SOME COMMON SPECIES FROM LABIATAE FAMILY AND THEIR POSSIBLE APPLICABILITY IN VARIOUS INDUSTRIES

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Abstract

It's well known that the interest in products as natural as possible was continuously growing for the past years. Either we are talking about food products or supplements, cosmetic industry and even pharmaceutics, today's manufacturers are searching for new ways to obtain products as per customer's requests. A lot of plants which are growing naturally in our country and have a big potential for being used in different industries, are not yet known and exploited in culture. Different studies revealed that some species from Labiatae family contain bioactive phenolic compounds, which can be used instead of artificial chemicals that exist now in different industries, as pesticides, food additives and preservatives and even cosmetics.Starting from this hypothesis, the paper's purpose is to identify some species from Labiatae family, from Romanian territory, which are not well known, but which may be suitable for different uses in different industries, managing in this way to reduce the impact of synthetic compounds on environmental and human health.

Key words:*Labiatae*, Industrial applications

INTRODUCTION

Since antiquity, plants were a big part in the life and wellbeing of the people. Without any knowledge, but instinctively, the cavemen started treating they're affections with different plants. In China and Egypt evidence was found that they used medicinal plants from IV-III millennium B.C.E. As the time passed, both medicine and chemistry developed, which led to identifying and extracting of chemical substances from plant material. Even though the interest towards medicinal and aromatic plants was reduced for a significative amount of time in history, nowadays, especially in economically developed countries, but not only, there is a tendency towards resuming the consumption of medicinal and aromatic plants. Therefore, it is important for us to study these plants and find new ways of introducing and replacing the synthetic chemicals from our daily use.

Labiatae family contains 7136 species from 236 genera. It's the largest family of *Lamiales* order and it has genera with around 250 species or more (Trivellini A. et al., 2016). *Labiatae* family has a tremendous economic value, because it contains several species which are used in food industry as culinary herbs. Also, *Labiatae* species are known to contain

pharmacologically active compounds (Venkateshappa and Sreenath, 2013), which have been also used in food, cosmetic and pesticides industries.

MATERIAL AND METHODS

Containing a multitude of aromatic plants used as culinary herbs, *Labiatae* family has a tremendous economic value. Because of this reason but also because of the other compounds which we can find in these plants, there is a need, nationally speaking of investigating and using the plants more in our daily life. *Labiatae* family contains 7136 species from 236 genera from which we can find in Romania 34 genus and 138 species.

In Romania we have various plants which can be of a great interest for different industries, but which are not yet exploited in culture, only growing spontaneously. As sources of information we used international and Romanian literature.

The purpose of this paper is to identify those species from *Labiatae* family which are not yet well known but have the necessary properties to be used in various industries.

RESULTS AND DISCUSSION

Stachys officinalis L. syn*Betonica officinalis L.*, is a plant from *Labiatae* family, genus *Stachys*, which is originally from Europe. In Romania, it grows in the mountain area, usually in the outer woods. The popular name is betony or wood betony and, in traditional medicine it's aerial part is used for heart stimulation, respiratory diseases, headache, fever, panic attacks and depression. The glycosides of *Stachys officinalis* proved the hypotensive activity by unblocking constrictive blood vessels (Russo, 2001). Studies made on *Stachysofficinalis* regarding the antioxidant activity and total phenolic content revealed that even though the phenolic compounds are not at a high level, the antioxidant capacity makes this specie worth for further studies and having a great chance in production of functional ingredients (Sliumpaite et al., 2013). For example, it is proved that because of the compounds found in the methanolic extract of *Stachys officinalis* (caffeic acid 3.8%, glycosides of 0-apigenin 0.14%, C-apigenin 0.1%, 0-quercentin 0.03%, pyrogallol 4.07%, gallic acid 5.97% and tannin 5.56%), this specie is useful as a natural preservative (Haznagy-Radnai et al., 2006).

Marrubiumvulgare L. is also a part of *Labiatae* family, genus *Marrubium*, which has approximately 100 species. Having its origin in Europe, Asia and North Africa, *Marrubium vulgare* is often used in

traditional medicine to treat asthma, bronchitis and coughs.In Romania we can find it in almost all parts of the country, preferring soils well-dried and full sun. It usually grows on the roadsides, fields and other dry areas.

Recent studies performed on different species of *Labiatae* family, including *Marrubium vulgare* revealed that the extract from this plant shows anti-microbial properties and great antioxidant features, being suitable as a food additive and having a low health risk in comparison with synthetic compounds (Khaled-Khodija et al., 2014).

Another not so well-known plant growing on Romanian land is represented by *Sideritismontana L.*, as well part of *Labiatae* family, *Sideritis* genus. Studies made on this genus proved that it has a significant biological activity due to the high content in flavonoids and phenolics (Koleva et al., 2003).Like the other species mentioned in this paper, *Sideritismontana* also has a good antioxidant activity due to its flavonoid content. It has been showed that the antioxidant activity of the methanol extracts of *Sideritismontana* is close to that of rosmarinic acid (Koleva et al., 2003).

