

STUDY OF SOME SELECTED HEAVY METALS IN MEDICINAL PLANTS (*PASTACIA ATLANTICA*, *MENTHA LONGIFOLIA*, AND *OLEA FERRUGINEA*) FROM ZHOB, BALOCHISTAN, PAKISTAN.

Manzoor Iqbal Khattak¹, Mahmood Iqbal Khattak², Rukhsana Jabeen³, and Aroosa Nizam⁴

^{1&4}-Chemistry Department, Balochistan University, Quetta.

-PCSIR Laboratories, Peshawar.

3-Sardar Bahadur Khan, Women University, Quetta.

Email: manzoor_ Iqbal@yahoo.com

ABSTRACT: *This work expects to give the substantial metals content in three restorative significant plants from Zhob, Balochistan, Pakistan. Overwhelming metals were resolved to utilize Atomic Absorption Spectroscopy (AAS). The examples were broken down and the information was deciphered. The substance of the substantial metals were found in picking order of following Fe > Cu > Mn > Zn > Cr > Pb in the plants of Mentha longifolia, Olea ferruginea and Pistacia Atlantica with connection to its condition. In which the convergence of Fe, Cu, Mn, and Cr were not as per the guidelines of WHO.*

Keywords: Medicinal Plants, Heavy Metals, Toxicity, Atomic Absorption Spectroscopy, Environmental Pollution.

1. INTRODUCTION

Restorative plants have dependably been esteemed as a method of treatment of an assortment of infirmities in urban regions and have assumed a significant job in finding advanced drugs with various substance constituents. Restorative plants have been utilized for a considerable length of time as solutions for human illnesses since they contain segments of helpful worth. Restorative plants are considered as a fundamental wellspring of organically significant components, which may have an impact on the watched therapeutic employments of these plants. Therefore, the analysts have the enthusiasm to build up the dimensions of certain components in like manner homegrown plants in light of the fact that at raised dimensions, these components can likewise be perilous and poisonous. As of late numerous researchers from everywhere throughout the world covering the significance of basic constituents of the homegrown medication plants which advance the mindfulness about the following components in these plants. Around 60 percent of the populace in Pakistan utilizes home grown medications, from which 350 restorative plants are found in wild, in light of the fact, as indicated by an overview Pakistan has a wide flower decent variety roughly containing 600 taxa in Pakistan. Salt scope of Soon valley was researched to decide the circulation example of vegetation particularly therapeutic plant assorted variety at various destinations and seasons. Three destinations were chosen based on variety in their natural [elevation, slant, viewpoint (western/northern), elevation, geology and soil composition] and network characteristics [habitat, vegetation type and plant network structure].

The quality restorative viability of herbs utilized in customary frameworks of prescriptions is likewise impacted by the ecological toxins including overwhelming metals. The collections of certain harmful metals in different organs (root, stem, leaf, natural product, seed and bark) generally utilized restorative plants to get ready homegrown details has been affirmed. As the patients, for the most part, utilized natural medications for delayed periods to accomplish an alluring impact, delayed utilization of such homegrown meds may prompt constant or unobtrusive wellbeing perils. Exacting quality control systems, henceforth, are expected to utilize safe crude homegrown material for setting up the natural medications to be utilized by people and creatures.

It is likewise accepted that conventional meds are dynamic everlastingly with an endless timeframe of realistic usability. This likewise may not be valid as these definitions contain bioactive particles and minerals that could be changed into different less dynamic, dormant or even poisonous mixes through physiochemical or natural procedure with the progression of time making these medications insufficient and dangerous. For instance, *Angelica archangelica* (*Angelicae radix*), utilized for nations in European meds as an expectorant for bronchial sicknesses, cold and hacks, and furthermore as stomach related guides for stomach disunities, contained 0.05-0.1% is lost each year. In this manner, the timeframe of realistic usability of homegrown prescriptions arranged from this plant ought to be resolved so as to keep up its quality and subsequently, clinical adequacy. These actualities in this way need quick consideration of academic network to assess the danger and time span of usability of the homegrown medications.

