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EXTRACTION OF CHEMICAL COMPOUNDS FROM MEDICINAL PLANTS USING SUPERCRITICAL CARBON DIOXIDE

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Supercritical fluid extraction (SFE) using carbon dioxide is an innovative, clean and environmentally friendly technology with particular interest for the extraction of biologically active secondary metabolites. It can provide valuable sources of natural drugs, pesticides and bio fertilizers [1]. Objective of this work was to optimize the SFE from eucalyptus (*Eucalyptus grandis* L.) leaves, which find application both in medicine and as botanical insecticide [2]. In particular, terpenes and terpenoids belong to active components of eucalyptus essential oil [3].

The extraction at 40 °C and 9-30 MPa followed by fractionation of extract was used in order to increase the concentration of volatiles and reach maximal insecticidal activity. The methods of fractionation were (i) gradual changes of solvent density,

(ii) use of additional separator, and (iii) use of silica gel as sorbent. Hydrodistillation of essential oil was conducted for comparison. Volatile fraction composition, yield and insecticidal activity of the isolates were evaluated. The chemical composition was determined by GC-MS and GC-FID and the insecticidal activity was measured

on larvae of *Spodoptera littoralis* in terms of antifeedancy (ED50), acute and chronic toxicity (LD50).

The major terpenes were α -pinene, 1,8-cineole, globulol and aromadendrene. The distillate was most effective in terms of acute toxicity and antifeedant activity due

to the highest concentration of volatile compounds. The maximum chronic toxicity was exhibited by the SFE extract at 40°C and 30 MPa (LD50 = 8 μ g), almost two times higher than by the distillate (LD50 = 15 μ g), due to the synergic effect of non-volatile and volatile extract components.

References:

1. S Abd-Ellatif et al. (2011) *J. Agric. And Biol. Sci.* 6: 25-32.
2. Y Tian et al. (2011) *Adv. Mater. Res.* 233-235: 82-86
3. EA Klein Gebbinck et al. (2002) *Phytochem.* 61: 737-770.