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A COMPREHENSIVE REVIEW ABOUT THERAPEUTIC QUALITIES OF ESSENTIAL OIL LEMON BALM (*MELISSA OFFICINALIS* L.)

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Abstract: In the context of the momentary market of natural products, a growth in the consumer request of natural products can be observed, especially regarding the therapeutic products. Previous research has emphasized the utility of bio-active compounds present in the essential Lemon Balm (*Melissa officinalis* L.) oil, and the positive effects it has over health. The following mini-review attempts to present the benefits of using essential therapeutic Lemon Balm (*Melissa officinalis* L.) oil over human body health.

Keywords: *Melissa officinalis L., Lemon Balm, essential oil, therapeutic*

Introduction

Essential oils serve the needs of plants before they serve us. What they do for us they have already practiced on plants. Thus, essential oils come to us as experienced helpers and healers. Therefore, it is appropriate to learn a little about how oils function in plants to better understand how they function in us.

What is an Essential Oil? An essential oil is the volatile lipid (oil) soluble portion of the fluids of a plant containing odiferous compounds produced by steam distillation of vegetable plant matter. Plant matter can be any part of a botanical species including stems, branches, fruits, flowers, seeds, roots, bark, needles, leaves, etc. During the distillation process, the vapors are condensed, collected, and separated from the condensation water. The residual

water, containing traces of oil constituents, is called a „floral water" of „hydrosol" and has therapeutic applications of its own. (Steward D., 2006).

The chemistry of an essential oil is very complex and may consist of hundreds of different and unique chemical compounds (LifeScience Publising) and are essential to the vital processes of living plants, which is also the reason why they are called „essential".

Homeostasis is a state of wellness, balance and proper function within an organism. Essential oils always work toward balance or homeostasis, first in the plants that created them, then in the humans who apply them. Essential oils afford various types of protection to plants such as helping them to fight off viruses, bacteria parasites, and fungi, and do the same things for people (Steward D., 2006).

Botanical description and bioactive constituents

Lemon balm, *Melissa oficinalis* L. (*Lamiaceae*) forms two subspecies, the lemon-scented subsp. officinalis and the fetid subsp. altissima (Sibth. and Sm.) Archangeli (Carnat A.P. *et al*., 1998).

Melissa officinalis (lemon balm) (Fig. 1) is a cultivated perennial lemon scented herb. Records concerning its use date back over 2000 years with entries in the Historia Plantarum (approximately 300 B.C.) and the Materia Medica (approximately 50 –80 B.C.). From its Moorish introduction into Spain in the seventh century, its cultivation and use spread throughout Europe by the middle ages (Koch-Heitzmann and Schultze, 1988, quoted by Kennedy *et al.,* 2002). Medicinal use throughout this early epoch includes a recommendation by Paracelsus (1493 – 1541) that balm would completely revivify a man and indication for "all complaints supposed to proceed from a disordered state of the nervous system" (Grieve, 1980).

Lemon balm is a plant which has a one meter height, white-lily colored flowers and light-green colored leaves. What differentiates Lemon balm from any other of its' sisters is the pleasant smell it sends out, which is also very similar to the lemon scent. Lemon balm (*Melissa officinalis*) is one of the most used medicinal plants in the world (Germans have a cult for it). Dozens of studies carried all over the world highlight its' extraordinary therapeutic value, with multiple effects, either as a simple remedy or combined with other treatments. (Crăciun *et al.,* 1992)

Anciently, Melissa was used for nervous disorders and many different food products dealing with the heart or the emotions. It was also used to promote fertility. Melissa was the main ingredient in Carmelite water, distilled in France since 1611 by the Carmelite monks. (LifeScience Publising)

Chemical constitution analyses of aerial part extracts show evidence of the presence of essential oils (citral, citronellal, geraniol, and camphor), mucilage, tannins, saponins, and resins. Some of the constituents are active principles for cosmetic and medicine production (Sarer & Kökdil, 1991; Van Den Berg *et al.,* 1997; Carnat *et al.,* 1998; Sorensen, 2000; Blank *et al.,* 2005).

