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A Study on Metal Analysis of Some Selected Medicinally Important Plants of (Seeds) of Family (Cucurbiteacea) Found in Sindh Pakistan

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Abstract: In the present study to determine the nine metals viz, copper (Cu), iron (Fe), potassium (K), sodium (Na), zinc (Zn), magnesium (Mg), manganese (Mn), lead (Pb) and cadmium (Cd) were analyzed, in six medicinal plants seeds of *Cucumis melo L.var. agrestis* (Wild melon), *Citrullus lanatus L.* (watermelon), *Cucumis melo L.*(muskmelon), *Cucumis sativus L.* (Cucumber), *Citrullus colocynthis* Schrad (Bitter apple), and *Cucurbita pepo L.*(Pumpkin) belong to family Cucurbiteacea found in Sindh Pakistan, all these medicinal plants (seeds) traditionally used in Pakistan for treatment of various ailments. Metal determined by using atomic absorption spectrophotometer (AAS). The *Cucurbitaceae* plants contain vast potential to be used against jaundice and hepatitis. The normal development of plants, animals and human being depends on the appropriate phase of metals

Keywords: The nine metals viz, Copper (Cu), Iron (Fe), Potassium (K), Sodium (Na), Zinc (Zn), Magnesium (Mg),

1. INTRODUCTION

The Cucurbitaceae family fruits, seeds and vegetables are usually consumed in different Ayurvedic arrangements and confectionary. This family comprises a vast collection of plants which are medicinally precious. The plants of the family are in a group familiar as cucurbits (Kocyan *et al.*, 2007).

This work provide informative knowledge such as medicinal nutritional importance, which include both natural and cultivated variety and diverse habits like sweet, bitter vegetable, fruit and salads, however the little knowledge concerning its medicinal nutritional value. Recent investigation was approved the traditional fitness care medication at this time practiced by the local community through family cucurbitacese plants. (Shrivastava 2013). Currently reported that Watermelon seed contain sufficient quantity of dietary proteins that possibly will be used for as nutritional constituent in foodstuff. (Ali, 2011). previously reported in metal Cu, Ni, Zn, Pb, Co, Cd, Fe, Cr, Ca and Na were *Cucumis sativus* by Hussain, (2010). In this study, metal analysis of six indigenous medicinal plants *Cucumis melo L.var. agrestis, Citrullus lanatus L., Cucumis melo L., Cucumis sativus L. Citrullus colocynthis* Schrad and *Cucurbita pepo L.*belong to family Cucurbiteacea found in Sindh Pakistan that family Cucurbitaceae is major resource of foodstuff, like wild melon, water melon, muskmelon, cucumber, bitter apple, pumpkin, used against various disease.

Citrullus lanatus seeds showed the metal analysis of calcium, magnesium, zinc, lead, potassium and sodium, calcium and magnesium observed in highest quantity while zinc and lead prove the smallest quantity were presence and recent information provides that the consumption of seeds *Citrullus lanatus* is protected (Okunrobo, *et al.*, 2012). Cucurbitaceae are vital source of foodstuff like pumpkin (*Cucurbita pepo),* (*Cucumis melo),* (*Cucumis sativa),* (*Citrullus lanatus), Lagenaria siceraria and Luffa cylindrica* (Nazimuddin and Naqvi, 1984; Sultan Asyaz *et al.*, 2010).

The present research work is support on the phytochemical analysis of most commonly used medicinal plants (seeds) of cucurbitaceae family. These plant varieties used to heal burns, wounds and abrasions, orally used in respiratory diseases, skin disorders, diabetes, and also used as diuretic, essence, and antipyretics, anti-inflammatory, it characterizes enormously precious records that give the information for the profitable use of bio resources. In addition the information may be useful for the manufacturing, pharmacologists, general practitioner, phytochemists, botanists, and involved in the increase of substitute treatment. (Gilani, *et al.*, 2005, Mukherjee, and Wahile, 2006).

Citrullus lanatus (watermelon) seeds are great source of protein, magnesium, calcium and potassium, salted and roasted watermelon seeds are used as food and drink. *Cucumis sativus* (Cucumber) seed usually used to push out the intestinal worms and tapeworms, *Cucurbit pepo* L. (Pumpkin) seeds help in free of pinworms from human body, by intake peel seeds in a preferred quantity.

