



SOLVENT-FREE MICROWAVE EXTRACTION OF ESSENTIAL OIL FROM LEAVES OF *Ocimum tenuiflorum*

Ranatunga R.A.G.N., Perera H.D.S.M., Bandara V.S. and Samarasekara R.*

Herbal Technology Section, Industrial Technology Institute, Colombo 07, Sri Lanka

radhika@iti.lk

ABSTRACT

Ocimum tenuiflorum (synonym *O. sanctum*) belongs to Lamiaceae family and known as “Maduruthala” in Sinhala. Solvent Free Microwave Extraction (SFME) is a modern technique to extract essential oils from aromatic and medicinal plants using microwaves. The aim of this study was to extract the essential oil from leaves of *O. tenuiflorum* using SFME technique to characterize the *O. tenuiflorum* oil using Gas Chromatography (GC) and Gas Chromatography-Mass Spectrometry (GC-MS) and to compare the oils obtained from SFME and hydro distillation (HD) techniques. The fresh leaves of *O. tenuiflorum* were subjected to SFME (Microwave power: 700 W for 5 min. and 500 W for 55 min.) and HD to extract the essential oil. The essential oils were analyzed using GC and GC-MS. The extraction time for SFME was found to be less (1.0 h) in comparison to that of HD method (5.0 h) to obtain comparable yield of oil from both methods (SFME: 0.35% and HD: 0.45%). The GC-MS analysis enabled the identification of 49 compounds from essential oil of leaves of *O. tenuiflorum* extracted using both techniques. GC-MS profile indicated 15 major compounds including 01 monoterpene (β -Ocimene), 13 sesquiterpenes (β -Selinene, α -Guaiene, δ -Cadinene, Eudesm-7(11)-en-4-ol, α -Copaene, (-)- β -Bourbonene, β -Cubebene, β -Elemene, Caryophyllene, Humulene, Germacrene D, Hedycaryol, 8-Isopropenyl-1,5-dimethylcyclodeca-1,5-diene) and 01 phenylpropanoid (Eugenol) in the essential oil of leaves of *O. tenuiflorum*. Eugenol, the predominant compound was detected higher in the oil obtained from SFME ($47.30 \pm 0.39\%$) over that of, HD ($44.76 \pm 0.14\%$). The percentage of monoterpenes was found to be lower than that of sesquiterpenes of the essential oils extracted from both methods. This is the first study of extraction of essential oil from leaves of the Sri Lankan variety of *O. tenuiflorum* using SFME and identifying the volatile compounds by GC-MS. The results indicate that SFME is an efficient method for extraction of essential oils over HD in terms of yield, extraction time and eugenol content.

Keywords: *Ocimum tenuiflorum*, Essential oil, Hydro-distillation, Solvent free microwave extraction, Gas-chromatography