The handling and post-preparing conditions ought to likewise be advanced to keep up the quality and viability of conventional details. This incorporates drying, pounding, extraction, and so forth of crude materials create customary meds as tablets, cases, syrups, and so forth. It is regularly said that natural medicines are protected with no reactions, despite the way that a ton of writing. The natural medications demonstrating harmfulness/unfavorable impacts [1-2].

The dynamic fixings incorporated amass in different pieces of therapeutic herbs and in charge of their restorative viability are orchestrated through the complex biosynthetic pathway. Their focus in the plant tissues just as the development of restorative plants are impacted by various edaphic, climatic and endogenous components including phytonutrients, development hormones, abiotic just as biotic pressure factors. Despite it appears glaringly evident that burdens will confine the development and advancement of the therapeutic herbs yet some fascinating information has been gotten in our research center demonstrating the improvement in restorative nature of herbs when the gathering was done following the pressure introduction. In an examination, dimensions of sennosides and artemisinin were discovered expanded under a few abiotic worries in *Cassia angustifolia* and *Artemisia annua*, separately, however, there was a decrease in the substance of dynamic particles and yield of the equivalent under delayed pressure periods [3-4]. Since the worldwide

climatic conditions have been changed and the herbs are confronting a ton of worries in their regular living spaces, subsequently, there is a pressing requirement for substance profiling and estimation of dynamic fixings in the herbs gathered from their common natural surroundings to survey any shift in the endogenous dimension of their dynamic fixings. The physiochemical and sub-atomic methodologies may likewise be utilized to improve the endogenous eves of the dynamic fixings in therapeutic herbs. Further, because of the expanding request of the therapeutic herbs by pharmaceutical ventures to create homegrown details of their utilization for new medication revelation, the number of inhabitants in these plants in their characteristic living spaces is diminishing and some of them either ended up wiped out or at the skirt of eradication. Subsequently, to satisfy the need of pharmaceutical enterprises and to spare them from termination, the appropriate agrotechnologies

ought to be created for their enormous scale generation and in situ just as in vitro procedures for their protection. The verification of rough homegrown materials before its use for the advancement of natural plans ought to likewise be done utilizing phytochemical profiling and DNA fingerprinting. This will keep up the consistency in the cluster quality and action of the medications.

In this way, the cutting edge logical methodologies won't just keep up the quality, yet additionally the adequacy of conventional prescriptions. It will eventually lead not exclusively to their more extensive acknowledgment among individuals of the world, however, build up the validity of tried and true conventional frameworks of prescription created by the intelligence of customary healers. Likewise, the therapeutic plants are found in Zhob, Balochistan as the guide of Zhob is given underneath in Figure-1.

