composition of 1,8-Cineol.

Keyword: Eucalyptus essential oils; Extraction method; 1,8-Cineol; Fumigant toxicity; *Sitophilus oryzae*