Comparative Studies of the Trace Elements Content of Some Herbal Tea Consumed in Jordan

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\textbf{Abstract:} Six mineral and trace elements (Cd, Ni, Pb, Cu, Mn and Zn) were determined in the five Samples of herbal teas commercially available in Jordanian Pharmaceutical market, such as Sahha Fennel Tea (SFT), Sahha Chamomile Tea (SCT), Sahha Herbal Tea (SHT), Miltea Herbal Tea (MHT) and Miltea Chamomile Tea (MCT). The mineral and trace elements content of the studied samples showed a wide variability. Mn was not detectable in SFT and SCT. It was ranged from 1.73 ppb in MCT to 5.95 ppb in SHT. The highest Cu content was 1.956 ppb in SCT and the lowest value was 0.939 ppb in SHT. However, it was not detectable in SFT, MHT and MCT. Cd ranged from 6.86 to 26.25 ppb in MCT and SHT respectively. Maximum concentration of Ni was 47.68 ppb in SHT while the minimum was 6.55 ppb in MCT. On the other hand, Zn concentration was not detectable in all studied samples. The results of this study indicated that, the herbal teas that are consumed in Jordan did not contain toxic elements.

\textbf{Key words:} Dietary intake, herbal tea, medicinal herbs, mineral, trace elements

\section*{INTRODUCTION}

Medicinal herbs and their preparations (hot and cold infusions, decoction, tinctures and teas) are widely used by human beings in the Mediterranean region as well as worldwide (WHO, 2002; Bashar et al., 2006). A World Health Organization survey indicated that about 70-80\% of the world population especially in developing countries rely on non-conventional medicine, mainly from herbal sources in their primary healthcare (Akelele, 1993). In Jordan herbal teas are widely used for prevention and treatment of illnesses. Many herbal teas have been habitually used not only for medicinal purposes, but also as beverages and tea such as chamomile, peppermint, hibiscus, oregano, thyme or their mixtures are the most commonly which could be purchased from all markets or offered in cafeterias. Medical doctors are also prescribing herbal teas and herbal extracts as a supplementary type of treatment in everyday problems caused by our modern civilization, for instance against stress or insomnia. The use of medicinal plants in both crude and prepared forms has greatly increased (Eisenberg et al., 1998; Yeh et al., 2002).

Although herbal remedies are often perceived as being natural and safe, they are not always free from adverse effects (Ernst, 2000; Ernst, 2002). Therefore, the interest in chemical composition of medicinal herb products is growing (Rodushkin et al., 1999) to evaluate their safety, efficacy and quality (WHO, 1991). Even though the enormous benefit of these herbs it may contain some components could be considered undesirable, dangerous and toxic, such as herbicides, pesticides, fungicides, insects, aflatoxins, micro-organisms, mycotoxins, heavy metals and undeclared constituents. Many of medicinal herbs can present a health risk due to the presence of toxic elements such as Pb, Cd, Al, Hg and Cr (Lekouch et al., 2000; Ernst and Coon, 2001; Garvey et al., 2001). Heavy metals, may contaminate different plants causing serious health hazards such as renal failure, symptoms of chronic toxicity and liver damage (Andrew et al., 2003; Shaw et al., 1997). Moreover, the concentration of heavy metals is one of the criteria that make raw plants admissible to the production of medicines (Lozak et al., 2002). Many studies over the world was undertaken to determine the macro/micro-nutrient contents of medicinal herbs such as, Austria (Chizzola et al., 2003), Egypt (Abou-Arab and Abou Donia, 2000; Abou-Arab et al., 1999), USA and Jordan (El-Rajoob et al., 2008).

The potential contamination of raw herbal products with toxic elements depends on many complex factors like species, cultivation, processing, harvesting time, level and duration of contaminant exposure, topography, geographical origin and their storage.

Growing pressure of regulatory bodies and consumer protection organizations extend the requirements for quality control monitoring of herbal medicines and their preparations. More information is required in order to

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maximize consumers' safety (Ernst and Pittler, 2002). So, many of studies and researches should be carried out to verify, analyze, identify these herbs. This study was carried out to establish the levels of some trace element, (cadmium (Cd), nickel (Ni), lead (Pb), copper (Cu), manganese (Mn) and zinc (Zn)) in infant herbal teas that are widely and habitually consumed for medical purposes in infant and children nutrition in Jordan.

MATERIALS AND METHODS

The herbal tea samples were commercially available in Jordanian pharmaceutical market as granulated teas prepared from air dried and powdered medicinal herbs. Sahha Fennel Tea (SFT), Sahha Chamomile Tea (SCT), Sahha Herbal Tea (SHT) produced by Jordanian company Nutridar, Miltea Herbal Tea (MHT) and Miltea Chamomile Tea (MCT) are produce Milupa GmbH &CO/Germany. All samples were used as supplied by the manufacturer.

Analytical methods

Determination of heavy metals content: Heavy metals content of tea samples were analyzed using Atomic Absorption-Graphite Furnace (Shimadzu, Japan) (Al-Alawi and Mandiwana, 2007; Naidu et al., 1999) using Perkin Elmer Spectrophotometer Model AAS300 Graphite furnace model HGA800 Autosampler Model: AS-72. The samples were dried by oven at 70°C for 24 hrs until the dry weight was constant. The dried samples were then grinded and passed through a 0.2 mm plastic sieve. Then, 0.5 g of herbal tea of each sample was wet digested with an Ultra-pure nitric acid (HNO₃ (10-15 ml) in a polyethylene test tube using a heating block digestion unit at 120°C. The final solution was filtered into a 25 ml or 50 ml volumetric flask through a 45-μm filter paper and diluted to the mark with ultra-pure water. All reagents used in this study were of analytical grade. The samples were analyzed in triplicate and all the results obtained were statistically analyzed.

RESULTS AND DISCUSSION

The average results of the studied samples are shown in Table 1. The Relative Standard Deviation (RSD) are given below the mean values. In general, The RSD was less than 10%. In the present work, concentrations of six elements were determined in the herbal tea Samples Such as sahha fennel tea, sahha chamomile tea, sahha herbal tea, Miltea herbal tea and Miltea chamomile tea.
those given in Table 1 and depending on the metal levels of herbal tea, the studied herbal tea may be a good source of essential elements. However, consumption rate of the herbal teas should be under strict control. Toxic elements such as Pb and Cd either were in low concentration or not found in studied samples. From the above results it could be concluded that beverages of the herbal teas that are consumed in Jordan do not contain toxic elements. However, herbal teas may be contaminated easily during growing and processing. It is important to have a good quality control for herbal teas in order to protect consumers from contamination. In addition, prepared method is suitable to determine elements in herbal teas and is useful for routine control analysis of herbal tea samples because of its rapidity, sensitivity and versatility.

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REFERENCES