

THE EFFECTS OF HABITAT TYPE AND DIURNAL HARVEST ON ESSENTIAL OIL YIELD AND COMPOSITION OF *Lavandula angustifolia* Mill.

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ABSTRACT

The world demand for lavender essential oil is still increasing. It is estimated that over two hundred thousands hectares are being cultivated in Europe and the quality of produced essential oil is important especially for medicinal and pharmaceutical uses as well as for aromatherapy. We tested and evaluated the quantity and the quality of essential oil produced by one lavender genotype, *Lavandula angustifolia* var *etherio*, which is well adapted in Greece region, in two different experimental sites (Kato Scholari and Kilkis). The diurnal essential oil yield and oil composition were also tested. The genotype presented an excellent transplantation degree and high survival percentage in the field. Small differences were recorded in production of oil between the experimental sites (for Kato Scholari was $2.67 \pm 0.12\%$ and for Kilkis region $2.54 \pm 0.13\%$). Differences were recorded in essential oil composition between the experimental sites. The main compounds were linalyl acetate (30.62%), linalool (29.56%), 1,8-cineole (5.18%) and camphor (4.03%) for Kato Scholari. The main compounds for Kilkis were linalyl acetate (26.92%), linalool (16.78%), 1,8-cineole (15.55%) and camphor (7.41%). Diurnal differences in oil yield were not observed. In contrast the major compounds percentage showed differences. The high content of linalyl acetate and linalool and low content of 1,8-cineole and camphor for Kato Scholari resulted in a very pleasant and delightful aroma. The selection of a field for lavender cultivation in a big scale should take into consideration the local conditions. Calcareous, well drainage light substrates are suggested as the most suitable for lavender oil production. It is also concluded from this study that the best time for lavender harvesting is after midday and during afternoon where the linalyl acetate is higher.

KEYWORDS: *Lavandula angustifolia*, lavender oil, distillation, diurnal, essential oil, aromatic plant

INTRODUCTION

The members of the Labiatae family are generally known for their multiple pharmacological effects such as anticonvulsant, sedative, antispasmodic, analgesic, antioxidant, local anaesthetic activity and it has been used for medicinal purposes [1-4]. The genus *Lavandula*, known as lavender, contains different species which belong to the 'Labiatae' family that geographically grow in Mediterranean countries [5]. Several therapeutic effects of lavender, such as sedative, relaxant, carminative spasmolytic, antiviral, and antibacterial properties have been reported [6, 7].

Essential oils obtained from aromatic plants, are complex mixtures of several chemical compounds including terpenes, alcohols, aldehydes and phenols. Lavender oil, obtained from the flowers of *Lavandula angustifolia*, is composed mainly of linalyl acetate, linalool, lavandulol, 1,8-cineole, lavandulyl acetate and camphor [8]. Because of its delightful odour, lavender is one of the most useful medicinal plants and has found wide application in perfumes, colognes, skin lotions and other cosmetics [9]. In food manufacturing, lavender essential oil is employed in flavouring beverages, ice-cream, candy, baked goods, and chewing gum [10]. Recently, with aromatherapy becoming increasingly popular, lavender is used as a relaxant [8]. The use of aromatherapy as a therapeutic treatment for affective disorders has also been widely reported in historical anecdotal literature [11]. The plant is used in different parts of the world for the treatment of several gastrointestinal, nervous and rheumatic disorders [12-13]. An *in vitro* cytotoxic activity of lavender oil and its main components linalyl acetate and linalool on human skin cells has been reported [14]. Lavender oil also has antioxidant properties [15] and unlike to many other essential oils used in aromatherapy, the oil is often applied undiluted to the skin. Jager et al. [16] suggested that essential oils and their components are rapidly absorbed through the skin and linalool and linalyl acetate were shown to be rapidly detected in plasma after topical application with massage, reaching peak levels after approximately 19 min.