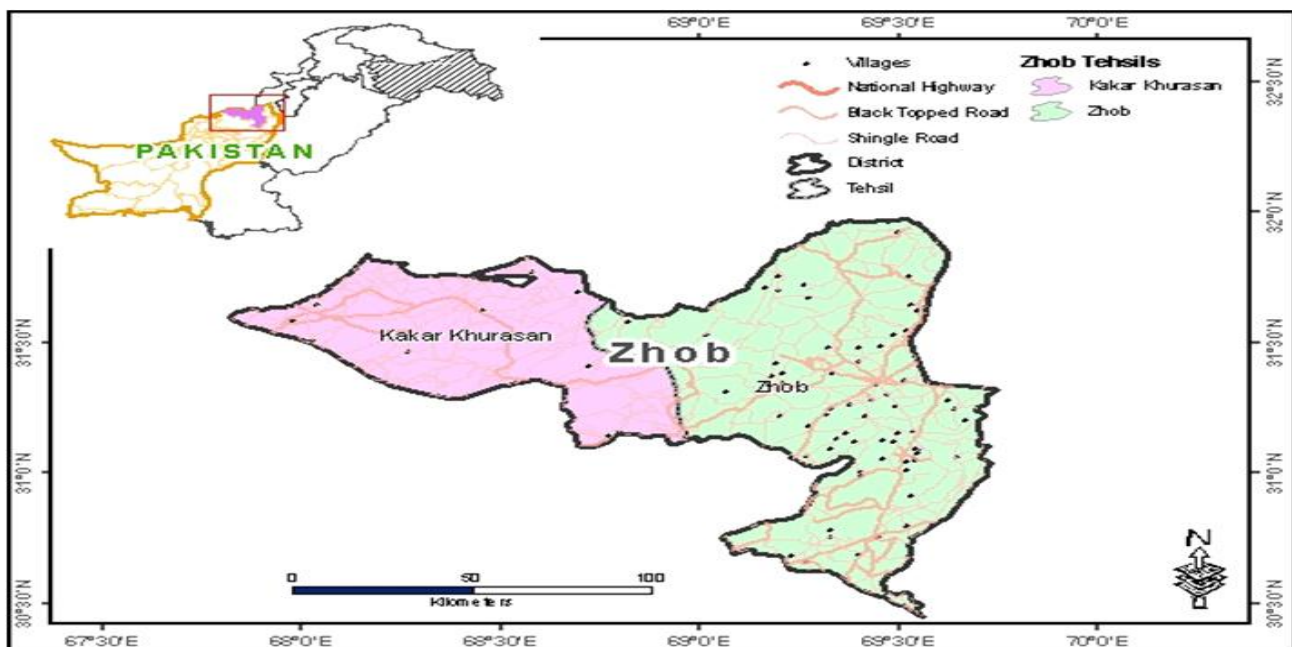


Figure-1. The map of Zhob.

***Mentha longifolia* (Horse Mint);**[5] syn. “*Mentha spicata* var. *longifolia* L., *M. sylvestris* L., *Mentha tomentosa* D’Urv, *Mentha incana* Willd”.) is a specie in the class *Mentha* (mint) local to European , west and focal Asian (eastern Nepal and the most distant western of Chines regions), and north and south of Africa [6-8] . It is a truly factor herby perpetual shrub with a fragrance of peppermint. In the same way as other mints, it has a crawling rhizome, with erect to crawling stems 40–120 cm tall. The leaves are elongated curved to lanceolate, 5–10 cm long and 1.5–3 cm wide, daintily to thickly tomentose, green to grayish-green above and white underneath. The blossoms are 3–5 mm long, lilac, purplish, or white, delivered in thick bunches (verticillasters) on tall, stretched, decreasing spikes; blooming in mid to pre-fall. It spreads through rhizomes to shape clonal settlements [9-10]. The nearby name of *Mentha longifolia* is (Sheenshoumbai) as given in Figure-2 beneath:



Figure-2. *Mentha longifolia*

Nicholas Culpeper's Complete Herbal (1653) states that "It is useful for wind and colic in the stomach...The juice, laid on warm, helps the King's shrewd or bits in the throat...The decoction or refined water helps a stinking breath, continuing from the defilement of the teeth, and snuffed up the nose, cleanses the head. It helps the scurf or dandruff of the head utilized with vinegar [11].

Olea ferruginea, regular perennial shrub, originate as a self-developing shrub in unwanted residences in dry dirt soil of inferior rises. Pakistani regions like Chitral, Dir, Hazara, Muri, Swat, Salty Range, Kashmir and Zhob. globally: Found in Afghani, Nepalian, and Indian regions.

A medium tree is up to 15 m. upright stem, spread, wooded and solid, with dull dim woof. Leaves basic, inverse, whole, petioles, Lancelot, high beefy dull avocado and inferior buttery green exterior. Blossoms little, various, creamiest, and in a fatal or sidelong cyme. Natural product droopy, oval-formed, and dark.

