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Research Article

EVALUATION OF TRACE ELEMENTS IN SELECTED MEDICINAL PLANTS (*ALBIZZIA LEBBECK, ACACIA MODESTA AND TRIBULUS TERRESTRIS*) OF SOONE VALLEY, KHUSHAB, PAKISTAN

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ABSTRACT
The study was conducted in area of soone valley, Khushab to evaluate the trace elements in medicinal plants (*Albizzia lebbeck, Acacia modesta and Tribulus terrestris*). Common name, botanical name, family, medicinal use as well as concentration of trace elements are discussed in this paper.

Keywords: *Trace Elements, Medicinal Plants*

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.

Plants	Family	Description	Common name	Part used	Medicinal uses	Ref
Acacia Modesta	Mimosaceae	Deciduous tree	Phulai	Bark, gum	Anti-inflammatory, and anti-platelet activities, gum used in medicine	G. Singh and Madhulika Bhati, 2005
Tribulus Terrestris	Zygophyllaceae,	Flowering sp. native to warm temperate and tropical regions	Puncture vine, caltrop, Bhakra.	Fruits, leaves and young shoots are cooked;	Anticancer activity, treatment of leprosy, psoriasis, congestion, liver, ophthalmia and stomatis.	Hussain, khan and Wali-Ullah, 2005)
Albizzia Labbeck	Fabaceae	Growing to a height of 18–30 m	Siris, Shiren		Antibacterial activity, relieving stress, anxiety, and depression	Shakira Ghazanfar, Mukhtar Ahmad Nadeem, 2011

(*A. lebbeck* (L.) Benth) belongs to a family Mimosaceae is a multipurpose tree for semiarid regions. *A. lebbeck* has been widely distributed around the tropics and mainly planted as a shade tree. This tree is found on a wide range of soil types including those that are alkaline and saline (Prinsen, 1986)

Albizzia lebbeck which is commonly called Siris, and belongs to family Mimosaceae. The root of plant is used in hemicramia. The bark is bitter, cooling, alexiteric, Antihelminthic. It cures leucoderma, itching, skin diseases, piles, excessive perspiration and inflammations. The leaves are good for ophthalmia. The flowers are given for asthma and snake bite.

Acacia modesta Wall. locally known as Phulai belongs to family Mimosaceae. It is a medium size deciduous tree grows on stony grounds and rarely found on salt range. The flowers (March-May) are pale white to pale yellow fragrant growing in bunches. It is mainly used in making agricultural implements, fodder, timber, fuel and apicultural purposes. Medicinally it is used for gas trouble and its young twigs are used for cleaning teeth, dental disorders and dental problems. Its miswak is approximately 20 cm long with 2 cm in diameter. It is slightly curved and tough with pleasant taste. *Acacia modesta* Wall. wood showed vessels with few cells and parenchyma cells. Fibres were also found. Pith consisted of rounded cells.

Species of genus Acacia are used as miswak (tooth brush) by local people of Pakistan in different areas. Anatomical features such as, fibers, parenchyma cells, vessels and pith were identified during microscopic studies.

Tribulus terrestris is known for its use in the traditional medicine of many countries for treatment of cancer and cardiac diseases, edema, skin itch and wounds and impotence. Puncture vine plants possess good ability to accumulate heavy metals. Plants grown on heavy metal polluted soil accumulated heavy metals in both the shoots and roots. Cd and Pb accumulated more in the roots than in the shoots of plants both from the non - polluted and polluted soil .

Tribulus terrestris is commonly called caltrop, and is mainly used for edible and medicinal purpose. Young leaves, fruits of caltrop are cooked and capsules are ground into powd plants growing in more polluted land areas contaminate more with trace elements as compared to non-polluted areas. So, it is suggested that plants of Tribulus terrestris, for the medicinal purpose should be collected from non-polluted areas.

Trace elements (also called micronutrients) are nutrients that are in very low concentrations in the grapevine but they play essential roles in vegetative and fruit development. The trace elements include copper (Cu), zinc (Zn), manganese (Mn), iron (Fe), boron (B), and molybdenum (Mo). While these elements, other than molybdenum, are more available at lower soil pHs.

MATERIAL 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 Simultaneus ICP OES, Varian, Austria)

RESULTS AND DISCUSSION

Analysis of samples showed that in *Albizzia lebbeck* max amount of Cu^{2+} was present at location of Dape Sharif (0.150), max amount of Ni^{3+} was recorded at Khbeki jheel (0.015), max value of Zn^{2+} was at Knotty garden (0.619), max amount of Co^{2+} was at Dape Sharif (0.399), highest value of Cr^{3+} was at Dape Sharif (0.183), max concentration of Cd^{2+} was at khabeki jheel (0.289), greatest value of Fe^{2+} was at Knotty garden (0.520), max concentration of Mn^{3+} was at Knotty garden (0.314), max concentration of Pb^{2+} was at Khebeki jheel (0.692), highest value of Mg^{2+} was at khebeki jheel (0.623).

In *Acacia modesta* max amount of Cu^{2+} was present at location of Dape Sharif (0.056), max amount of Ni^{3+} was recorded at Dape Sharif (0.161), max value of Zn^{2+} was at Knotty garden (0.350), max amount of Co^{2+} was at Dape Sharif (0.149), highest value of Cr^{3+} was at khebeki jheel (0.287), max concentration of Cd^{2+} was at khabeki jheel (0.241), greatest value of Fe^{2+} was at Dape Sharif (0.604), max concentration of Mn^{3+} was at Dape Sharif (0.596), max concentration of Pb^{2+} was at Knotty garden (0.474), highest value of Mg^{2+} was at Knotty garden (0.541).

In *Tribulus terrestris*, max amount of Cu^{2+} was present at location of Dape Sharif (0.044), max amount of Ni^{3+} was recorded at Dape Sharif (0.239), max value of Zn^{2+} was at Knotty garden (0.434), max amount of Co^{2+} was at Khebeki (0.161), highest value of Cr^{3+} was at khebeki jheel (0.241), max concentration of Cd^{2+} was at khabeki jheel (0.384), greatest value of Fe^{2+} was at Dape Sharif (0.349), max concentration of Mn^{3+} was at Knotty garden (0.527), max concentration of Pb^{2+} was at Dape Sharif (0.494), 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. e.g. in case of *Albizzia lebbeck* Mahmood and Iqbal discussed that seeds of *A. lebbeck* from polluted areas of Karachi showed significant reduction in seed germination due to the presence of Pb in vehicular exhaust. The reduction in root length in *A. lebbeck* was great at different concentrations of Pd and Cd treatments as compared to shoot and seedling length. This fact was also confirmed by researchers in some other species. The reduction in root length may be due to accumulation of trace elements within the root tissues. Hyper accumulators are plants that can absorb high levels of contaminants concentrated either in their roots, shoots and/or leaves have defined metal hyper accumulator as plants that contain more than or up to 0.1% of copper, cadmium, chromium, lead, nickel cobalt or 1% of zinc or manganese in the dry matter. For cadmium and other rare metals, it is > 0.01% by dry weight.

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