International Journal of Thermal Technologies
ISSN 2277 - 4114

Available at http://inpressco.com/category/ijtt

Research Article

Negative Effects of Heavy Metals in Medicinal Plants

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Accepted 10August 2013, Available online 01 Sept. 2013, **Vol.3, No.3 (Sept. 2013)**

Abstract

The use of medicinal plants and their extracts, deserve a separate analysis, due to the significant impact they have human. To ensure that they are not contaminated with toxic metals during the growth and processing of medicinal plants. The aim of this study was to achieve a high degree of quantitative toxic elements (Cr, Cu, Zn, Mn, Pb, As) in medicinal plants such as nettle. In the popular tradition known as the Queen of medicinal plants which are often used in green salads or cooked form. To define elements using ICP-MS method. The content of heavy metals in medicinal healing plants is dried and turned into powder form, was in order: Zn> Mn> Cu> Cr> Pb> Hg> Pb. Analytical results show that the herbal medicinal products show a heavy metal transfer from plants to humans. Monitoring the content of mineral elements in medicinal plants and their extracts is of particular importance for health. It is important, because some heavy metals in large quantities in the body, the use of medicinal herbs, can have a toxic effect, the population is very damaging and long-term adverse effects

Keywords: *Heavy metals, Medicinal plants, Nettle*

Introduction

Bioaccumulation of heavy metals in medicinal plants, has been studied in plant Nettle which plants have been planted as a household herb since ancient times in Kosovo is as herbaceous plants used for curing many diseases. Using extracts of flowers, leaves, trunk and roots that nettle, which are used to treat the large number of diseases, such as rheumatism, arthritis, kidney infections, anemia, diarrhea, milk production in lactation stage, against the backdrop of hair, etc. The use of herbal medicines is increasing recently in Kosovo, due to their low prices in the market. This herbaceous plant grows everywhere in Kosovo near settlements, factories, roads with heavy traffic and in dry places which contains a large amount of Fe ore, which is used by anemic persons. Thinking that every time, these medicinal plants can have positive effects. Given that grows near urban activities: use of waste water, the amount of air pollution, may also have toxic effects and therefore it is necessary to analyze heavy metals in this plant. However, the lack of knowledge of the toxic effects, it is necessary awareness of people about their side effects. There is a common concept amongst people who used herbal products like herbal medicines have no side effects, toxic (De Olivier A *et al*,1995; Smith, R. M. *et al*,1981; Herning *et al*,1988)Due to the natural origin, think that every time are safe.

Fig: 1. Nettles die (hislla) (Lamium album), diotike nettles (Urtica dioica), soft nettles (Lamium purpureum).

In some cases, toxic effects, since these plants are contaminated with heavy metals without knowing tone and negative effects such as: mental disorders and carcinogenic heavy metals such as Cr, Cu, Zn, Mn and Pb, etc.

These metals are highly toxic to humans and the environment. Plants are bioabsorben likely to attract heavy metals from the soil. In plants, met with several groups in the form of compounds or metal ions to form complexes, as (carbonyl, sulfhydryl, hydroxyl, carboxyl, phosphonate, sulfonate, amine, amide, phosphodiester, tralizing, imidiazole,) (Herning *et al*,1988)

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The World Health Organization (WHO 1998) provides recommendations that raw medicinal plants and their finished products can be controlled with analytical methods for the presence of heavy metals or the presence of pesticides, fungicides. However, there may be a risk for human health, the use of medicinal plants, many of these plants because of the large presence of heavy metals. Medicinal plants could be a major potential source of toxic metal exposure for man and animals. Nettle benefits have been known for a long time, but below if you mention a few of their best properties(Knoch, W *et al*,1994)

Restorative action for women, especially young women, early menstruation and older women in menopause. Can assist the body in detoxification of chemicals and heavy metals. Helps to reduce water retention, and is particularly useful when there is heavy menstrual flow in women.

Stimulating nettle helps mothers milk and increased energy after birth. Natural testosterone booster which aids in increased vitality in men. Diuretic, increasing the secretion of uric acid, while at the same time, strengthens the resistance of going to the bathroom during the night, that helps to urinary problems. Sterol , an ingredient that reduces the activity of DHT, which is a kind of testosterone that causes enlargement of the prostate. Has anti-inflammatory capacity of acting to help many of the symptoms associated with arthritis. Rich in minerals such as boron and silicon help to reduce the pain of osteoarthritis, tendons and arthritis.

