CIBTech Journal of Pharmaceutical Sciences ISSN: 2319–3891 (Online)
An Open Access, Online International Journal Available at http://www.cibtech.org/cjps.htm
2016 Vol.5 (2) April-June, pp.8-10/Ghani et al.
Research Article

DETERMINATION OF TRACE ELEMENTS IN SELECTED MEDICINAL PLANTS (*WITHIANA SOMNIFERA* AND *MENTHA PIPERATA)* OF SOON VELLEY, KHUSHAB, PAKISTAN

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ABSTRACT
The study was conducted in the area of soone valley, Khushab to determine the trace elements in medicinal plants (*Withania somnifera* and *Mentha piperata*). Common name, botanical name, family, medicinal use as well as concentration of trace elements are discussed in this paper.

Keywords: *Withiana somnifera, Mentha piperata, Trace Elements, Soon Valley, Khushab*

INTRODUCTION
Plants provide a variety of resources that contribute to the fundamental needs of food, clothing and shelter. Among plants of economic importance Medicinal and Aromatic plants have played a vital role in alleviating human sufferings. Early herbalists believed that each part of plant body resembles with any part of the human body, and was considered useful for the curing of those parts and there is no part of the body without its corresponding herb. Any plant, which includes materials that can be used for curative purpose or which is an inventor for production of useful drugs is a medicinal plant. Plants are utilized as therapeutic agents since time immemorial in both organized (Ayurveda, Unani) and unorganized (folk, tribal, native) form.
Pakistan is one of the few places on earth with such a unique biodiversity, comprising of different climatic zones with a wide range of plant species. Approximately 6000 plant species with medicinal properties are found in Pakistan.
Soil may naturally have contamination of trace elements or may be secondarily contaminated. When fertilizers, organic manures and when pesticides reach the soil. Soil can also be contaminated with heavy metals and trace elements as a result of weathering of rocks. Both these mix with soil particles and transform the soil. When plants grow in such type of soil, they get contaminated. Age of plant, period of treatment, type of plant organs are important aspects, which influence the sensitivity of a plant.

Plants	Family	Description	Common Name	Part Used	Medicinal Uses	Ref
Mentha Piperata	Lamiaceae	herbaceous rhizomatous perennial plant growing to 30–90 cm	Podina, pepper mint	Stem, Leaves,	Nutritious, scenty, enhance memory, used as tea and for flavouring ice cream	Braun & Cohen, 2005
Withania Somnifera	Solanaceae	3 to 4 feet	Ashwagandha	Ashwagandha powder	Cures weakness, blood purifier, increases sperm count and sexual potency.	*J. Chin. Chem. Soc., 2007*

Withania somnifera (Linn.) Dunal (Figure 1a) which is commonly called Ashwagandha / Indian ginseng /Winter cherry one of the important ingredients in Ayurveda and other traditional Systems of medicine. *Withania somnifera* has been reported to have adaptogenic activity, anticancer, anticonvulsant, immunomodelatory, anti oxidative and neurological effects and also used in dietary purposes. At the same time extensive works have been carried out on *Withania somnifera* and a few medicinal plants with reference to their pharmacological activity, composition of herbal products variation, species diversity, genomic composition and techniques and markers which have been used to analyze genetic variations. (Krishnamurthy *et al.*, 2010)

The plant *Withania somnifera* has extensive uses in indigenous medicinal systems. In Ayurvedic and Unani systems, the leaves of the plants are used for tumor and tubercular glands. Leaves are bitter in taste and used as an antihelminthic. The roots are used for constipation, senile debility, rheumatism, in cases of debility, nervous exhaustion, loss of memory, loss of muscular energy and spermatorrhoea. It infuses fresh energy and vigor and is good for the treatment of syphilis, rheumatic fever, etc. The roots of the plant are also used as nutrients and health restoratives in pregnant women and old people. The decoction of the root boiled with milk and vegetable oil is recommended for curing sterility in women (Khan *et al.*, 2007).