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The fruits of cucurbits are very useful in conditions of human being fitness, i.e. refinement of blood, elimination of constipation and great for digestion and provide vitality. Some part of cucurbits plants are reported to have purgatives, emetics and antihelmintics resources due to the secondary metabolite cucurbitacins content (Rahman *et al.,* 2008 and Bisognin, 2002). Cucurbitacins constitute a group of diverse triterpenoids substances which are well known for their bitterness and toxicity. (Guha *et al.*, 1975). Many compound of this group have been examine for their cytotoxic, hepatoprotective, anti-inflammatory and cardiovascular effects (Dhiman *et al.*, 2012 and Miro, 1995).

2. MATERIALS AND METHODS

Collection of medicinal plant materials: The medicinal plant (seeds) of *Cucumis melo L.var. agrestis, Citrullus lanatus L., Cucumis melo L., Cucumis sativus L.,* and *Citrullus colocynthis* Schrad, *Cucurbita pepo* were collected from the different areas of Sindh, during January-February 2010, 2011 reference sample were identified through flora of Pakistan (Nasir and Ali, 1973). Digestion of the plants seeds: The medicinal plants (seeds) were initially cleaned, washed, dried under shade at room temperature for 2 days and later on in an oven at 60-80 ºC for 1h., 1 g of manually crushed sample material was carefully dissolved in 10 ml HNO_3 and the sample was left for 8 hours for the digestion. Acidic solution of the sample was then heated gently on hot plate at 100-120ºC till the sample was nearly dried. When the sample became cool it was again digested with 8ml HNO_3 and H_2O_2 (2:1) and the samples was dried by keeping on hot plate 100-120°C till 1 ml volume of the sample remained. The sample was cooled and diluted by adding 24ml double distilled water making total volume of 25ml. The colour of diluted sample should be bright yellow; otherwise the solution was filtered through Whatman filter paper No.42 (Khanzada, *et al* .2008a-b, 2013).

Elemental assay: The six medicinal plants seeds were investigated for metal analysis by using atomic absorption spectrophotometer Hitachi Ltd. 180-50.S.N5721- at National Center of excellence for Analytical Chemistry University of Sindh, Jamshoro. Appropriate working standard solution was drawn for each element. The calibration curves were obtained for concentration vs. absorbance. The data were statistically analyzed by using fitting of straight line by least square method. All metals were determined in medicinal plants under this investigation procedure. A blank reading was also taken and necessary correction was made during the calculation of percentage concentration of various metals. (Khanzada *et al* .2008a-b, 2013).

3. RESULTS AND DISCUSSION

(**Table 1)** summarizes the concentrations (mg/kg) of metals which were observed in different concentrations viz , Cu, , Cd, Fe, K, , Na, Pb Mn , Mg, and Zn have been analyzed for *Cucumis melo L.var. agrestis, Citrullus lanatus L., Cucumis melo L., Cucumis sativus L.,*and *Citrullus colocynthis* Schrad, *Cucurbita moschata.* The highest concentration (mg/kg) were found in *Cucumis melo L.var. agrestis* (mg, 2634.4 mg/kg). The highest concentrations (mg/kg) were found in *Cucumis melo L.var. agrestis Cucumis melo L.var. agrestis* Mg, 2634.4 mg/kg, Na mg/kg,, 1423.3 mg/kg, K, 1240.5 mg/kg, and Cd and Pb metal were lowest concentration 0.153 mg/kg -0.413 mg/kg,; and *Citrullus lanatus L.*, highest concentration of K, 2544.2 mg/kg, Na, 2354.3 mg/kg, Mg, 1526.4 mg/kg,, lowest concentration Pb 0.252 mg/kg, and Cd, 0.142 mg/kg, *Cucumis melo L.*, highest concentration of Na, 1744.3 mg/kg, Mg, 1740.5 mg/kg, K, 1333.4 mg/kg, Zn, 9.60 mg/kg and lowest Fe, 5.45 mg/kg, Cd 0.17 mg/kg 1and Pb 0.521 mg/kg, *Cucumis sativus L.* Na, 2454.3 mg/kg, K, 2043.2 mg/kg, Mg, 1834.6 mg/kg and lowest Zn, 5.45 mg/kg, Fe, 6.26 mg/kg, Cu, 0.41 mg/kg, Pb, 0.325 mg/kg, Cd, 0.165 mg/kg, *Citrullus colocynthis (L.) Schrad*, Mg, 2123.3 mg/kg, K, 1933.7 mg/kg, Na, 1351.2 mg/kg, Zn, 7.00 mg/kg smallest amount Cu, 1.22 mg/kg, Mn, 2.33 mg/kg, Fe, 3.25 mg/kg lowest in Cd, 0.130 mg/kg, Pb 0.653 mg/kg and *Cucurbita moschata Duchesne* Na, 2413.4 mg/kg, Mg, 2031.2 mg/kg, K, 1433.1 mg/kg, Zn, 8.12 mg/kg, Fe, 5.24 mg/kg and smallest amount Cd, 0.125 mg/kg , Pb 0.312 mg/kg, Cu 1.22 mg/kg, Mn, 3.00 mg/kg.

