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Study of the Active Compound in the Essential Oil of Myrtus Communis L.

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Abstract
This study appears of the major volatile compounds in the essential oil of myrtle leaves because of its significant medical and economic benefits.
The essential oil composition of *Myrtus communis* leaves during its flowering stage was determined.
six volatile compounds were identified in leaves essential oils, α-Pinene 308 µg/ml, linalool (23.83 µg/ml), Eucalyptol or 1,8-cineole (41.46 µg/ml), Limonene (45.22 µg/ml), α-terpineol (41.73 µg/ml), Geranyl acetate (18.28 µg/ml) were the main monoterpene compounds.
α-Pinene was Represents the bulk of the other compounds in the myrtle leave
Keywords: *Myrtus communis* L., myrtle, flowering stage, essential oil, chemical compounds.

Introduction

Among the earth's more than one hundred warmth flourishing myrtle varieties, surely none has such regional cultural significance as *Myrtus communis* L., a native of the Mediterranean and Asia like as Turkey, Iraq, Iran, Syria .

Like all evergreen plants with a pleasant aroma, in that region it was also a symbol of strong life force (Heilmeyer, 2007).

Myrtus communis L. is better known as a medicinal plant for its anti-hyperglycemic (Elfellah *et al.,* 1984), antiseptic and anti-inflammatory activities (Al-Hindawi *et al.,* 1989; Diaz & Abeger, 1987).

Different parts of the plant find various uses in food and cosmetic industries (Chalchat *et al.,* 1998).

Leaves of Myrtle have been used as a substitute in beer (Buhner,1998). While the drinks prepared from myrtle berries became popular especially in Sardinia (Nuvoli & Spanu, 1996)

On the other hand, this species is a very aromatic plant because of the high essential oil content in its leaf, flower, and fruit glands, different part of essential oils have been employed for their antimicrobial, tonic and balsamic properties (De-Laurentis *et al.,* 2005).

The chemical composition of the myrtle leaf essential oil belonging to the different regions and harvested at different periods has been widely studied (Bradesi *et al.,* 1997; Chalchat *et al.,* 1998; Gardeli *et al.,* 2008) and the evaluation of the fruit essential oil composition have also been reported (Mazza, 1983; Mulas *et al.,* 2000). Moreover, many phytochemical researches investigated at the same time the essential oil composition of leaves and fruits as well as the other parts of *M. communis* (Aidi -Wannes *et al.,* 2007& Tuberoso *et al.,* 2006).

There are many references to myrtle in ancient Egyptian medical texts as to remove mucus from the chest, a remedy for urinary disorders, pain, heartburn, swelling, stiffness of the limbs and cough also in Coptic medicine, the essential oil of myrtle was used in a prescription with fresh rue and a mineral for a number of skin disease (Manniche, 1999).

Volatile oil of *Myrtus communis* have been used for several purposes, where the leaves are used to treat hypertension, hemorrhoids, common colds, cardiac disorders, urethral disorders, diarrhoea, internal diseases, rheumatic pain, edema in the extremities, to lower blood glucose, to pass kidney stones, as an appetite stimulant, hair restorer, wound healer and a haemostatic also the leaves by steam distillation is also commonly used to lower blood glucose(Tuzlaci, 2006; Baytop 1999; Yeşilada *et al*. 1995; Ertuğ 2004).

Although it is known that both the berries and the leaves are used to macerate an aromatic liqueur called Mirto at the islands of Sardinia and Corsica (Guarrera *et al.* 2006).

The purpose of this work is to characterize *M. communis* leaves through its essential oil and fatty acid composition at flowering stages to determine the active compounds and to try to estimate this berry fruit as source of bioactive molecules.

Figure 1. shape of myrtle leaves

Material and methods

Plants materials

Leaves of *M. communis* were collected at flowering periods from plants grown in the region of Baghdad in the middle of Iraq. Where collected at April 2015.

Analysis of essential oil of Myrtle leaves

The extract was separated on FLC (fast liquid chromatographic) column under the optimum condition.
Column: 3 µm particle size (50×2.0 mm I.D) C- 18 DB column.
Mobile phase: were methanol: d ionized water: 0.1% phosphoric acid: (88:12:0.1. V/V).
Detection UV set at 285 nm
Flow rate 1.2 ml/min.
The sequences of the eluted material of the standard were as follow, each standard was 25 µg/ml.

Calculation

$$concentration\ of\ sample\ \mu g/l = \frac{area\ of\ sample}{areae\ of\ standard} \times conc.of\ standard \times dilution\ factor$$

Essential oils Eos

Extracts these oils via steam distillation.
Commercially the vast majority of Eos are extracted by steam distillation, although some are obtained through fermentation, steam distillation involves boiling water and directing the steam through the plant components. The steam vaporizes the aromatic components as it passes through the plant components 10 gram were used to extract the oil, carrying it to the top of the still. The mixture of aromatic compounds and vapor (now called hydrosol) then passes through a condenser where it is cooled and settles back into the liquid state. The liquid mixture flows down into a collection vessel where the hydrophobic essences separate from the hydrosol (figure 1) the 20 µl were injected into HPLC according the optimum condition.