0.050 Kg of crunchy greeneries is gathered by menfolk and youngsters 15-31 yrs. of age, in any period once mandatory.

0.040-0.050 Kg of crisp greeneries is bubbled every day in 2 dishes (0.5L) of H₂O for 11-17 minutes. At the point ounce, 1 mug (0.25L) of H₂O is gone, it is stressed and set to a patient experiencing teeth ache, gums, roughness, and sore throat. For youngsters, 2 10-15 mL of extracts is utilized thrice daily for three days. Grown-ups, 125 mL of extracts is utilized thrice daily up to 4 days. It is utilizing for mouth wounds, toothache, throat agony, and roughness. The nearby name of *Olea ferruginea* is (shoon) and Family name is Oleaceae as given in Figure-3.



Figure-3. *Olea ferruginea*

Ethnobotanicals Usages: Greeneries are utilized as grain for dairy livestock. Timber is utilized for manufacturing graceful furnishings, farming executes, instrument handles, tool and blade handles, mud rooftop covering, and as timber fuel and wood. Youthful versatile twigs are utilized to create riggings and firewood; the snowy sticky concentrate is palatable. The natural product is utilized to brand dots (tubs). green tea (kawa) are leaves of the plants. Phytochemistry: Oily stains, arachins, cholesterin, oleins, linoleins, palmatins secure oil; oleics, linoleics, _palmatics, stearic, and mystics acids.

Pistacia atlantica is a deciduous tree growing up to 7 m (23 ft) tall with branches spreading and becoming erect to frame a thick crown. The storage compartment is hefty and shrouded in fissured bark. Old trees may have trunks

estimating 2 m (6 ft 7 in) in distance across; it might take 200 years for a tree to achieve 1 m (3 ft 3 in) wide [12]. The leaves are pinnate, each with seven to 9 spear formed handouts. The neighborhood name of *Pistacia atlantica* is (sherrawon) as given in Figure-4.



Figure-4. *Pistacia atlantica*

The leaves and branches regularly have nerves when the tree is pervaded with nerve delivering types of aphids, including *Pemphigus utricularis* [13], *Slavum wertheimae*, and *Forda riccobonii* [14].

The tree is dioecious with masculine and feminine parts conveying different sorts of blooms. The two sorts are close, greenish and drop quickly, monosexual and bisexual plants are being seen, anyway are bizarre [15]. The curved, substantial, smooth regular item borne by the feminine tree is 0.6 to 0.8 cm lengthy and rosy in shading, maturing to blue. It grows step by step getting the opportunity to be 1000 years old. It has broken bark with pale diminish shading. Increasingly prepared branches have a comparable arrangement, broke and red hot remains to shade, that furnishes plant a greyish appearance. The oval leaves are, for all intents and purposes immobile, shining above, and diminish olive, with 7 to 9 flyers, impercipient with petiole to some degree winged, sprouts in racemes indiscrete, the male and female on different trees. The blossoms are unisexual, little, judicious green, thick as pea normal item, by then altering to reddish azure [16]. In icier constituencies, the greeneries in May checked and drop in November. In spite of the way that dioecious, in specific systems folks direction the feminine models in amount. It creates in oak backwoods and oak achlorophyllous. The normal items age from end June to end of September, starting to hold up under natural item at eight years of age to 10 years, with rich natural item following a couple of years.

There are numerous utilizations of the herb. This rough pistachio is the maximum monetarily significant shrub in numerous Iranian regions, including the Zagrosian Mountains, wherever it is overseen as an important backwoods tree [12]. The sap and natural oily products were truly utilized for an assortment of restorative drives [13]. The gum, referred to in Iranian regions as saqez, is as yet a significant ware [12].