Quality are as Anti-hemorrhagic internal bleeding, as well as scratches and scars. Anti-asthmatic two bronchospasm and asthmatic in difficulties, helps to clear the bronchi and nose. Contains natural antihistamine. Good for fever and allergies. Depurative and tonic agent for renal gland (A.H. Weerts *et al*,1994)

Materials and Methods

Collection of samples for analytical analysis is made in the top and June, obtained are regarding some samples in some plots planted near roads circulation of vehicles and geological soil composition. Plant samples were fully washed with distilled water, removing all external impurities, dried and then ground in special mills, particle size <1 mm. Sample preparation process for the analysis of heavy metals present in different soil fractions defined geological sampling time. Mobile metal ions in the form of carbonate bound, Fe and Mn oxide, and in the form of organic compounds, absorbed weak ion exchange, Hydrous oxide is associated with organic form, material and components are lattice, respectively, 1 g soil sample, which was placed in a 50 ml container. Sample has been added to the reagent.

Each part of the sample is separated from the substrate by means of centrifugation at 10,000 rpm (12,000 gravity) for 30 min time. Substrate is collected for laboratory analysis (B.S. Mathur,2005)

Sediment is rinsed with 9 ml de ionizing water and subjected to centrifugation process again. Samples of soil and floral sheet. After flushing for the fourth time taken fraction of 1 g (dry weight). Samples treated with 12 ml HF-$HClO_4$ in reports of (05:01). Continues acid mixture by evaporation to dry, a second treatment continues HF-$HClO_4$ in reports (10:01) acid mixture is added to the sample and continues until complete drying, followed by about 1 ml $HClO_4$, continue steaming until presented with a white smoke. Final digestion was carried out with dilute acid in 25 ml HCl 12 N. Are using various chemicals of high purity grade reagents (E. Merck, Germany), chemicals are used to digest the samples of soil and plants. By applying techniques ICP-MS and ICP-OES determined concentrations of some chemical elements present, including mercury. Because purposive (lower limit dictation for many elements, very good selectivity and high accuracy) ICP-MS (Plasma induction coupled mass spectroscopy) and ICP-OES (induction coupled Plasma - optical emission spectroscopy) are techniques that offer multielementare analysis more complete than other techniques. Multielementare analysis techniques ICP-MS and ICP-OES (Bratli L.J,2000)

Results and Discussion

Content metals on land, the application of laboratory methods to analyze the amount of the distribution of heavy metals in the soil, and plants are used four chemical reagent, hot water, $NaHCO_3$, NaOH and HCl reagent these are used to determine sinsights, exchange of ions associated with Fe and Al hydroxide and carbonate parts. HNO_3 acid mixture respectively, $HClO_4$ and HF is used to determine the content of toxic metals. Total content (mg kg^{-1}).

As content in flowers (Lamium album) sheet varies from 0.19 to 2.3. (Urtica dioica) at 0.16 and flowers in the Sheet 1.8. (Lamium purpureum) in flower 0.14 in sheet 1.5.

Cr flowers (Lamium album) varies from 21.4 to 22.24 sheets. (Urtica dioica) in flower sheet 11.8 and 25.3. (Lamium purpureum) in flower sheet 9.6 to 7.8.

Mn in flowers (Lamium album) varies from 103 to 194 sheets. (Urtica dioica) in 22.4 and 277 sheets flowers. (Lamium purpureum) in flower 31.8 to 124 sheets.

Ni flowers (Lamium album) sheet varies from 12.9 to 19.6. (Urtica dioica) in 2.8 and flowers on sheet 14.2. (Lamium purpureum) in flower sheet 2.5 to 5.9.

Cu in flowers (Lamium album) sheet varies from 23.8 to 29.2. (Urtica dioica) in 18.7 and flowers on sheet 21.4. (Lamium purpureum) in flower 7.4 in sheet 15.1.

Hg in flowers (Lamium album) sheet varies from 0.18 to 2.4. (Urtica dioica) at 0.21 and flowers in the Sheet 2.1. (Lamium purpureum) in flower 0.22 in sheet 1.3.

For, Pb flowers (Lamium album) sheet varies from 16.8 to 19.5. (Urtica dioica) in 8.5 and flowers on sheet 10.5. (Lamium purpureum) in flowers sheet 6.4 to 9.8 (mg kg^{-1}).

Heavy metals (As, Hg, As, Cr, Mn, Fe, Ni, Pb) in the leaves, are found to be very high. Hg and Pb levels defined in the sample analyzed plants were found to exceed the maximum allowable levels, Hg (0.08 mg kg-1) and Pb (2.2 mg kg-^{1}).