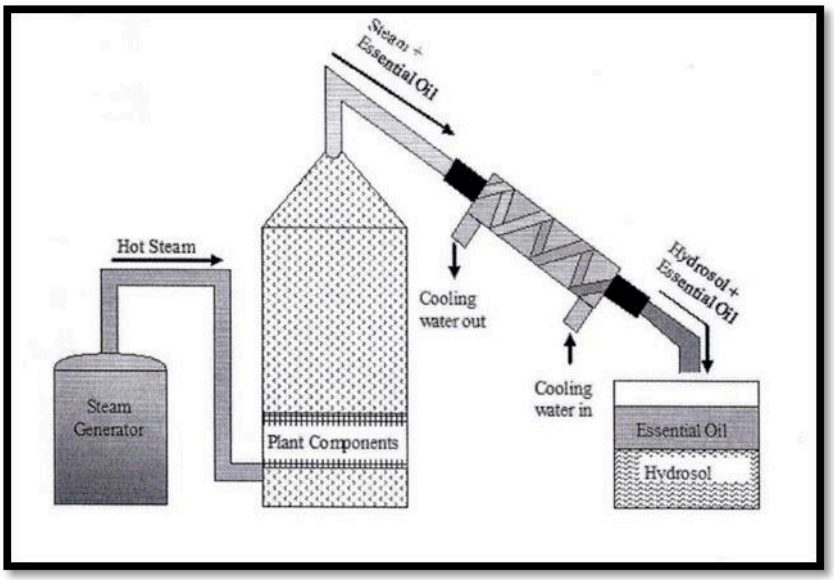

Figure 1. The separation occurred on liquid chromatography shimadzu 10 AV-LC equipped with binary delivery pump model LC- 10A shimadzu, the eluted peaks were monitored by UV-Vis 10A SPD spectrophotometer.

Results and discussions

They found six important compounds in the myrtle leaves in different concentration the compound are (α-Pinene , Eucalyptol, Linalool, Limonene, α-terpineol and Geranyl acetate)

α-Pinene is an organic compound of the terpene , It is found in the oils of many species like as coniferous trees, notably the pine, it is also found in the essential oil of rosemary and present in some oils such as eucalyptus oil and orange peel oil (David, 2000).

Concentration of α-Pinene in the myrtle leave was 308 µg/ml where the bulk of the other compounds in the myrtle leave (Table 1 & Figure 1).

α-Pinene is an anti-inflammatory via PGE1 and seems to be a broad-spectrum antibiotic (Nissen *et al.*, 2010). It exhibits activity as an acetylcholinesterase inhibitor, aiding memory (Russo, 2011).

The other solution in the myrtle leaves is linalool, it's also a naturally occurring terpene alcohol chemical found in many flowers and spice plants, the concentration of linalool in the myrtle leaves 23.83 µg/ml (Table 1 & Figure 1).

It has other names such as β-linalool, linalyl alcohol, linaloyl oxide, *p*-linalool and alloocimenol (Casabianca *et al*., 1998).

Linalool is used as an odor in 60–80% of perfumed cleaning products and cleaning agents including soaps, detergents, shampoos, and lotions (Pengelly, 2004).

It is also used as a chemical intermediate, one common downstream product of linalool is vitamin E (Lewinshon *et al.,* 2001).

In addition, linalool is used by pest professionals as a flea, fruit fly and cockroach insecticide and used in some mosquito-evictor products as the sole active ingredient against to the mosquito (Nakamura *et al*., 2009).

Eucalyptol or 1,8-cineole comprises up to 90% of the essential oil of some species of the generic product Eucalyptus oil, hence the common name of the compound, is also known by a variety of synonyms cajeputol, eucalyptole, cineol, cineole. (Boland *et al.,* 1991)

The Concentration of Eucalyptol in the myrtle leaves arrived to 41.46 µg/ml (Table 1 & Figure 1).

It can be used internally as a flavoring and medicine ingredient at very low doses, typical of many essential oils (volatile oils), eucalyptol is toxic if ingested at higher than normal doses (Sfara *et al.,* 2009).

Eucalyptus is used in spices, perfume and cosmetics because of its pleasant spicy aroma and taste, Cineole-based eucalyptus oil is used as spices at low levels (0.002%) in various products, including breaded goods, sweetmeats, meat products and drinks (Harborne and Baxter, 2001).

