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Abstract: Supercritical fluid extraction (SEE) of the volatile oil from Thymus vulgaris L. aerial flowering parts was performed under different conditions of pressure, temperature, mean particle size and CO2 flow rate and the correspondent yield and composition were compared with those of the essential oil isolated by hydrodistillation (HD). Both the oils were analyzed by GC and GC-MS and 52 components were identified. The main volatile components obtained were p-cymene (10.0-42.6% for SFE and 28.9-34.8% for HD), gamma-terpinene (0.8-6.9% for SFE and 5.1-7.0% for HD), linalool (2.3-5.3% for SFE and 2.8-3.1% for HD), thymol (19.5-40.8% for SFE and 35.4-41.6% for HD), and carvacrol (1.4-3.1% for SFE and 2.6-3.1% for HD). The main difference was found to be the relative percentage of thymoquinone (not found in the essential oil) and carvacryl methyl ether (1.0-1.2% for HD versus t-0.4 for SFE) which can explain the higher antioxidant activity, assessed by Rancimat test, of the SFE volatiles when compared with HD. Thymoquinone is considered a strong antioxidant compound.

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