The species from *Scutellaria*genusare very common, we can find over 350 in the world, but native from Romania have been reported only 8, and 3 of them are more common (*S. hastifolia L., S. altissima L.* and *S. galericulata L.*). As the other mentioned species, *Scutellaria* also is not cultivated, it only grows spontaneously. It is considered that this species has a profound action on the nervous system and it can be used for serious mental illnesses as schizophrenia, and also for epilepsy and histerya (Kunkel, 1984).

*Lycopuseuropaeus L.*is native from Europe and Asia, and in Romania can be found usually in humid areas, along the lakes. Because of their phenolic compounds it has been used in traditional medicine and as well as a refrigerant, narcotic, astringent and in cosmetic industry (Vermeulen, 2006). Studies made on *Lycopuseuropaeus*showed the existence of a new diterpenoid which is abietane type, acetylated and highly oxygenated named euroabienol (Radulovic, 2010). This compound was isolated from the fruits of *Lycopuseuropaeus* and tested against six fungal strains and fifteen bacteria strains. This compound showed a large spectrum of activity and it's considered suitable to use against pathogen attack.

Nepeta cataria L., also called the catnip plant can be found on Romanian territory, but not in big quantities and it usually grows under shrubberies, on the side of the roads and in places where the waste is deposited. The leaves and flowers of this plant contains flavonoids and essential oils which are very useful in traditional herbal medicine for

different affections as digestive system pains, bronchitis and even insomnia. The flowers of *Nepeta cataria* can be used as well in the composition of detergent, the sprouts are used in salads and the leaves can be used to flavor the meat and the fish. Another important thing for further utilization of *Nepeta cataria* is that in it's essential oil chemical composition we can find nepetalactone isomers and other important components as (E)-(1R,9S)-caryophyllene which makes the plant to have a good potential in using it as protection against pathogen vector mosquitos, for example malaria mosquito. (Birkett, 2010).

Thymus serpyllum L. also called the wild thyme, usually grows in areas of hills and mountains, being a specie that loves heat and sunny places. Wild thyme is used in a wide range of conditions due to the content of its essential oils, starting from mild conditions as headaches, but also in cardiac conditions and epilepsy. Some studies performed, validated from a scientific point of view, the traditional uses of *Thymus serpyllum*.The major oil constituents of Thymus serpyllum's essential oil is thymol and carvacrol and it's proved to have the strongest biological activity in comparison with *Thymus algeriensis* and *Thymus Vulgaris*. It's also believed that, besides its use in food and cosmetics industries, the essential oil of Thymus species has a big potential in anti-cancer treatments and should be studied more in the future (Nikolic et al, 2013).

Dracocephalummoldavica L., also called the Moldavian dragonheador Moldavin balm and in Romania we can find it in south-east areas because of its requirements of relatively high temperature. Also, this specie is very sensitive to excess of water, the quantity of essential oil decreasing if this situation comes before the harvesting.*Dracocephalummoldavica* is used in traditional herbal medicine for the treatment of liver, gastric and cardiovascular disorders. As per Yang et al., 2014, the aerial parts from *Dracocephalummoldavica* contain polyphenols like hydroxycinnamic acids (rosmarinic and caffeic) and flavonoids (luteolin, apigenin) with their glycosides (diosmetin, quercentin, acacetin, agastachioside, salvigenin, apigenin, luteolin), which lately have been demonstrated to be very important dietary antioxidants.

Even though it is considered that there is a need of further investigation regarding this specie, it is believed that *Dracocephalummoldavica* from Europe can be a major source of rosmarinic acid which is of interest as adjuvants in chemo- or radiotherapy (Aprotosoaie , 2015).

CONCLUSIONS

The studies made on a national and international level regarding species from *Labiatae* family are very developed, but only towards those popular species from genera which are already in our everyday use such as:*Origanum, Mentha, Ocimum, Satureja,*and*Micromeria.*For this plants, it's already well known that they have been used in all the industries mentioned earlier. For example, in cosmetic industry rosmarinic acid is used to protect the skin against UV. The same properties as rosmarinic acid we saw in the methanol extract of *Sideritismontana*. Talking about additives and preservatives for food industry, the need to replace artificial antioxidants and additives such as BHT (butylated hydroxytoluene) and BHA (butylated hydroxyanisole) which are suspected to have carcinogenic effects on humans (GokturkBaydar et al., 2007) can be fulfilled by using some plant species (as mentioned, *Marrubium vulgare*) due to their antioxidant activity. A significant variety of species belonging to *Labiatae* family contain important compounds as phenolic terpenes, phenolic acids and flavonoids. As said, this type of compounds is known to be pharmacologically active and started to be exploited in sectors as food preservatives and additives, cosmetics and pesticides. However, it is considered that further studies are required so these compounds can be used in the food industry, especially regarding their stability.

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