



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1048228>Available online at: <http://www.iajps.com>

Research Article

**TOXIC METAL DETECTION IN NATURAL/HERBAL
PRODUCTS IN THE MARKET OF QUETTA, PAKISTAN****Abdul Sattar^{1*}, Ghulam Razaque¹, Nisar Ahmed¹, Syed Umer Jan¹, Ghulam Mustafa¹,
Abdul Qadir¹, Qaiser Rasheed¹, Basera Akhtar², Waheed Shah³**¹Faculty of Pharmacy and Health Sciences University of Balochistan, Quetta, Pakistan.²Department of Botany, University of Balochistan, Quetta, Pakistan.³Department of Chemistry, University of Balochistan, Quetta, Pakistan.**Abstract:**

The plants which are using as to cure the illness long before the use of herbs. Herbal medicines are mostly used for the remedy of different diseases including postoperative diseases. Toxic heavy metals such as Arsenic, Mercury, Cadmium, Lead, Copper, Iron, Aluminum, Cobalt and Manganese are present during all processes of the natural drugs. All of these are being considered as toxic dangerous heavy metals. The toxic heavy metals in medicinal plants or its derivatives during formulations it may be a consequence of accidental addition of pollution or it may be intentionally combined for the purpose of therapeutic characteristics. Totally four products were selected to check their constituents. All the samples were kept in normal temperature (room temperature) to evade any humidity and deterioration. 1g of each sample were taken in flask with 10 ml of nitric acid 67%. After this process percholic acid (4ml) were incorporated with the sample and were kept in fume hood at room temperature for 24 hours. A hot plate was used for heat to make the sample concentrated up to 1 ml, when these samples were concentrated deionized water (50 ml) was incorporated in this sample and it was filtered by Whatman's filter paper. After filtration process added sufficient amount of deionized water made 100ml. Each of this solution was labeled as a stock solution. All of these stock solutions were examined according to the specified procedure by the help of atomic absorption spectrometer for the detection of different heavy toxic metals if present in the natural formulations. The findings of this research work were showed that Ninety percent of these herbal products have heavy toxic elements.

Key words: Elements, Iron, copper, lead, Zinc**Corresponding author:****Abdul Sattar,**
Faculty of Pharmacy and Health Sciences,
University of Balochistan,
Quetta, Pakistan

QR code



Please cite this article in press as Abdul Sattar et al, Toxic Metal Detection in Natural/Herbal Products in the Market of Quetta, Pakistan, Indo Am. J. P. Sci, 2017; 4(11).

INTRODUCTION:

The plants which are using as to cure the illness long before the use of herbs. Herbal medicines are mostly used for the remedy of different diseases including postoperative diseases. All over the world this is a practice of prescriber to use the herbal medicine and they also believe that there is less side effects of these medicines. The treatments from these plants have long history where there is no remedy for diseases, still plants are widely used and manufacturing [1]. The history of china and japan the traditional natural medicine have significant role which is using fro long period of time till now. They believe that the natural herbal products are effective and having no side effect .now the trend of using herbal medicine is increasing day by day. Chines have developed their own traditional medicinal pharmacopeia which carry all the plat of china and their native's. The main sources for cure was based on plants, animal and mineral sources. More than 12000 substances are using for cure and out of these 12000 substances five hundred are common. Plant products which were using after soaking these contain, for example, soaking or stir-frying in wine or vinegar. In most of the clinics where different types of diseases are treated, the findings of the natural drugs are frequently followed by the reference of a prescriber and patient based on remedy. When these recommendations allow any of the drug which is in acceptable range or having no side effect it will be added in the natural Pharmacopeia. More than half of the population this is using these natural traditional medicines for remedy frequently in the cities and also in rural areas [2].

