Elementals Profile Of Traditional Some Important Medicinal Plants Of Uttarakhand State, India

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Abstract: The life on the earth depends upon two types of chemical reactions such as the photosynthesis and respiration. Metal ions play a vital role in both the reactions. Mineral elements are nutrients which are found in foods and which are essential to the body in microscopic amounts. The inorganic constituent's viz., Fe, K, Mg, Ca, Cu, Zn, Ni, Co and chloride, sulphate, inorganic phosphorus, organic phosphorus and total phosphorus of *Jasminum grandiflorum, Vitex negundo, Salvadora persica, Anacyclus pyrethrum* and *Olea europaea* were determined by using AAS (Atomic Absorption Spectroscopy). These plants are traditionally used for nervous and urinary diseases, disorder of the blood and bile, dental, cooling, tonic, chronic bowel complaints, fever, headache, ulcer and worms. [Report and Opinion 2010;2(6):34-36]. (ISSN:1553-9873).

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Introduction:

The minerals are obtained from the earth's crust. Through the effects of the weather, rocks that contain minerals are ground into smaller particles, which then become part of the soil. The mineral content in the soil is absorbed by growing plants. The plants are consumed by both animals and human beings as food. This mineral becomes part of the food chain. The plants absorb much of the essential elements from the soil in which they grow and serve as indicators of the materialization and are in fact used for this purpose (Prabhat, *et al.,* 2008). Heavy metals are the matter of concern in the herbal drugs as certain plants have the tendency to store them from the soil, polluted water and atmosphere (Newall *et al.*, 1996, Baker, 1994).

Dental caries is one of the most important problems in public health because of its ubiquitousness in civilized populations. The prevalence of dental caries in industrialized countries like India is on the rise because the treatment is very costly and requires a lot of manpower thus the prevention at the primary level is the solution of choice. (Chopra *et al.,* 1958). Nanogram quantities of chromium are required in every insulin dependent system. It has been reported that by acting on ribosome, chromium facilitates the incorporation of insulin stimulated amino acid protein (Baker, 1992). Insulin dependent diabetics excrete more chromium than the control subjects (Anderson, 1997). Chromium deficiency has also been held responsible for vascular complications associated with diabetes mellitus (Anderson, 1997 and 1998). Zinc plays a role in the synthesis, storage and secretion of insulin (Cunningham, 1998 and Roussel, *et al.,* 2003). The high concentration of potassium in the plants could be related to the diuretic action of the drug prepared from the plant materials. The high concentration of Ca and Mg can explain the absence of side effects as regard to stomach lesions (Venketaraman and Krishanan, 2002, Shailajan *et al.,* 2004). A number of metal complexes and ligands have been shown to be chemically useful as antitumour and antiviral agents. In the present study, the inorganic elements (Fe, K, Mg, Ca, Cu, Zn, Ni and Co) of five medicinal plants, i.e. *Jasminum grandiflorium* (leaf), *Vitex negundo* (whole plant), *Anacyclus pyrethrum* (root) *Salvadora persica* and *Olea europaea* (stem) were detected by using Atomic Absorption Spectrophotometer (AAS). These plants are used for the treatment of various diseases and are useful to the users of herbal medicine.

Material and Methods:

The stem and bark of 20-25 years old *Salvadora persica* and *Olea europaea* plants, leaf of 5-10 year old *Jasminum grandifloruI,* whole plant of 4-15 year old *Vitex negundo* and roots of one year old plants of *Anacyclus pyrethrum* were cleaned and washed with tap water to remove mud or dust particles. They are dried at 150 ^{0}C to a constant weight and then ground to fine powder. Each ground sample was weighed in a precleaned porcelain crucible and heated in a muffle furnace

at 400 ^{0}C till there was no evolution of smoke. The ash was then moistened with concentrated H_2SO_4 (5 %) and then heated till the fumes of H_2SO_4 ceased. The crucible containing ash was heated at 600 ^{0}C till the weight of the contents become constant. This sulphated ash was dissolved in water and filtered through Whatman filter paper No. 42. The prepared solutions were directly used for the determination of elements.

Results and Discussion:

The elemental composition of all the plants is given in table-1 maximum amount of Potassium is present in the leaf of *Jasminum grandiflorum* (2240 mg/ml) and minimum composition (199 mg/ml) in the stem of *Salvadora persica.* Potassium also plays an important role in the regulation of acid base balance in the cell, water retention and essential for protein biosynthesis by ribosomes. Magnesium composition is maximum (818 mg/ml) in leaves of *Jasminum grandiflorum* and minimum (130 mg/ml) in stem of *Olea europaea.* Magnesium is necessary for the activity of many enzymes in carbohydrate metabolism and together with calcium and hydrogen ions is able to depress neuromuscular activity and action of Na and K. Calcium composition is maximum (1787 mg/ ml in the stem of *Olea europaea* and minimum (568 mg/ml) in the leaves of *J. grandiflorum.* Calcium is the main constituent of bones, teeth and component of the cell membranes and controls its permeability and electrical properties and play very important role in blood coagulation neuromuscular transmission and muscle contraction. Normal human blood contain from 0.9 to 11.5 mg of calcium per 100ml corresponding to 4.5-5.7 mill equivalents per liter. There is apparently a reasonably a close relationship between serum calcium, phosphate (Chatterjee, 1972).

Zn composition is found to be maximum (2.8 mg/ml) in the whole plant of *V. negundo* and minimum (0.17 mg/ml) in the stem of *S. persica*. Zinc competes for absorption with calcium non-herme iron and copper because they all are divalent and are presence in living-William series. Zinc's ability to decrease copper absorption makes it an effective part of treatment for hypercupremia associated with Wilson's disease (Scott, 1938). Fe composition is maximum (127 mg/ml) in the root of *A. pyrethrum* and minimum (10 mg/ml) in the stem of *S. persica*. The main function of iron is in the transport of oxygen to the tissues (haemoglobin) and is also involved in the processes of cellular respiration. Ni composition is maximum (0.22 mg/ml) in the stem of *O. europaea* and minimum (0.07 mg/ml) in the whole plant of *V. negundo*. Ni is not in detectable limits which may be accounted for the less toxicity of these medicinal plants in traditional medicine. It has been reported that Fe and Ni contents ranges from 0-1642 ppm, and 0-2.50 ppm respectively in medicinal plants (Borovik, 1990., Al-Shayab, 2002., Alloway, 1990, Ross, 1994). In present study, the iron concentrates is higher 127 mg/ml in the roots of *Anacyclus pyrethrum* since iron can promote disease eliminating polygene and these medicinal plants can be used as a very good diuretic agent and also strengthening the functions of dental and stomach.

Table 1. Elemental compositions of the medicinal plants

Elements (mg/ml)	*J. grandiflorum* Leaf	*V. negundo* Whole plant	*S. persica* Stem	*A. pyrethrum* Root	*O. europaea* Stem
Fe	20	53.3	10	127	32
K	2240	1618	199	800	275
Mg	818	320	180	340	130
Ca	568	1434	1323	1198	1787
Cu	0.23	0.2	0.04	0.17	0.08
Zn	1.98	2.8	1.7	1.9	2.0
Ni	0.18	0.07	0.15	0.08	0.22
Co	0.16	0.014	0.00	0.04	0.015

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