The tannoids as of the nerves were utilized for preserving [13]. The pistacia natural products are a sustenance found

in the region, yet the additional regularly developed pistachio tree *Pistacia vera* is increasingly profitable for nourishment generation [12]. The crude products of the wild pistacia have not supported as sustenance and are supposed to pose a flavor like turpentine's spirit [17]. These are approximately 45% oily [18].

Restorative plants are the crude material for some natural definitions and prevalent enhancements. The utilization of homegrown medications has been on the ascent as of late because of their low costs. There is a typical idea among individuals that homegrown meds have no symptoms and that "being normal in starting point, herbs are protected". The digestion of substantial metals in plants is clearly a result of across the board overwhelming metals in the dirt due to geo-climatic conditions [19-23]. Overwhelming metals have a more prominent inclination to amass in human organs over delayed timeframes. The nearness of overwhelming metals past as far as possible can cause metabolic unsettling influences. In this way both the insufficiency and overabundance of basic micronutrients, for example, Fe, Zn, and Cu are unsafe to the human wellbeing. Impacts of lethal metals (Cd, Cr, Pb, and so on.) on human wellbeing and their association with basic follow components may deliver genuine results [24]. The World Health Organization (WHO) prescribes that therapeutic plants which structure the crude materials for the completed items might be checked for the nearness of substantial metals, pesticides, bacterial or parasitic tainting. *Mentha longifolia*, *Olea Ferruginea* and *Pitacia atlantica* are significant medication in the antiquated arrangement of Ayurveda used to fix an assortment of illnesses and is generally circulated in India, Pakistan, Sri Lanka, Greece, Egypt, China, Mediterranean areas, Canaries, S. Africa, Iraq, Iran, Syria and Turkey [27-32]. Substantial metal statement in plants from anthropogenic sources has expanded the consideration on inorganic contamination and built up plants as detached bio-screens [33-34]. An assortment of plant-animal groups has been utilized as organic screens since they tend to acclimatize metals from the encompassing condition [35-36]. Metal poisonous quality was found to have a huge association with components controlling metal resilience, including accessible take-up destinations, compound cooperation, and ionic speciation. Numerous plants that collect >1000 mg kg⁻¹ or >10000 mg kg⁻¹ of the following metals are ordered as metal hyper aggregators. Most plants translocate inorganic and supplement constituents from roots to leaves [17-20].

The human body requires various minerals for their development and different exercises which are gotten from plants since plants retain and collect minerals from the earth which is vital for its development. Plants can likewise aggregate metals from nature. Among the distinctive kind of minerals, hints of Cd and Pb have been distinguished and detailed in all plants and groceries.

Substantial metals are regular parts of the world's outside layer. They can't be pulverized and could enter the human body by means of nourishment, drinking, restorative plants and so on. Overwhelming metal alludes to any components that have a moderately high thickness and is dangerous or toxic at low focuses and instances of substantial metals incorporate mercury, cadmium, arsenic, chromium, thallium, and lead. Substantial metals are likewise alluded to as metals having nuclear weight more noteworthy than

sodium and have some dimension of lethality [41]. Overwhelming metals could be harmful and fundamental: Toxic substantial metals for the most part Pb, Cd, Hg and As can make metal harming the patients. Some overwhelming metals are fundamental and required by the human body in follow sums. Anyway, they become dangerous when blood level expanded. They may make harm indispensable organs of the body like heart, liver, kidneys, and cerebrum [42].

