

Chemical Composition, Antioxidant and Antibacterial Activities of Essential Oil from the Leaves of *Thymus vulgaris* L.

Authors : Tsige Reda

Abstract : Essential oil of *Thymus vulgaris* was extracted by means of hydro-distillation. This study was done to investigate the chemical composition, antibacterial and antioxidant activities. The chemical composition of the essential oils was determined using gas chromatography coupled to mass spectroscopy (GC-MS). Using disc diffusion assay the antibacterial activity was assessed on one Gram-positive bacteria and one Gram-negative bacteria. The percentage oil yield of the essential oil was found to be $0.97 \pm 0.08\%$ (w/w) with yellow color. The physicochemical constants of the oil were also noted. The phytochemical screening of the plant extract revealed the presence of tannins, saponins, phenol, flavonoids, terpenoids, steroids and alkaloids. A total of 18 chemical constituents were identified by Gas Chromatography-Mass Spectroscopy analysis representing 100% of the total essential oil of *Thymus vulgaris*, with thymol (31.977%), o-cymene (29.992%), and carvacrol (14.541%). Previous studies have revealed that the thymol, o-cymen and carvacrol components of *Thymus vulgaris* are responsible for their biological activities. *Thymus vulgaris* have been used traditionally to treat a wide variety of infections. Based on the extensive use and lack of scientific evidence, a study was embarked upon to determine its bioactivity. The essential oil of *Thymus vulgaris* leaves exhibited higher activity towards the Gram-positive bacteria (*Staphylococcus aureus*) than the Gram-negative bacteria (*Escherichia coli*) and also has good antioxidant activity, and can be used medicinal and therapeutic applications. This activity may be due to the high amount of thymol, o-cymen and carvacrol.

Keywords : hydro-distillation, *Thymus vulgaris*, essential oil composition, phytochemical screening, physicochemical constants, antioxidant activity, antibacterial activity

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