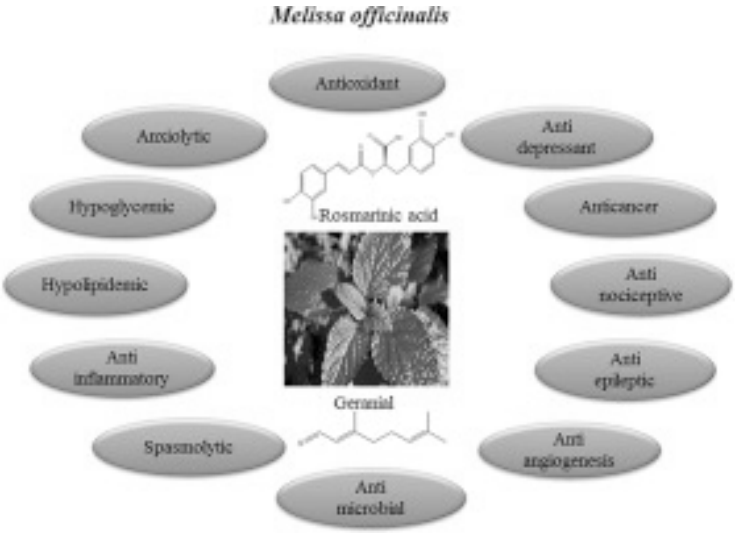


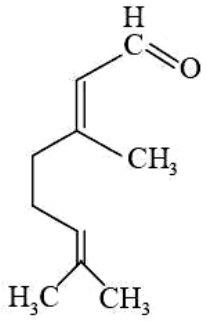
Fig. 1 *Melissa officinalis* (lemon balm)
(Source: Shakeri et al., 2016)

The chemical constituents of Melissa are Aldehides (up to 65%): geranial (<35 %), neral (<28%), citronellal(<3%), α-cyclocitral; Sesquiterpenes (< 35%): β-Caryophyllene (<19%), α-copanene (<5%), germacrene-D (<4%), β-bourbonene, δ- & γ-cardinenes, humulene, β-elemene; Oxides (<11%): caryophyllene oxide (7%), 1.8 cineol (<4%); Alcohols (<7%): linalol, octen-3ol, nerol, geraniol, citronellol, isopulegol, caryophyllenol, farnesol; Esters (<7%): methyl citronellate (<5%), citronellyl, geranyl, neryl, linalyl acetates; Ketones (<7%) methyl heptanone (5%), farnesylacetone, octanone; Monoterpenes (<3%): cis- & trans-ocimenes, l-limonene; Sesquiterpene Alcohols: elemol, α-cadinol; Furanocoumarins: aesculetin (Koliopoulous *et al.,* 2010) and the key compounds are Geranial, Neral and β-Caryophyllene (Fig. 2).

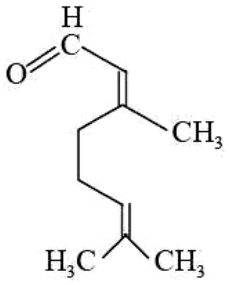
The leaf also contains polyphenolic compounds: caffeic acid derivatives in large proportions, such as rosmarinic acid (ca. 2-5%) (Lamaison *et al.,* 1991) and trimeric compounds (Agata *et al.,* 1993) and 302 A.P. Camat et al. /Pharmaceutica Acta Heluetiae 72 (1998) 301-30.5 also some flavonoids such as luteolin-7-0-glucoside (0.0002%) (Mulkens and Kapetanidis, 1987).

It is used in traditional medicine from ancient times. French monks and nuns, and Paracelsus (1493- 1541), Swiss physician and chemist, prepared tonics, called as "life elixir", contain lemon balm, and used. English writer John Evelyn (1620-1706), described this plant as "ruler of brain, strengthening to mental, and removing from melancholia". Its essential oil was named "balsmin" or "leader of the oils" in Hebrew. Avicenna recommends that lemon balm strengthened heart (Anonymous, 2003).

