

LAMIACEAE: ÓLEOS ESSENCIAIS E ANTIOXIDANTES IMPORTANTES

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RESUMO: O presente trabalho refere-se a uma revisão bibliográfica, especializada por consulta de artigos científicos e sites eletrônicos de um período de 25 anos, de 1992 a 2017, em que demonstraram que a família de Lamiaceae, também conhecida como família das Mentas, é a sétima maior família de plantas com flores existentes e pode ser encontrada como grama, arbusto ou árvore. Suas folhas são simples, também podem ser compostas, opostas ou verticiladas e sem estípulas, geralmente são serreadas, com inflorescência cimosas, geralmente congesta. Suas flores são vistosas, bissexuais, zigomórficas, diclamidas, pentaâmeras e bilabiadas. Seus frutos podem ser do tipo baga ou esquizocarpo. Essa família tem grande importância econômica na indústria farmacêutica e cosmética, na qual é utilizada para extração de óleos, chás, na culinária, aromaterapia e também como ornamentação da paisagem. Eles são conhecidos por suas propriedades antioxidantes em relação a doenças cardiovasculares, inúmeros cânceres, AIDS, catarata, doença de Alzheimer e outros distúrbios do sistema nervoso. A partir dessas informações, eles mostram a importância dos estudos dessa família, a fim de influenciar cada vez mais pessoas a explorar suas propriedades e uso.

Palavras-chave: Lamiaceae. Óleos essenciais. Antioxidantes. Medicinal. Cosméticos.

LAMIACEAE: IMPORTANT ESSENTIAL OILS AND ANTIOXIDANTS

ABSTRACT: The present work refers to a bibliographical review, specialized through consultation of scientific articles and electronic sites of a period of 25 years, from 1992 to 2017, in which they showed that the family of Lamiaceae, also known as the family of the Mentas is the seventh largest family of plants with existing flowers, and can be found as grass, shrub or tree. Its leaves are simple, can also be composed, opposite or verticillate and without stipules, are usually serreadas, with cymous inflorescence, often congesta. Its flowers are showy, bisexual, zygomorphic, diclamid, pentaamera and bilabiate. Their fruits may be of the berry or schizocarp type. This family has great economic importance in the pharmaceutical and cosmetic industry, in which they are used for extraction of oils, teas, in cooking, aromatherapy and also as landscape ornamentation. They are known for their antioxidant properties in relation to cardiovascular diseases, numerous cancers, AIDS, cataracts, Alzheimer's disease and other nervous system disorders. From this information, they show how important is the studies of this family, in order to influence more and more people to explore their properties and use.

Keywords: Lamiaceae. Essential oils. Antioxidants. Medicinal. Cosmetics.

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INTRODUCTION

Brazil harbors the greatest biodiversity on planet earth, with a variety of biomes reflected in the enormous wealth of flora and fauna. This diversity elevates Brazil to the rank of principal nation among the 17 megadiverse countries, containing a further 20% of the total number of species on Earth. It also takes into consideration that many species of plants of global economic importance. Its flora comprises approximately 30.000 species, totaling about 10% of the planet (De Souza et al., 2015).

The family Lamiaceae, also popularly known as the Mint family, belong to the order Lamiales, this family covers about 300 genera and 7.500 species, with an average of 26 genera and about 350 species (Souza; Lorenzi, 2005). They are cosmopolitan, originating in the Mediterranean regions, the Middle East and the subtropical mountains (Trindade et al., 2016).

They are known for their antioxidant properties (Cuvelier et al., 1994). As a result of phytochemical composition, these plants have important economic value, being used in cooking, as condiment, and as ornamental, in the decoration and aeration of environments (Veiga-Júnior; Mello, 2008).

Essential oil is a term used for ethereal or volatile oils composed of complex mixtures of substances of varying chemical functions present in various parts of plants: they are diffused throughout the aerial part of the plant, on the flowers, on the leaves, on the fruits, in the wood, in the seeds and in the roots (Koketsu; Gonçalves 1992). Essential oils are composed of numerous compounds, sometimes highlighting some majorities, and their activity is most often related to this set of substances (Vandar-Ünlü et al., 2003).

In recent years, the effects of antioxidants on diseases have been investigated, especially in the developed countries of the West. Research has attempted to explain the benefits of antioxidants in cardiovascular disease, in numerous cancers, in AIDS, and even in others directly associated with the aging process, such as cataracts, Alzheimer's disease, and other nervous system disorders and in the present study (Lima et al., 2004).

The species of the family Lamiaceae present important compounds biosynthesized by the secondary metabolism, among which are the essential oils. Therefore, this review had the objective of approaching extensively, but objectively, about essential oils and their antioxidant properties.