Plants obtain metals by absorbing them from polluted soil deposit on part of the plants showing to the atmosphere from contaminated environments (Khairiah *et al*, 2004; Chojnacka *et al*, 2005). Zinc is one of the essential trace metals used for all living organisms. Lead is toxic metals, has no known helpful role in the body, with the exception of its growth causes a numeral of unfavorable property on a variety of body structure. Metals, such as lead, copper chromium, and cadmium are increasing poisons.

Recently reported in metal Cu, (11-14ppm), Zn, (31-33 ppm), Pb, (0.015-0.015ppm), Cd, (0.0008-0.0008 ppm), Fe, (34-90 ppm) and Na (7.06-15ppm), were *Cucumis sativus Cucurbita pepo L.* by Hussain .J. 2010. Acceptable Cu range set by WHO of 2-5 mg use per day (Anon., 1998). It has been reported that Cu use in excess of 3 mg/L of intake water effect in vomiting and further bad effects on the gastrointestinal tract (GIT) excess Cu can cause oxidative stress in plants and subsequently increase the antioxidant responses due to increased production of highly toxic oxygen free

Table -1. Concentrations of metal in six medicinal plants *Cucumis melo L.var. agrestis, Citrullus lanatus L., Cucumis melo L., Cucumis sativus L. Citrullus colocynthis* Schrad, *Cucurbita pepo* . (mg/kg) Cucurbitaceae Family

S. No	Elements	*Cucumis melo L.var. agrestis*	*Citrullus lanatus L.*	*Cucumis melo L.*	*Cucumis sativus L.*	*Citrullus colocynthis (L.)* Schrad,	*Cucurbita pepo*
1	Copper Cu	1.10 mg/kg	1.46 mg/kg	2.00 mg/kg	0.41 mg/kg	2.46 mg/kg	1.22 mg/kg
2	Iron Fe	6.12 mg/kg	4.00 mg/kg	5.45 mg/kg	6.26 mg/kg	3.26 mg/kg	5.24 mg/kg
3	Potassium K	1240.5 mg/kg	2544.2 mg/kg	1333.4 mg/kg	2043.2 mg/kg	1933.7 mg/kg	1433.1 mg/kg
4	Sodium Na	1423.3 mg/kg	2354.3 mg/kg	1744.3 mg/kg	2454.3 mg/kg	1351.2 mg/kg	2413.4 mg/kg
5	Zinc c Zn	6.74 mg/kg	10.13 mg/kg	9.60 mg/kg	5.45 mg/kg	7.00 mg/kg	8.12 mg/kg
6	Magnesium Mg	2634.4 mg/kg	1526.4 mg/kg	1740.5 mg/kg	1834.6 mg/kg	2123.3 mg/kg	2031.2 mg/kg
7	Manganese Mn	2.50 mg/kg	1.70 mg/kg	3.21 mg/kg	4.25 mg/kg	2.33 mg/kg	3.00 mg/kg
8	Lead Pb	0.41 mg/kg	0.25 mg/kg	0.52 mg/kg	0.32 mg/kg	0.65 mg/kg	0.31 mg/kg
9	Cadmium Cd	0.153 mg/kg	0.142 mg/kg	0.171 mg/kg	0.165 mg/kg	0.130 mg/kg	0.125 mg/kg

radicals (Pizzaro *et al.*, 1999., De Vos *et al.*, 1992; Luna *et al.*, 1994). Many metals can be considered as important nutrients for human being fitness other than their toxic absorption should also be considered for preparation of herbal drug (Sadia *et al.*, 2011), six medicinal plants were selected for metals analysis well-known for their helpful therapeutic utilize. The metals observe absorption include sodium (Na), potassium (K), magnesium (Mg), iron (Fe), zinc c (Zn), lead (Pb), manganese (Mn), copper (Cu) and cadmium (Cd) by atomic absorption spectroscopy. Previously reported the seeds (*Cucurbita pepo L.*) have a significant quantity of minerals such as Zn, K, Ca, Mg, Fe, Cu and P (Lazos, 1986). (*Cucurbita pepo L.)* Cu, 22.3- 14.9, Pb 2.87-2.13 and Cadmium, (Cd) 0.50- 3.58 reported (Stefania Papa *et al.*, 2009). The possible toxicity and constant environment of heavy metals, and the everyday use of vegetables and fruits, it is compulsory to investigate these foodstuffs to certification the levels of these contaminants collect decided international necessities (Radwan *et al*., 2006). Scientists and nutritionists have in growth considered in the role of metals such as zinc, copper and iron in human being fitness. The sufficiency of trace minerals depends on equally, the quantity and bioavailability in the diet (Udayakumar and Begum, 2004).