Table: 1. Metal content in sheet nettles (mg kg-1) dry weight.

Metals	*Dead nettles (hislla)*	*diotike nettles*	*Soft nettles*
	(Lamium album)	*(Urtica dioica)*	*(Lamium purpureum)*
As	2.2	1.9	1.4
Cr	22.5	25.3	7.9
Mn	192	277	124
Fe	11919	9143	2565
Ni	19.6	14.2	5.9
Cu	29.2	21.4	15.1
Zn	35.2	29.2	11.9
Hg	2.4	2.1	1.3
Pb	19.6	10.4	9

Table: 2. Metal content in different parts of nettle (mg kg-1) dry weight.

Metals	*Dead nettles (hislla)*		*Diotike nettles*		*Soft nettles*	
	(Lamium album)		*(Urtica dioica)*		*(Lamiumpurpureum)*	
	Flower	Plates	Flower	Plates	Flower	Plates
As	0.19	2.3	0.16	1.8	0.14	1.5
Cr	21.4	22.5	11.8	25.3	9.6	7.8
Mn	103	194	22.4	277	31.8	126
Ni	12.9	19.6	2.8	14.2	2.5	5.9
Cu	23.8	29.2	18.7	21.4	7.4	15.1
Zn	29.8	35.2	19.7	29.2	7.7	11.9
Hg	0.18	2.4	0.21	2.1	0.22	1.3
Pb	16.8	19.6	8.5	10.5	6.4	9.8

Conclusion and recommendations

Concentration of some heavy metals in different parts of nettles, international exceeds permissible levels. Heavy metals contaminated soil, ground water and polluted air containing dust aerosol pollutants are expected to be the main sources relevant to their absorption nettle. They can accumulate in nettles, through leaves and roots. The use of medicinal plants has increased greatly and can be one of the dangerous roads possible, in humans and other animals, toxic metals. To prevent further pollution of this important artery for Kosovo and to achieve a standard normal margins, would recommend that attention should be focused on:

a) Prevention, control and reduction of water pollution from urban wastes.
b) Providing quality conservation, and ecosystems of these waters.
c) Treatment of all sewage in urban and rural areas.
d) Recycling of waste.
e)Systematizations organized and sanitary waste collection.
f) Rehabilitation and greening degraded) Establishment of electrostatic measuring station building: air, water and soil and chemical and microbiological monitoring of the degree of pollution.

Literature

De Olivier A, C.R., Lombardi, A.T. & Jar dim W.F..Copper (1995), Compexation by naturally occurring organic meter: A multiligand model. *Chem. Spec. Bloavail*, 7, 125.

Smith, R. M. & Martell, A.E. (1981), Critical stability constants. *Plenum Pres*, New York.

Herning , J. G. & Morel, F. M. M. (1988),Kinetcs of trace metal Complexation: role of alkaline- earth metals. *Environm. Sci Technol.*, 22,1469.

Knoch, W. Wasserversorgung, Abwasserreningung und abfallentsorgung (1994), *VCH, Weinhaim*, New York, 557.

A.H. Weerts (1994), Analytical models for chemical transport on the subsurface environment, Wageningen Agricultural University, *Department of Water Resources,Wageningen*, The Netherland.

B.S. Mathur (2005), The pollution of ëater resources due to rural industrial waste, *Chemistry and Chemical Engineering Department of the Indian Institute of Technology*, Delhi, India.

B.G.Skakalsky (1981), Study of anthropogenic influence on water quality in some rivers of the Baltic Sea Basin, *State Hydrological Institute*, 2nd line, 199053, Leningrad, U.S.S.R.

BMZ ed (1995),Environmental Handbook: documentation on monitoring and evaluation impacts (Vol.I-III). *Vieweg*, Leverkusen.

Bratli L.J (2000), Classification of the Environmental Quality of Freshwater in Norway: Hydrologicaland limnological aspects of lake monitoring. *John Willey &Sons Ltd.*

Brebbia, C.A.Skerget, P. (1984), Diffusion-convection problems using boundary elements, in Laible, J.P., Brebbia, C.A., Gray, W., Pinder, G. (Eds),Finite Elements in Water Resources V, *Springer-Verlag*, Berlin, pp.74768.

C.P. Kumar (2003), Groundwater flow models, Scientist 'E1', *National Institute of Hydrology*, Roorkee-247667 (UK).