MATERIALS & METHODS

This was an extensive and objective descriptive bibliographical research, carried out in May, in which a 25-year (1992-2017) research was used, through the collection of data researched in the literature, using the databases Scielo, PubMed, Google Scholar and sites (InfoEscola, my article and Terra), in order to select studies, in Portuguese and English, relevant to the discussion of the topic. For this selection we used the combination of the following terms: Lamiaceae, botanical aspects, medicinal potential, antioxidants, essential oils.

As a next step, the reading of the titles began, with only the scientific articles being selected, due to the current situation they represent in terms of research. This stage of the research is relevant, being able to know works carried out on the studied subject, to be theoretically grounded and even to acquire new ideas, allowing the researcher a deeper view about the subject, thus answering his questions.

In addition, a qualitative and quantitative approach was used. In order to carry out the final selection of the works, abstracts from each of the publications were read with the intention of verifying the relevance of each of the studies to the guiding question. The nature of the

research is characterized as basic that is defined to generate knowledge. While the exclusion criteria were articles that did not address the main ideas to be exposed in the article. This stage of the research is relevant, being able to know works carried out on the subject studied, being theoretically grounded and even acquiring new ideas, enabling the researcher to have a deeper insight into the subject, thus answering their questions.

RESULTS & DISCUSSION

For the production of this review article, twelve (13) articles and one (3) electronic site of the period 1992 to 2017 were used. The morphological characteristics of this family are diverse, being able to present as grass, shrub or tree. The leaf blades, whose forms varied between suborbicular, ovate, oblong, elliptic, lanceolate and deltoid, are penínervas, types craspedódromo, semi-craspedódromo and craspedódromo with prominent primary veins, while the secondary ones are spaced uniformly (Faria, 2008).

The species of the Lamiaceae family have important compounds biosynthesized by secondary metabolism, among which are essential oils. Therefore, this review proposes to survey some recent works with the main biological activities of some essential oils, highlighting their major components (Lima; Cardoso, 2007).

They have cimous inflorescence, often congested. Their flowers are showy, bisexual, zygomorphic, diclamid, pentamere and bilabiadase, the fruits of the plants belonging to this family present as berry or schizocarp (Lorenzi et al., 2002).

Among some Brazilian species that stand out most are *Hyptis suaveolens* L. (alfavacão), *H. mutabilis* and *H. atrorubens*; *Lavandula angustifolia* Mill (lavender); *Leonotis nepetaefolia* L. (cordon-de-monde); *Leonurus sibiricus* L. (macaé) *L. cardiaca* and *L. sibiricus*; *Leuca martinicensis* (Jacq.) R. Br. (Catinga-mulata) *Marrubium vulgare* L. (Mint), *Melissa officinalis* L. (citrus), *Mentha avensis* (mint), *M. piperita* L. *O. selloi* Benth., *O. vulgare* L. (oregano), *Rosmarinus officinalis* L. (rosemary), *Salvia officinalis* L. (salvia), *M. pulegium* L. (poejo), *Ocimum basilicum* L. (Lorenzi; Matos 2002).

According to Araújo (2010), economically, the use of plants of the family Lamiaceae is very varied and extremely important, for example: essential oils, which are very advantageous financially. These are extracted and used in the making of perfumes (as in the case of lavender, lemon balm), soaps and shampoos (patchouli, mint), cooking, exemplifying oregano, thyme and basil, or even as medicinal teas such as mint. Another very interesting and versatile economic use is the natural landscaping, aiming that these plants are of easy cultivation, marking the species *Salvia splendens* L., *Solenostemon scutellarioides* L. and *Clerodendrum thomsonae* L. as the most used.

According to Trindade et al. (2016), commercial, medicinal and cosmetic use is of great relevance, being used for extraction of oils and teas and in aromatherapy. Tea is one of the most consumed and oldest beverages in the world, and in the literature referred to as one of the best sources of phenolic compounds (Lima et al., 2004), the Lamiaceae family usually uses rosemary, spearmint, -current, oregano, sage. The first reports of its use date from the 27th century BC, being considered as one of the oldest drinks produced by biotechnology and practiced by humans (De Morais et al., 2009).

According to Cardoso (2009) and as already mentioned, the species belonging to the family Lamiaceae have several uses, such as: rosemary, used in cooking and preparation of teas, having antiseptic properties, stimulants, expectorants, muscle relaxant, diuretics, decongestants, etc.; lemon balm, medicinal, cosmetic (bath products and perfumes) and cooking, adhering to anti-spasmodic, sedative, digestive, carminative and stimulant properties;

mint, used in cooking (sweets, food and drink), cosmetic (bath products, toothpaste), and also toning, stimulating, soothing, refreshing, antibiotic, expectorant, digestive, among others.