Substantial metal take-up by the plants is in this manner a primary pathway of metal exchange from residue and water to the nourishment web. The metal take-up by the plant is dictated by metal portability and bioavailability. The greater part of the methods received includes dry ashing or wet assimilation utilizing nitric corrosive alone, or in the mix with perchloric corrosive or hydrogen peroxide. This examination program embraces the strategy of medium-term wet processing with nitric corrosive alone for the assurance of substantial metals [43]. Plants can aggregate metal in their parts and moves it from soils into the evolved way of life [44]. This gathering is a standout amongst the most genuine natural concerns as a result of the potential hurtful impacts that lethal metals could have on creatures and human wellbeing. A few metals like zinc, iron, copper, chromium, and cobalt are poisonous just at higher fixations, while others like lead, mercury and cadmium are solely lethal [45]. This investigation gives the overwhelming metals content in three therapeutic significant plants from Zhob, Balochistan, Pakistan. Overwhelming metals were resolved to utilize nuclear ingestion spectroscopy (AAS). In light of the above examinations, the point of the present investigation was to decide the overwhelming metal focuses on the plants of *Mentha longifolia*, *Olea Ferruginea* and *Pitacia atlantica* with connection to its condition.

3. EXPERIMENTAL

A sum of 03 restorative plants (*Mentha longifolia*, *Olea Ferruginea* and *Pitacia atlantica*) from Zhob, Balochistan, Pakistan root were broken down utilizing nuclear ingestion spectroscopy. Logical evaluation nitric corrosive (HNO₃) and 70% perchloric corrosive (HClO₄) provided from fischer logical were utilized as reagents for wet processing of tests. Arrangements were made utilizing deionized water. All the dishes were altogether washed and flushed before use.

Standard readiness

The standard answers for all the overwhelming metals under investigation were set up in three to five distinct focuses to get an alignment bend by weakening the stock standard arrangement of fixation 1000 ppm.

Examination strategy

Tests under investigation were first processed utilizing wet absorption technique. Quickly approx. 0.2gms of the example were taken in 100ml volumetric jar and around 4 ml of HNO₃ was added and the arrangement was permitted to represent a couple of hours than it was painstakingly warmed-over water shower till red exhaust originating from the cup totally stopped. The jar was permitted to cool at room temperature and than around 4 ml of perchloric corrosive was included and than carafe was warmed again over water shower to vanish till a little part which was than the channel through Whatman channel paper no.42 and made up the volume utilizing refined water till 100ml.

Instrumentation

Overwhelming metals assurance in all the therapeutic plants was finished utilizing nuclear assimilation spectroscopy (shimadzu). Standard working parameters were set. The empty cathode lights for Cr, Cu, Fe, Mn, Pb, and Zn (shimadzu) were utilized as a radiation source and fuel was air acetylene. Every one of the examples and standard was kept running in the copy.

4. RESULTS AND DISCUSSION

A sum of 03 restorative plants (Mentha longifolia, Olea Ferruginea and Pitacia atlantica) from Zhob, tests gathered

Table-1. The level of heavy metals (mg/kg) in medicinal plants collected from Zhob.

S.NO.	Samples	Cr	Mn	Fe	Cu	Zn	Pb
1	Mentha longifolia	43	198	2589	26	59	11
2	Olea Ferruginea	20	155	859	22	25	10
3	Pitacia atlantica	35	149	759	502	30	10

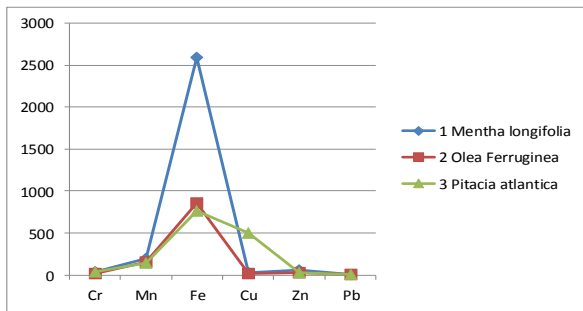


Figure-5. The level of heavy metals (mg/kg) in medicinal plants collected from Zhob.

Mn is another fundamental component for plant and creature development. The principle hotspots for Mn in topsoil are composts, mess slop, and iron smelters. Basic Mn focus in florae is in the array from 0.3 to 0.35g per kilogram. Consequently, the fixation dimension of manganese is well underneath the basic dimension and subsequently worthy at this dimension, since it doesn't influence the plant development nor it would source contamination.