In atmosphere outer layer of earth the heavy metals substances are present , as a fact which cannot be destroyed nor be created , but only one way which recycle, so these may be recycled. The concentration percentages of these heavy metals differ from soil to soil [3]. There are different pollution factors which are responsible for heavy metals such as power generation mining and manufacturing and the main factor is the use of leaded gasoline [4,5]. The heavy metals are shortly defines as that any metal having the density greater than or equal to is called the heavy metal. It is more easily defined as the metals which are dangerous, poisonous and toxic for the human being. Toxic heavy metals such as Arsenic, Mercury, Cadmium, Lead, Copper, Iron, Aluminum, Cobalt and Manganese All of these are being considered as toxic dangerous heavy metals [6]. The considered combination or addition of these heavy toxic metals in medicinal plants as a curative agent. During cultivation of medicinal plants which are used as medicines some of them are contaminated from the soils having the concentration of heavy toxic metals which shows the high concentration, is another example of heavy toxic metals, produced from the pollution of natural process of products [7]. The toxic heavy metals in medicinal plants or its derivatives during formulations it may be a consequence of accidental addition of pollution or it may be intentionally

combined for the purpose of therapeutic characteristics. So all the parameters should be considered and checked before manufacturing process [8].

MATERIALS AND METHODOLOGY:**Materials****Chemicals/Glassware**

1. Nitric acid (Merck)
2. Deionizer (Silex)
3. Perchloric acid (Merck),
4. Whatman's 42 filter paper

Instruments

1. Atomic Absorption Spectrometer (Nordic Scientific)
2. Hot plate (Jenway 1000)

Methodology**Sample Selection and Collection**

The natural medicines were selected from the market of Quetta city on the basis of mostly prescribed. All of these products having mixed or single ingredients. Totally four products were selected to check their constituents. All the samples were kept in normal temperature (room temperature) to evade any humidity and deterioration.

Preparation of Samples

All the eight selected samples were allotted the different codes for identity secrecy. In second step four bottles (glass) were washed to protect from contamination with the help of methanol and dried. The samples (tablets) were grinded after emptied from their packaging and each samples of these were kept in each glass bottles according to the codes allotted.

Method of Determination

As per the recommended method of investigation 1g of each sample were taken in flask with 10 ml of nitric acid 67%. After this process percholic acid (4ml) were incorporated with the sample and were kept in fume hood at room temperature for 24 hours. A hot plate was used for heat to make the sample concentrated up to 1 ml, when these samples were concentrated deionized water (50 ml) was incorporated in this sample and it was filtered by Whatman's filter paper. After filtration process added sufficient amount of deionized water made 100ml. Each of this solution was labeled as a stock solution. All of these stock solutions were examined according to the specified procedure by the help of atomic absorption spectrometer for the detection of different heavy toxic metals if present in the natural formulations. The results of these formulations were confirmed by Saeed *et al.*, 2011 and expressed as parts per million (ppm) and the mean expressed as \pm SEM (n=3) [9].

Table 1: List of the formulations with company name collected from the market

S.No	Name of the product	Dosage	Active ingredients	Indications	Company Name
1.	Convit-D	Tablets	Vit.D 10mcg, Elemental calcium 650mg	Calcium and Vit D Deficiencies	Convell Laboratories(Natural division) Saidu Sharif, swat, Pakistan
2.	Chery-Vit	Tablets	Enzyme, Minerals, Co-enzymes, multivitamins	Anemia, General debility, Loss of memory	Famous natural Pharma, 84 madni Chowk data Nagar, badami Bagh Lahore
3.	Lasavit	Tablet	Winter cherry, Piper nigrum, Emblic, Myroblan, Ginger, Myrolons, Cebulla, Asparagus, Cinamun Bark.	Vit. Deficiency and post-operative weakness	Famous natural Pharma, 84 madni Chowk data Nagar, badami Bagh Lahore
4.	Salvical	Tablets	Calcium 600mg, Vitamin-D3 20Iu	Dietry supplement	Technat Nutraceutical, 27-M Block sabzzazar, Lahore

RESULTS:**Table 2: Metal Content in Convit-D**

Metal	Zinc	Iron	Copper	Lead
Average (ppm ± SEM)	67.00±0.82	23.00±0.61	149.50±0.63	25.50±1.22
Recommended Limit (ppm)	27.4	20	100	10

Mean value and heavy metals in Convit-D as ± SEM

In Convit-D the contents of zinc and copper were higher than the recommended specified limits and lead concentrations were also high, whereas iron concentrations were near to the limits.