Lavender, generally used in the manufacture of perfumes and cosmetics, having analgesic, antiseptic, healing, sedative and invigorating properties; basil, used in cooking, preparing teas for stomach pains, sickness, vomiting and respiratory problems, since it is a light toner, digestive tonic and anti-infective, also remembering that it is usable in repellents; oregano, with antioxidant, antibacterial and anti-inflammatory properties, is used in the preparation of teas and in cooking; patchouli, invested in cosmetics and perfumes for its woody aroma, and in medicine as a stimulant, sedative, tonic, anti-inflammatory, decongestant, aphrodisiac and antidepressant; sage, harnessed in cosmetics and cooking, also known for its astringent, digestive, stimulant, anti-inflammatory, sedative and relaxing properties (Cardoso, 2009).

Research has attempted to explain the benefits of antioxidants in cardiovascular diseases, in numerous cancers, in AIDS, and even in the aging process, such as cataracts, Alzheimer's disease, and other nervous system disorders (Cai et al., 2004; Netzel et al., 2007; Jayaprakasha et al., 2007).

According to Lima; Cardoso (2007), several plants of the family Lamiaceae produce essential oil with insecticidal activity, such as mint, oregano, thyme and sage. One example is the menthol terpenoid, found in plants of the genus *Mentha*, which is an excellent insecticide, which acts as an inhibitor of the growth of several larvae (Agarwal et al., 2001). The phenolic monoterpenoids, thymol and carvacrol, besides having antioxidant activity mentioned previously, also have insecticidal activity against stored grain pests (Isman; Wan; Passreiter, 2001). Castro et al. (2006) verified the insecticidal potential of *Achillea millefolium* L. (Thyless) and *Thymus vulgaris* L. (Thyme) essential oils against *Spodoptera frugiperda* (corn caterpillar), and related this activity to the presence of the substances germanrene D and thymol, found in the respective essential oils.

Compounds are formed in the human organism that contain one or more unpaired electrons, known as free radicals. They are extremely reactive molecules, which cause oxidative damage in cells and tissues, which have been related to the cytology of several diseases, including degenerative ones such as cancer, atherosclerosis and heart diseases, among others (Lima; Cardoso, 2007). Phenolic monoterpenoids, thymol and carvacrol, in addition to having previously mentioned antioxidant activity, also have insecticidal activity against stored grain pests (Isman et al., 2001).

Rosemary (*Rosmarinus officinalis* L.) and sage (*Salvia officinalis* L.) are two of the most potent antioxidant condiments, especially in pork lard (Medsen & Bertelsen, 1995). Several studies have been published regarding the isolation and identification of different antioxidants, diterpenes and triterpenes, as well as flavonoids of *Rosmarinus officinalis* L. (Soliman et al., 1994).

The antioxidant properties of rosemary extract have received considerable attention in recent years and have been recognized since antiquity, but recently attempts have been made to determine the chemical structure of the active constituents of the plant, with rosmanol, rosmaridiphenol and rosmarquinin diterpenes have already been identified (Svoboda; Deans 1992).

De Morais et al. (2009), says that knowledge of the antioxidant properties of products of our daily consumption can target the population appropriately in the choice of a product with greater medicinal power. The knowledge about the utilities of the plants was initially from the indigenous peoples and passed from generation to generation within these peoples, from several evolutions this information was passed in a colloquial way, being a popular knowledge.

According to Hatchwell (2017), popular knowledge is intuitive, spontaneous, with a strong inclination for errors, because it is not studied, analyzed and proven, in contrast,

scientific knowledge arises with the purpose of proving the information previously defined by empirical knowledge. Petrin (2015) defines scientific knowledge as the result of studies and search for knowledge. Pasa (2007) states that it is of fundamental importance to collect information about the use of plants from the population through empirical knowledge and also emphasizes that medicinal plants are being revalued because, among other reasons, it is the most accessible way for the populations traditional or local knowledge, that use plants to treat diseases.

Thus, according to Da Silva; Neto (2015), the relationship between popular knowledge and scientific knowledge does not fit any kind of impediment in its uses, nor any kind of tension. Both kinds of know-how advertise mutual aid and complementarity and recognize within themselves their limits and their contributions.

The imbalance between oxidizing and antioxidant molecules results in cell damage, and is known as oxidative stress. Thus, the use of antioxidant elements in food and drinks can help fight free radicals. Several compounds present in plants have this activity, as are the examples of vitamins (α -tocopherol, β -carotene, ascorbic acid), chlorophylline, curcumin, flavonoids and also some essential oils (BIANCHI; ANTUNES, 1999; RUBERTO; BARATTA, 2000).

Based on data obtained by Urban et al. (2019) we can conclude that several species of the Lamiaceae family, have action against Diabetes mellitus and other families with phylogenetics close to this family, are also used for the treatment of this disorder.

CONCLUSIONS

In view of all these facts, we can conclude that the essential oils and antioxidants produced by the Lamiaceae family are of great economic and medicinal importance, as well as their use in cooking, cosmetics and landscaping. Therefore, studies in these areas should be more insinuating in order to increase their coverage in Brazil and in the world, in order to influence people more and more to explore their properties.

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