Eucalyptol is an ingredient in many trademark of mouthwash and cough drugs, as well as use in the in body powder (Schiestl and Roubik, 2004).

Eucalyptol is used also as an insecticide and insect repellent (Klocke *et al.,* 1987 and Sfara *et al.,* 2009).

Limonene is a colourless liquid hydrocarbon classified as a cyclic terpene, the Concentration of this compound in myrtle leaves was arrived to 45.22 µg/ml (Table 1 & Figure 1).

Limonene is common in cosmetic products, as the main odor constituent of citrus, limonene is used in

food industrialization and some drugs like as a flavoring to disappear the bitter taste of alkaloids and as an aroma in perfumery, aftershave lotions, bath products and other such products that include perfume, it is also used as botanical insecticide (Matura *et al.,* 2002).

In natural and alternative medicine, d-limonene is marketed to relieve gastroesophageal reflux disease and heartburn (Sun, 2007).

Limonene is an adenosine agonist which may explain its antistress and calmative properties (Park, 2011; Zhou, 2009 and Do-Vale, 2002).

The other solution Terpineol is a naturally occurring monoterpene alcohol that has been isolated from a variety of sources such as cajuput oil, pine oil, and petitgrain oil(Shan-Shan *et al.,* 2005).

The Concentration of terpineol in myrtle leaves was arrived to 41.73 µg/ml (Table 1 & Figure 1).

There are four isomers, α, β and γ-terpineol, β- and γ-terpineol differ only by the location of the double bond, terpineol is usually a mixture of these isomers with α-terpineol as the major constituent and some chemists have suggested the synthesis terpineol appeared from alternative way starting from d-limonene (Yuasa and Yuasa, 2006).

Terpineol has a pleasant odor similar to lilac and is a common factor in perfumes, cosmetics, and flavors. α-Terpineol is one of the two most abundant taste constituents of lapsang souchong tea (a variety of souchong tea with a smoky flavor) the α-terpineol construct in the pine fume used to dry the tea (Shan-Shan *et al.,* 2005).

The else solution is Geranyl acetate is a natural organic compound that is classified as a monoterpene, the concentration of this compound was 18.28 µg/ml in the leaves of myrtle (Table 1 & Figure 1).

Geranyl acetate is used primarily as a component of perfumes for creams and soaps and as a flavoring ingredient. It is used particularly in rose, lavender and geranium formulations where a sweet fruity or citrus aroma is desired (Claon and Akoh, 1993).

Table 1: concentration of solution in the myrtle leaves.

solution	Concentration of the solution
α-pinene	308
Linalool	23.83
1-8 cinole (Eucalyptol)	41.46
Limonene	45.22
α-terpineol	41.73
Geranyl acetate	18.28

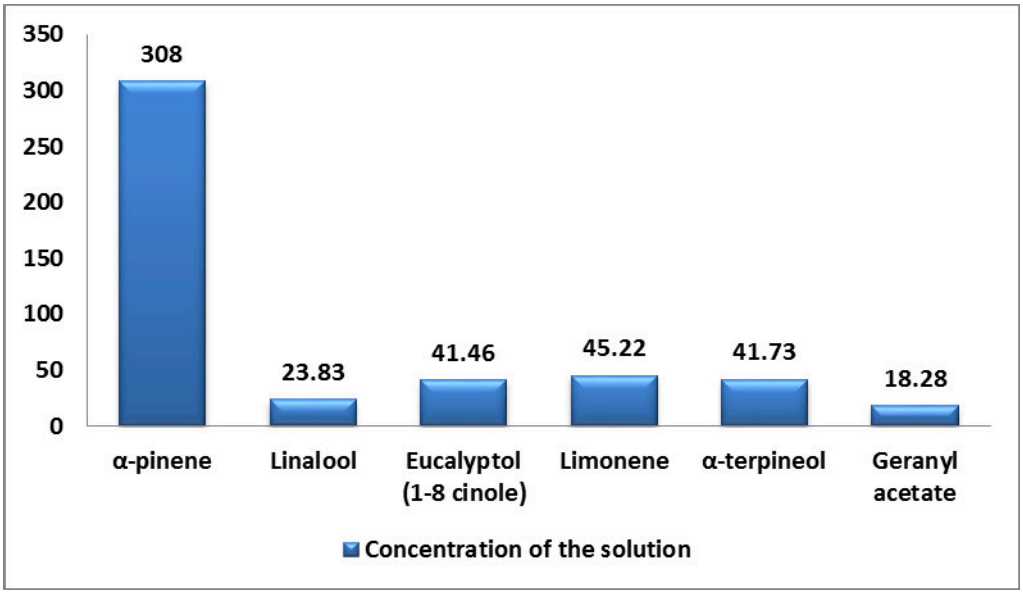

Figure 1: concentration of solution in the myrtle leaves.

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