Table 1: Metal Content in Cheryvit.

Metal	Zinc	Iron	Copper	Lead
Average (ppm ± SEM)	122.50±0.41	365.50±2.04	35.00±1.22	17.00±0.83
Recommended Limit (ppm)	27.4	20	100	10

Mean value and heavy metals in Cheryvit as ± SEM

In Cheryvit the contents of zinc and iron were very much higher than the recommended specified limits and lead were near to the limits in concentration, whereas copper concentration were lower than the limits.

Table 4: Metal Content in Lasavit

Metal	Zinc	Iron	Copper	Lead
Average (ppm ± SEM)	387.50±2.04	25.00±0.50	17.50±1.63	135.50±3.27
Recommended Limit (ppm)	27.4	20	100	10

Mean value and heavy metals in Lasavit as ± SEM

In Lasavit the contents of zinc and lead were higher than the recommended specified limits and iron concentration were near to the recommended limits, whereas the copper concentration were less than the recommended limits.

Table 5: Metal Content in Salvical

Metal	Zinc	Iron	Copper	Lead
Average (ppm ± SEM)	22.10±1.22	100.75±2.45	112.62±2.04	7.50±0.41
Recommended Limit (ppm)	27.4	20	100	10

Mean value and heavy metals in Salvical as ± SEM

In Salvical the contents of iron were very much higher than the recommended limits. Where the concentrations of zinc, copper and lead were within the limits.

DISCUSSION:

The findings of this research work were showed that Ninety percent of these herbal products have heavy toxic elements and these findings were also confirmed the author [10]. There are so many factors which are responsible for the presence of these heavy toxic metals in the herbal/natural products. During product manufacturing the manufacturers have not fallowed the standard operational procedures of manufacturing, also the packaging materials used were contaminated and the personnel also avoid the responsibilities to fallow the regulation [11,12]. The findings of this research work showed the lowest concentrations of lead were 7.50 ppm, and highest concentration were 35.50 ppm. Among all the products the lowest concentration was found in Salvica and highest concentration of lead was found in Lasavit. Lead is known as very toxic metal, it penetrates in the body from drinking water, from inhalation, from skin absorption, from eating food items and all of these are polluted with lead, it has not being identified beneficial effects and makes the human body affected [13].

The Lead concentrations in these products were in between the ranges of 7.5-135.50 ppm and the recommended limits are 10 ppm [14]. Among all of these products only one product is under recommended limit i.e.7.5 ppm. The findings showed that among these four products only one product showed the concentrations below the specified recommended limits, it indicates the highly toxicity of this product which is a hazardous sign for the patients who are using these products [15]. In this research work four formulations were checked and three of them were exceeded the limit.

The results showed that three out of four products having highest concentrations of zinc than recommended limit. Only one formulation is within the limits. The lowest zinc concentration was 22.10 ppm and the highest concentration was 387.50 ppm. The lowest was in Salvica and Highest was in

Lasavit. Zinc has important role in the body. Its deficiency effects directly the growth, excess amount of zinc effects the toxicity of zinc in the body. Its toxicity causes fever, nausea, diarrhea and vomiting. Copper has both effects toxic and significant. In this study among four two of the formulations were in exceeded amount and two are under the limits. In Salvica and convit-D the concentration were high which were 149.5ppm and 112ppm and lowest were 35 ppm and 17.5ppm.

Iron role is very much important for the normal functioning of numerous processes of human body. In RBC, in immune system it has important role. It is frequently found in daily routine food that is in vegetables, meat and also found in grains. It is present mostly in Iron supplements. In this study findings the results showed the concentration high in all products which converts the product toxic.