W. somnifera is claimed to possess sedative, antiseptic, abortifacient, deobstruent and arthritis properties.

Mentha piperata-, The peppermint plant is a hybrid of spearmint and water mint. Its active ingredient is a volatile oil made up of more than 40 components. Peppermint is primarily used for indigestion relief. It is also used as an inhalant, for clearing congestion in coughs and colds. Peppermint soothes the digestive tract, helps relieve nausea, and sweetens breath. Peppermint oil acts as a relaxant on the muscles of the stomach and gastro-intestinal tract (Braun & Cohen, 2005).

Peppermint is widely used in food, cosmetics and medicines. It has been proven helpful in symptomatic relief of the common cold. It may also decrease symptoms of irritable bowel syndrome and decrease digestive symptoms such as dyspepsia and nausea, although more research is needed. It is used topically as an analgesic and to treat headaches. Peppermint is currently one of the most economically important aromatic and medicinal crops produced in the U.S.

MATERIALS AND METHODS

An experiment was carried to assess the analysis of trace elements of five medicinal plants collected from distinct habitats of soon valley at regular interval of two months. The native spp. samples (*Albizzia labbeck, Tribulus terrestris* and *Acacia modesta*) were collected from different sites of Soone valley (khabeki, Dape Sharif, Knotty garden). These varieties were studied to analyze the trace element concentration. Heavy metal profile was also determined in those samples. It is hoped that this research on the elemental concentrations will be helpful in the synthesis of medicine for the control and cure of various diseases. The plants were dried at 70oC for 72 hours in an oven. The dried ground material (0.2g) was placed in test tubes and then added 4 ml of HNO3 and incubated it overnight at room temperature. Placed the tubes in the digestion block and heated up to 250oC until fumes were produce. Removed the tubes from the block after 60 minutes and cooled. Slowly added 2 ml of H2O2 and placed the tubes back into digestion block. Repeated the above process until the cooled material was colorless and transparent. The volume of extract was made up to 50ml in volumetric flask. Then these samples were analyzed in order to check the concentration of trace elements in relative samples. Metal concentration were determined on the inductively – coupled Plasma Mass Spectrometer (CCD Simultaneous ICP OES, Varian, Austria).

RESULTS AND DISCUSSION

Analysis of samples showed that in *Mentha piperata* max amount of Cu^{2+} was present at location of Dape Sharif (0.187), max amount of Ni^{3+} was recorded at Khbeki jheel (0.116), max value of Zn^{2+} was at Khbeki jheel (0.463), max amount of Co^{2+} was at Dape Sharif (0.349), highest value of Cr^{3+} was at Dape

Sharif (0.320), max concentration of Cd^{2+} was at khabeki jheel (0.159), greatest value of Fe^{2+} was at Knotty garden (0.634), max concentration of Mn^{3+} was at Knotty garden (0.485), max concentration of Pb^{2+} was at Khebeki jheel (0.692), highest value of Mg^{2+} was at Dape Sharif (0.631).

In *Withania somnifera* max amount of Cu^{2+} was present at location of Dape Sharif (0.284), max amount of Ni^{3+} was recorded at Khbeki jheel (0.282), max value of Zn^{2+} was at Knotty garden (0.644), max amount of Co^{2+} was at Dape Sharif (0.063), highest value of Cr^{3+} was at Dape Sharif (0.274), max concentration of Cd^{2+} was at Dape Sharif (0.295), greatest value of Fe^{2+} was at Dape Sharif (0.538), max concentration of Mn^{3+} was at Knotty garden (0.637), max concentration of Pb^{2+} was at Dape Sharif (0.564), highest value of Mg^{2+} was at Knotty garden (0.541).

It has been demonstrated that due to accumulation of trace elements or presence of heavy metals, the growth of plants is badly affected. Salisbury and Ross listed 16 elements which are believed to be essential to all higher plants. These elements are classified in to trace elements, micro elements and macro elements depending on their requirements, the elements like zinc, manganese, copper and iron are included under the trace elements. The deficiency of iron causes chlorosis, chlorosis of interveinal of the younger leaves. It is believed that iron deficiency results in a rapid inhibition of chlorophyll formation.

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