

Chemical composition, antioxidant and antimicrobial activities of essential oil of *Thymus algeriensis* wild-growing in Libya

Research Article

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Abstract: The composition of essential oil isolated from *Thymus algeriensis* growing wild in Libya was analyzed by GC and GC-MS. The essential oil was characterized with thymol (38.50%) as the major component. The oil was screened for antioxidant activity using DPPH assay, and compared to thymol and carvacrol. Antioxidant activity was high, with the IC_{50} of 0.299 mg/ml, compared to 0.403 and 0.105 mg/ml for thymol and carvacrol, and 0.0717 mg/ml for BHA. In addition, antimicrobial activity was tested against eight bacteria and eight fungi. *T. algeriensis* oil showed inhibitory activity against tested bacteria at 0.001-0.05 mg/ml, while bactericidal activity (MBC) was achieved at 0.0025-0.05 mg/ml. For antifungal activity MICs ranged 0.0005-0.025 mg/ml and MFC 0.001-0.05 mg/ml. High antimicrobial activity against the fungi in particular suggests that the essential oil of *Thymus algeriensis* could have a useful practical application.

Keywords: *Thymus algeriensis* • Essential oil • Antimicrobial • Antioxidant activity

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1. Introduction

The genus *Thymus* is one of the largest and economically most important genera within the Lamiaceae (= Labiatae) family. *Thymus* species are distributed throughout the arid, temperate and cold regions of the Old World north of the equator, and on the coasts of Greenland [1]. The number of species within this genus is assumed to be more than 200 [2]. Many *Thymus* species are extensively used, dry or fresh, as culinary herbs. Also, essential oils obtained from these species were utilized as flavor ingredients in a wide variety of foods, beverages and confectionery products, as well as in perfumery for the scenting of soaps and lotions. Several *Thymus* species are used as medicinal herbs,

and they are known to possess antispasmodic, sedative, antiphlogistic, antiviral, antioxidant, antibacterial and antifungal activities [3-11].

In Libya, the genus *Thymus* is represented by only two species - *Thymus algeriensis* Boiss. et Reut., and *Th. capitatus* Hoffms. et Link. They are known in Libya under the common name "Zaatar" [12]. These species are commonly used fresh or dry as a spicy herbs, for medicinal purposes to treat respiratory system disorder, and against illnesses of the digestive tube and anti-abortion [13,14]. There are a number of reports on the chemical composition of essential oil of *Th. algeriensis*, with a large variation in the chemical profile established [3,4,15-18]. There is only one earlier study of the chemical composition and antimicrobial activities of

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