Fe is an additional fundamental component for herbal and creature development. Its insufficiency could produce different kinds of ailments; nonetheless, its high fixation likewise influences plant development. The plant's tests gathered from the diverse site indicated huge contrasts between the substantial metals. The plant tests gathered from the Zhob have various measures of iron.

Cu is a fundamental component for florae and creatures. The well-known hotspots for Cu dissemination in topsoils are insecticides, manures, manufacturing and manure slop. The convergence of Cu was observed to be upper in the plant tests gathered from Zhob.

Zn is the significant metallic part for typical development and advancement in individuals. A widespread scope of zinc focus was seen amongst the plants gathered from Zhob.

Pb is viewed as very perilous for florae, creatures and especially for microbes. The fundamental wellsprings of Pb contamination in agribusiness and florae are Pb mining, petroleum burning, manure uses and farmstead fertilizer. Because of soil and air contamination, lead fixation in plant parts was above WHO models. Clearly, the high Pb focus in the over the earthen portions is because of airborne Pb and furthermore owing to receiving the quick relentless

from various Sites demonstrated essentially various measures of Iron (Fe). On account of the florae, higher Iron (Fe) sums were originated in florae gathered from Zhob. This additionally demonstrates the discharging waterway of the Cr from the leaves of the plant body, and more noteworthy grouping of Cr in rooty parts can be clarified by the nearness of Cr in the dirt and the creation of moderate harmony. From the information, it was watched the dimension of overwhelming metals in therapeutic plants as given in Table-1 and Figure-5.

state balance. The florae from the 3 distinct conditions amassed various measures of lead.

5. CONCLUSION

The present examination demonstrated that plants developed in defiled territories have a high danger of having substantial metal fixations past as far as possible for every one of them when contrasted with the less debased zones. The groupings of components in the vegetal materials were influenced by the centralizations of the substantial metallic ions in the dirt. In the polluted topsoil, be that as it may, various patterns were watched. The information it is obvious that the stocks (roots) ingest great convergences of metallic components from the dirt. The nature of topsoil and the degree of sullyng the dirt apply the main and huge effect on the amassed dimensions of the harmful metallic components, for example, Fe Cu, Mn, Cr, Zn and Pb in the Mentha longifolia , Olea Ferruginea and Pitacia atlantica leaves, which could cause wellbeing dangers through eating routine . Mentha longifolia assimilates a high centralization of the considerable number of components for example, Fe Cu, Mn, Cr, Zn and Pb and so on. Of the substantial components, iron (Fe) will, in general, be the most noteworthy aggregated in the base of the Mentha long ifolia plant pursued intently by Mn after that Zinc Zn and Copper Cu. Comparable higher focuses are seen in the greeneries of the Menthe long ifolia shrub with Fe is available in the most elevated fixation at this point. Lead (Pb) likewise will in general amass in the leaves of the M. longi-folia herb. In light of the gathering and translocational variables got in this examination M. longi-folia herb is successful in expelling Cu, Fe, Mn, and Zn from the arenas. The current examination provides another point of view around the nearness of approximately following metallic in nearly native therapeutic plant and the emoluments they develop in.

6. RECOMMENDATIONS

- we should change our sustenance and way of life with the goal that each Balochistan remaining in towns, urban and city zones. It is a wellbeing challenge for all.
- Our prompt methodology ought to be offered to build up the state therapeutic plant board in each condition of the nation alongside preparing offices to be accessible in the state rural office, woods divisions and other partnered NGOs/VOs, and so on.

- To improve sterile conditions for the city nourishment markets, and increment mindfulness in shoppers and strategy creators on the perils of substantial metal defilement in the sustenance admission.
- The Govt. of Pakistan should weight on the creating training for the destruction of lack of education and numbness of the Balochistan in underdeveloped territories with the end goal of the improvement of prosperous Pakistan.

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