HEAVY METALS IN AROMATIC PLANTS FROM GREECE AND IN THEIR INFUSIONS

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The use of aromatic plants and herbs as remedies and spices has always been popular throughout developed and developing countries (WHO, 2005). Nonetheless, herbal remedies have potentially harmful side-effects, due, among other reasons, to their high content of heavy metals (Ernst, 2003).

The aim of this study was the determination of toxic and essential heavy metals (Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb and Zn) in fourteen widely used herb species from Greece and in their infusions, in order to assess both their potential health risk and their nutritional value, regarding toxic and essential metals, respectively. Total metal concentrations were determined in chamomile (Matricaria chamomilla L.), Cretan marjoram (Origanum microphyllum), dittany (Origanum dictamnus L.), laurel (Laurus nobilis L.), lemon balm (Melissa officinalis L.), marjoram (Origanum majorana L.), mountain tea (Sideritis syriaca L.), oregano (Origanum vulgare ssp hirtus L.), pennyroyal (Mentha pulegium L.), pink savory (Satureja thymbra L.), rosemary (Rosmarinus officinalis L.), sage (Salvia fruticosa L.), St. John’s wort (Hypericum perforatum L.) and thyme (Thymus vulgaris L.), after microwave assisted digestion, whereas extracted metals were determined in infusions prepared by brewing. Metal determinations were performed by atomic absorption spectrometry, using the flame or graphite furnace technique, as appropriate.

The concentrations of the analysed metals in herbs (in mg/kg, d.w.) and in their infusions (in µg/L) were similar to those reported in the literature for non polluted areas. For all metals, element dependent statistically significant differences among species were detected by ANOVA. The mean percent of the total metal concentrations mobilised to the infusions varied among metals between 3.5 % and 48.9%, with the lowest values recorded for Fe (3.5 %) and Cr (5.6 %) and the highest for Co (48.9 %) and Ni (43.4 %), while for the rest of the metals it was between 28.9 % and 36.5 %.

The measured Cd and Pb contents in dried plants were well below the maximum levels of 0.3 and 10 mg/kg set by WHO (1998). The calculated dietary intake per cup (1 cup = 200 mL) varied among species and it was found below 1 % of the recommended or tolerable daily intake for the majority of the metals, with the exception of Fe, Ni and Mn for which it reached 1.4, 2.4 and 6.1 %, respectively.

KEYWORDS: Herbs, infusions, metal contents, metal intake

REFERENCES: