

MEDICINAL PLANTS IN VIEW OF TRACE ELEMENTS

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Annotation. The use of herbs in different indication fields is well known. The beneficial properties of plants may due to their organic agents and inorganic mineral elements. Measurement of trace element content in plant drugs may be relevant in view of e.g. human health, animal health and environmental relations. This fact has a great significance since about half of the plant drugs available in the trade originate from natural habitat. The element content of herbs may refer to soil pollution, soil type on which the plant grow up or air pollution.

Keywords: microelements, herbs, inorganic mineral elements, drugs, environmental relations

Introduction

The trade and application of herbs show continuously increasing tendency. In Hungary more than 200 plant species official in the Hungarian Pharmacopoeia and more than 300 plant species are used in traditional folk medicine. One part of the plant drugs available in the commercial networks are collected from natural habitat and the other part of the plants are cultivated. This rate generally 50-50 %. The organic compounds and main bioactive agents of plants are generally known but the element composition and concentration of elements are unknown in most cases. Or if we know some data on them, there is no exact way for the evaluation. The determination of microelement content is important in view of plant, animal and human health, and environmental aspect as well. Therefore, the 100 measurement of toxic, essential and non-essential elements in plant drugs may be significant in environmental, toxicological and phytotherapeutical aspect (LESKO et al. 2002; SAGIROGLU et al. 2006, SZENTMIHÁLYI et al. 2005; SZÍKE & KÉRY 2003). This paper presents some data on microelement content in medicinal plants and possibilities for the evaluation of trace element content.

Material and methods

Drugs of medicinal plants were obtained from the commercial network and herbs were collected in natural sources or botanical gardens in Hungary and Transylvania between 1989 and 2005. Drugs originated from commercial network were *Cichorium inthybus* (1989, Herbária), *Galega officinalis* (1991, Herbária), *Matricaria chamomilla*

(1992, Herbaház). Collected plants and plant parts were in cases of *Lavendula officinalis*, *Grindelia robusta*, *Hibiscus abelmoschus* (Botanical Garden of University of Medicine in Tirgu Mures, Transylvania, 1996 and 1999) and *Calendula officinalis* (Botanical Garden, Budapest, Hungary, 1998). *Aesculus hypocastanum*, *Alchemilla vulgaris*, *Corylus avellana*, *Rhamnus frangula* and *Urtica dioica* were obtained from natural habitat of Tirgu Mures, Transylvania (1996 and 2000), while *Cichorium intybus* and *Taraxacum officinallis* were gathered from Budakeszi (Hungary), in 1995 and 2005. *Helianthus tuberosus* was cultivated in a vegetable garden in Tirgu Mures, Transylvania, in 1995. For the chemical investigation the air dried plant parts of collected plants were used. Determination of microelement content Concentrations of the elements of samples were determined by ICP-OES (inductively coupled plasma optical emission spectrometry). Type of instrument: AtomScan 25 (Thermo Jarrell Ash Co.). Sample preparation for element measurement: plant material (0.5 g) was digested with HNO₃ (5 ml) and H₂O₂ (3 ml). After digestion, the samples (three parallel) were diluted to 25 ml from which the elements were determined in three parallel measurements. Statistical calculations The results were expressed as means and standard deviations. One way analysis of variance (ANOVA) was used for comparing the results between groups. Significance level was determined as P<0.05.

Results and discussion

Element content of plants are different according to the species and of same species varied according to the soil, climate and other factors. For example the microelement content in herba of *Urtica dioica*, *Lavendula officinalis* and 101 *Grindelia robusta* growing on the same soil and year is significantly different (P<0.05) for most of the elements (Al, B, Ba, Cr, Cu, Fe, Mn, Mo, Ti, V and Zn)

Conclusion

The measurement of element content in medicinal plants is important in several point of view. The most significant things are the examination of cleanness of plant by determination of concentration of toxic elements and by determination of presence of soil forming elements in high concentration.

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