MEDICINAL PLANTS – IMPORTANT SOURCE OF ESSENTIAL MICROELEMENTS

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Abstract
The purpose of this paper was to evaluate the concentration of some essential microelements (Fe, Mn, Zn and Cu) from the leaves of two plants: stinging nettle (*Urtica dioica*) and sage (*Salvia officinalis*), species of plants with multiple uses in the food and medical field due to their high content of compounds with beneficial action for organisms. Samples were obtained by washing, drying and calcination of fresh leaves. The results obtained by atomic absorption spectrometry regarding Mn, Fe, Zn and Cu concentration in sage and nettle leaves shows that the samples contains important amounts of essential microelements, Cu (1.72-1.87 μg/g), Fe (25.43-65.67 μg/g), Mn (7.86 – 9.30 μg/g), Zn (54.61 – 73.12 μg/g). The appreciable contents of essential microelements recommend the use of these plants as a supplementary source of essential elements.

Keywords: *essential microelements, sage, nettle, medicinal plants*

Introduction

Medicinal plants are known through the prism of their double status – foods and medicine [1]. The beneficial effects of medicinal plants are due to the large number and diversity of active biological compounds present in their composition: alkaloids, tannins, oils, vitamins, mineral elements, that makes possible the use for different therapeutic purposes – prevention and healing of numerous health conditions as herbal teas [2,3].
The levels of essential microelements in medicinal plants can be influenced by soil and climate conditions and by the plants' ability of assimilating these elements [4].
Stinging nettle (*Urtica dioica*), is a perennial plant whose leaves are a relatively good source of caloric energy, protein, fiber, and an array of health-promoting bioactive compounds which include vitamins A, C, and K, fatty acids (α-linoleic and linoleic acid), minerals (Fe, Mn, K, and Ca) and carotenoids [5]. Nettle leaves are rich in proteins, fats, carbohydrates, vitamins, minerals and trace elements [6].

Sage (*Salvia officinalis*) is a plant well known due to its important healing and flavoring properties. From sage leaves numerous active principles were identified: constituents of the essential oil, diterpenes, phenolic acids, flavonoids and tannins [7].
The purpose of this experiment was to analyze nettle (Urtica dioica) and sage (Salvia officinalis) leaves grown spontaneously in gardens and to evaluate the concentration of some essential microelements from their leaves, based on the fact that they can be used as a supplementary (alternative) source of essential elements.

Materials and methods

Plant material.
For samples we used nettle (Urtica dioica) and sage (Salvia officinalis) leaves, grown spontaneously in gardens, cultivated alongside fruits and vegetables. They were cleaned and washed under running tap water to remove mechanical impurities, after which they were left to dry at room temperature, until the crispy texture was observed. Until the analysis, samples were placed in brown glass vials and kept cold.
Determination of mineral elements.
The essential mineral element in sage and nettle leaves were carried out according to the method recommended and used by Velciov et al. (2015) when a similar product was analyzing [8]. The determination consists in the calcination of the leaves sample at 550°C, followed by the solubilization of the ash in HNO_3 0.5 N and the measurement of mineral element concentrations using the FS Varian 280 Spectrometer.

Results and discussions

The results obtained from the analysis, regarding Mn, Fe, Zn and Cu concentration in sage and nettle leaves shows that the samples contains important amounts of essential microelements (figure 1).

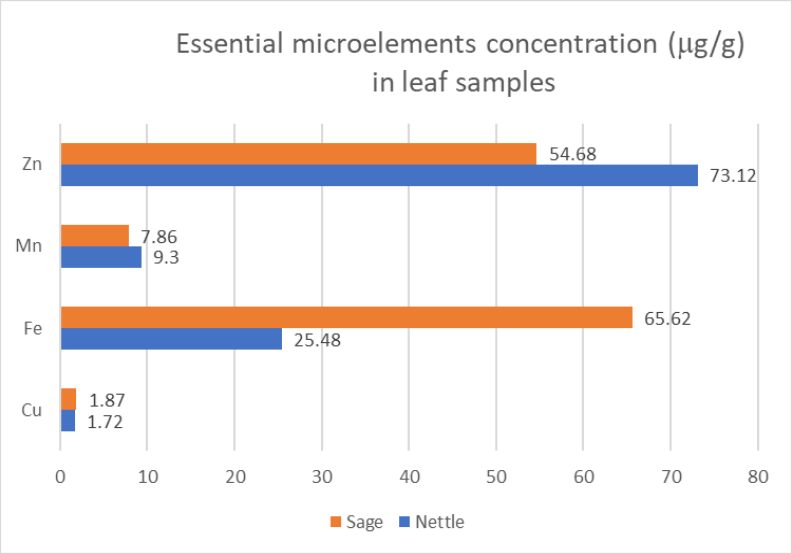

Figure 1. Distribution of Fe, Mn, Zn and Cu in sage and nettle leaf samples

The distribution of bioelements analyzed in sage and nettle leaves is uneven, depending on the plant from which they come (nettle or sage) and the analyzed bioelement: 1.72 µg/g Cu, 25.48 µg/g Fe, 9.3 µg/g Mn, 73.12 µg/g Zn - in nettle leaves and 1.87 µg/g Cu, 65.62 µg/g Fe, 7.86 µg/g Mn, 54.68 µg/g Zn - in sage leaves.

From all the analyzed elements, zinc and iron are the best represented. Compared to these, manganese and copper were determined in lower concentrations. Comparing the mineral concentrations of the two medicinal plants leaf, it can be seen that the both have an important content of essential microelements.

Conclusion

The nutritional and therapeutic qualities of nettle (*Urtica dioica*) and sage leaves (*Salvia officinalis*), two of the well-known medicinal plants, are influenced by their content of essential microelements.

The concentrations of microelements in the two analyzed medicinal plants follow the same decreasing trend Zn> Fe> Mn> Cu. Zinc is the most abundant trace element, followed by iron, smaller amounts of Mn and much smaller Cu amounts.

Comparing the concentrations of microelements in the analyzed medicinal plants, it is observed that, compared to the sage leaves, nettle leaves are richer in Zn and Mn, and sage leaves are richer in Fe. Copper show similar values in both plants.

The appreciable contents of essential microelements recommend the use of these plants for the preparation of teas or other products with therapeutic effects, but also as an additional supply of microelements.

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