Recently report of *Citrullus colocynthis* plant as antimicrobial agent is confirmed by the results obtained in anti-mycotic activity and seed parts were monitor monitor *in vitro* against four important plant pathogenic fungi by Mohamed, 2013. The metal content (Cd, Cr, Cu, Fe, Mn, Ni, Pb, and Zn) was determined in *Cucurbita pepo*, By Ciura *et al.*, 2005. Recently report of eight metals concentrations (mg/kg) in the part of leaf were found in *Citrullus colocynthis* plant, the concentrations Fe 3.88, Cd, 0.77, Pb 0.45, Mn, 0.096,Cu 5.22, Cr, 3.72, Mg 3.35 and Na78.34 recently reported by By Sultan Asyaz, 2010. Metal analysis of *Citrullus lanatus* (Zn) 1.20±0.10 (Pb) 0.08±0.00 (Ca) 16.80±1.20 (Mg) 11.40±1.00 (K) 7.80±0.00 (Na) 5.70±0.10 recently reported by Okunrobo L, 2012,

The dietary value of watermelon as review mostly rich in vitamins A 3%, Thiamine (Vit. B1), Riboflavin (Vit. B2) , Niacin (Vit. B3), Pantothenic acid (B5), Vitamin B6 and Folate (Vit. B9) which range among 1-3%, Vitamin C 14%. mineral composition be present Calcium 1%, Iron 2%, Magnesium 3%, Phosphorus 2%, Potassium 2%, zinc 1% comprising 50% oil, and 35% protein, nourishment of Watermelon, safe to eat parts rich in essential amino acids like arginine, glutamine, aspartic and minerals such as zinc and essential fatty acids, *C. lanatus* is a rich source of flavonoids and phenol, with ability to scavenge free radical and inhibit hydrolytic and oxidative enzymes and anti-inflammatory action, and also phytochemical mineral deposits. *C. lanatus* can be a possible basis of helpful medicine. (Jack, 1972, Mathias *et al.*, 2001, Sepasal, 2004, Frank, 1995, Ojeih *et al.*, 2008 and Olamide, 2011).

4. CONCLUSION

The present study gives a new place about the presence of a number of metals in these local medicinal plants (seeds) (Sindh Pakistan). The chief metals contents were Mg, Mn, Fe, K, and Zn these medicinally important plants (seeds) of Cucurbitaceae family, metal concentration showed in Table 1. In conclusion, all six medicinal plants were reputable to be a rich source of metals mostly in seeds**.** The highest metal concentrations were present in magnesium, *Cucumis melo L.var. agrestis* 2634.4 mg/kg and highest potassium were present in *Citrullus lanatus L* 2544.2 mg/kg highest concentration of sodium 2454.3 mg/kg, and zinc in *Cucumis sativus L.,Citrullus lanatus L* zinc 10.13 mg/kg, iron in *Cucumis sativus L* 6.26 mg/kg, manganese, 4.25 mg/kg, *Citrullus colocynthis* Schrad copper 2.46 mg/kg, lead *Citrullus colocynthis* Schrad, 0.653 mg/kg, *Cucumis melo L.var. agrestis* cadmium, 0.153 mg/kg, and highest concentration of magnesium, *Cucurbita pepo L.*2031.2 mg/kg. This work attempt to improve information of the dietary property of these plants and significance of metals contents. These studies point out that these plants accumulate specific metals and these plants used for medicinal purpose. The metals requirement in these plants helps obtain remedial and chemically pure medicine. All these metals source of environmental exposure and are details to be marvelously toxic (Ellen *et al*, 1990). The Cucurbitaceae plants are medicinal and vegetable plants, Different scientist proved that Cucurbitaceae plants are suggested for the important source of food and the prevention of many diseases as well as diabetes and cancer, include Hepatitis and also, antimicrobial activities and further use for remedial uses.

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