So in the end it was found that the manufacturing industry does not fallow the SOPs during manufacturing which finally effect the finish product in all way it effects the patient. In developed countries they have established laws to control the illegal act of natural/herbal formulations, so their products shown positive effects. (WHO, 2002).

It is highly recommended that the plant materials which are using for the medicinal production may be checked for their toxicity and passed through the legislation body before formulation process.

CONCLUSION:

It is concluded here with that the natural/herbal products which are manufacturing in Pakistan are not fallowing all the SOPs, rules and regulations of manufacturing, most of the products contain toxic elements which is dangerous for health. These contain Zinc, lead, copper and Iron, near about 85% of drug formulations derived from the natural sources and found toxic elements. The toxicants of Zinc, copper, lead and iron leads to many complications

included GIT, Neurologic, Blood, lethargy, metabolic diseases, weight gain and other diseases.

So it is recommended that during cultivation, manufacturing, packaging and handling all the SOPs should follow.

REFERENCES:

1. Li S, Fang Y, Ning H and Wu Y. Heavy metals in Chinese therapeutic foods and herbs. *J. Chem. Soc. Pak*, 2012;34(5):1091.
2. Leape LL, Brennan TA, Laird N, Lawthers AG, Localio AR, et al. (1991) The nature of adverse events in hospitalized patients. Results of the Harvard Medical Practice Study II. *The New England journal of medicine*.
3. Genuis SJ, Nowhere to hide: Chemical toxicants and the unborn child. *Reprod Toxicol*, 2009; 28: 115–116.
4. Genuis SJ, The chemical erosion of human health: adverse environmental exposure and in-utero pollution - determinants of congenital disorders and chronic disease. *J Perinat Med*, 2006; 34: 185–195.
5. Centers for Disease Control, Department of Health and Human Services (2009) Fourth National Report on Human Exposure to Environmental Chemicals. 2009. [Accessed Jan 18, 2009] Atlanta: Georgia. 1–529.
<http://www.cdc.gov/exposurereport/pdf/FourthReport.pdf>.
6. Forbes RM, Cooper AR and Mitchell HH. On the occurrence of beryllium, boron, cobalt, and mercury in human tissues. *Journal of Biological Chemistry*, 1954;209(2), 857-865.
7. Quig D (1998). Cysteine metabolism and metal toxicity. *Alternative Medicine Review*, 1998; 3, 262-270.
8. Wong MK, Tan and Wee YC., Heavy metals in some Chinese herbal plants. *Biological trace element research*, 1993; 36 (2): 135-142.
9. Saeed M, Muhammad N and Khan H., Assessment of heavy metal content of branded Pakistani herbal products. *Tropical Journal of Pharmaceutical Research*, 2011;10 (4): 499-506. Chicago.
10. Obi E, Akunyili D, Ekpo B and Orisakwe O., Heavy metal hazards of Nigerian herbal remedies). *Sci Total Environ.*; 2006;369: 35-41.
11. Koh HL and Woo SO. Chinese proprietary medicine in Singapore. Regulatory control of toxic heavy metals and undeclared drugs. *Drug Saf*, 2000;23:351-362.
12. Yee SK and Choo PL., Regulatory control of Chinese Proprietary Medicines in Singapore. *Health Policy*, 2005; 71:133-149.

13. Venkatesh T., The effects of environmental lead on human health- a Challenging Scenario. *Health Focus*, 2004; 2:8-16.

14. Kosalec I, Cvek J, Tomi S. Contaminants of Medicinal Herbs and Herbal Products. *Arch Indus Hyg Toxicol.*; 2009;60: 485-501.

15. Ravi RA, Vishal Babu G, Menezes G and Venkatesh T., Lead toxicity as a result of herbal medication. *Ind J Clin Biochem.*; 2008;23: 200-3.