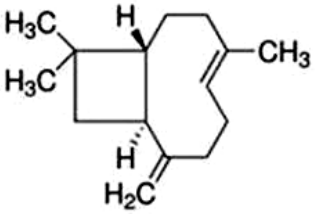
Today, lemon balm is used in various branches of industry (such as medicine, perfume and cosmetic, and food etc.) in many countries of the world. (Bahtiyarca *et al.,* 2006).



Geranial



Neral



β-Caryophyllene

Fig. 2. Structures of Geranial, Neral, β-Caryophyllene

Therapeutic Qualities Of Essential Lemon Balm

(*Melissa Officinalis* L.) Oil

Anciently, Melissa was used for nervous disorders and many different aliments dealing with the heart or the emotions. It was also used to promote fertility. Melissa was the main ingredient in Carmelite water, distilled in France since 1611 by the Carmelite monks. (LifeScience Publising).

Melissa essential oil (*Melissa / Melissa officinalis*) is known for its' healing proprieties from ancient times, whereas now it is considered one of the best treatment for heart condition. The essential Melissa oil is anti-depressive (Feliu-Hemmelman *et al.,* 2003; Arceusz *et al.,* 2013), tonic, hypotensive (Sepand *et al.,* 2013), antispasmodic, antibacterial, hypoallergenic (Weidner *et al.,* 2013), viral infections (herpes, etc.) (Taiwo *et al.,* 2012), depression, anxiety, insomnia, anti-inflammatory, antiviral, relaxant, hypotensive, anti-oxidative (Lamaison *et al.,* 1991), antihereptic (Schinitzler *et al.,* 2008; Astani et. al., 2012), anti-diabetic (Chung *et al.,* 2010). The antioxidant activity on the ORAC ladder is 134,300 μTE/100 g, antitumor (Jun et al., 2012).

Contemporary reports stress the sedative, spasmolytic and antibacterial effects of ingestion of *Melissa officinalis*, with indications encompassing nervous disorders including the reduction of excitability, anxiety and stress, gastrointestinal disorders and sleep disturbance. In keeping with its long history of safe usage, no side effects have so far been reported (Wong *et al.,* 1998).

A number of studies involving rodents suggest specific ''calming'' or sedative effects. Examples include a reduction in spontaneous movement demonstrated in mice as a consequence of both the whole volatile oil of Melissa and the individual isolated terpenes (Wagner and Sprinkmeyer, 1973)

The leaves of the subsp. officinalis are widely used in Europe as an herbal tea for their aromatic, digestive and antispasmodic properties in nervous disturbance of sleep and functional gastrointestinal disorders (Bisset and Wichtl, 1994). The traditional use of the tea is consistent with its generally acknowledged innocuity. Some pharmacological properties have been attributed to the principal constituents. Rosmarinic acid is antiviral and antioxidant while the essential oil is spasmolytic and antimicrobial (Wagner and Sprinkmeyer, 1973). Enriched extracts containing rosmarinic acid are

used as a virostatic against herpes viruses, alcohol extracts as sedatives and the essential oil.

Lemon balm is a potential medicinal and aromatic plant grown commonly most of our wild areas. Its essential oil is currently used in medicine and pharmacology (anti-tumor, anti-bacterial, antimicrobial, antihistaminic, antispasmodic and antioxidant, by means of its antiviral effect curing of the herpes (Allahverdiyev *et al.,* 2004), antiulcerogenic, moderate Alzheimer's disease, modulation of mood and cognitive performance, stimulating the immune system (against anti HIV-1) (Yamasaki *et al.,* 1998) and the heart, insect bites, painful menstruation, colds, headaches, mumps, insomnia, mild sedative and anti-depressant), (Foster and Duke , 1990), in food industry (using it's essential oil for food spoilage yeasts to extending the storage periods, in soft drinks industry because its fresh lemon tastes and herbal tea industry) and in cosmetic industry (containing hydrosol for curing dermatological problems).

CONCLUSIONS

This paper aims to synthesize pieces of information gathered from previous research, to conclude that the essential Lemon Balm (*Melissa officinalis L.*) oil has therapeutic proprieties, it is considered one of the best treatment for hearth diseases, while also being an excellent antidepressant, tonic, hypotensor, antispasmodic and antibacterial.

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