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Determination of The Mineral Elements of Aerial Parts of Two *Artemisia* Plant and The Growing Place Soil from Taftan Area.

Alireza Sardashti*, and Amin Ganjali.

Department of Chemistry, Faculty of Science, University of Sistan and Baluchestan, P.O. Box 98135-167, Zahedan, Iran.

ABSTRACT

The effect of high correlation and close relation between plant covering and soil is as such that change in the situation of one of them has intensive influence on other performance of echo system. There for analysis of the growing place soil of plant has great importance along with analysis of aerial parts of plant in order to define mineral elements. In the present research, the growing place soil of *Artemisia* plant was analyzed after initial preparation by XRF technique. Results show that these soils are little alkali and are relatively poor with respect to organic materials. The growing place soil of *Artemisia*. *sieberi* has higher acidity than that of (*A.santolina*). Aerial parts of *A.santolina* and *Artemisia*. *sieberi* were heated at 300-600 °C in furnace until they converted into ashes. Obtained ashes were analyzed according to the XRF and Flame Atomic Absorption techniques. The amounts obtained by F.A.A.S technique for *Artemisia*. *sieberi* were Zn^{+2} 52.77mg/kg; Ni^{+2} 6 mg/kg ; Mn 131mg/Kg: Co^{+2} 4.33mg/kg;Cu^{+2}8.55mg/kg; Ag^{+} 5.62mg/kg: of dry mass and for *A.Santolina* were Zn^{+2} 77.48mg/kg; Ni^{+2}8mg/kg ;, Mn 151.30mg/Kg: Co^{+2} 6.18mg/kg;Cu^{+2}10.30mg/kg; Ag^{+} 4.48mg/kg: of dry mass .The second of sample were heated at 400 ^{0}C in furnace until they converted into ashes. The ashes was analyzed after initial preparation by XRF.. The amounts obtained by XRF for *Artemisia*. *sieberi* were Al_2O_3 1.78%:SiO_2 6.04%:MgO 0.64%:K_2O 0.98%;CaO 1.25Na_2O 0.47w/w of dry mass.The results of two plants analysis were consistent with the results of soil analysis. The amounts of Calcium, Manganese, Iron, Potassium and Sodium were high and the quantity of Copper, Zinc and Nickel was desirable. Meaning full difference was observed in different processes in the results, such as more increases in Calcium of aerobics organs than Calcium quantity of soil of the place of growing that in turn, recognizes the higher ages of plant.

Keywords: *Artemisia plant*- Mineral elements–Growing place soil, XRF and Flame Atomic Absorption techniques

Corresponding author

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INTRODUCTION

The species of *Artemisia*. *sieberi* Boiss is a permanent shrubby plant growing as tered in the heights of south- easth of Iran. The lands are of the types of high and relatively high mountains with foothills 2100 to 2300 m in height. Its habitat has steep slopes high and low surfaces as well as cold semi-arid climate with annual average rain full of 300-400mm[1]. The soil of its habitat is shallow and slightly calcareous and in some habitats the soil is 5 percent calcareous no salty less than 1 mums/cm alkaline (EC) and its pH being between 7.4-7.7[1]. *Artemisia*. *sieberi* Boiss is a very sustainable woody bush and its resistant to cold that is observed on the lands of northern slopes of Taftan mountain in pasture hills. The root network is relatively deep and very strong that needs to grow and develop habitat environment of *Artemisia*. *sieberi* Boiss is fragrant especially in summer and spring so that its distinct smell is Felt in the space. Since it is not appetizing so the livestock pays no attention to this plant during the summer and spring[2,3].*Artemisia Santolina* is shrubby and woody, with the height of 35-45 cm which is low-scattered and relatively expanded a little on the skirts of the hills of Taftan mountain1700 to 2000 m steep. It's habitat is moderate with an almost dry climate, including cold-desert arid and moderate-desert arid with annual mean rain full of 150-250mm.The soil of habitat is not salty mostly about 6mm/cm alkaline neutral acid to basic with a ph from 7.4 to 8.8.it s poor regarding organic materials it is an effective species in said conservation that despite of being resistant to dryness it is seriously damaged in continual droughts it is very appetizing. Because of having little fragrant substances comparing with other kinds of Artemisia it is considered for live stock pasturing in the spring and summer [3].In 2015 Sardashti et al. sprayed humic substances onto root soil around the base of plant, and measured metal ions in plant organs before growth and after HS spray during growth, the results indicated reduction in the amount of metal ions and better growth of plant [4].Unfortunately because of environmental contaminations including some of heavy metals the plant has been contaminated so with respect to the importance and medicinal utilizations of them the reduction of contamination is necessary [5].

MATERIALS AND METHODS

Sampling

Aerial parts of *Artemisia*. *sieberi* Boiss and *Artemisia Santolina* were collected from slope and skirt of Taftan in the month of June 2008 .In order to remove the moisture of sample it was placed at shadow, exposed to dry air dried plant sample was ground with a Molinx grinder so that it was covered to powder. The 4 soil of growing place of two species, from surrounding half meter of root was prepared.

Method of work

Two samples of five gram from leaf powder were weighed the first sample was mixed in the environment of Nitric acid and Perchloric acid(on a ratio of 1;2) by wet approach and was heated at 200^0 C for four hours after refining the product was placed into a 50ml juju balloon and reached the volume by water double-distillation.pH of solution is one existing mineral elements of solution excepting Arsenic VGA-AAs)were measured by technique of flame atomic absorption second sample was put into the Oven at 400 ^{0}C for four hours then obtained ash was measured it weighed 0.80 g The best Temperature for providing the ash sample is 400 ^{0}C in which the measurement of metal ions of samples is performed best with the least error mineral elements and oxides contained in resulted ash were measured with the Tablet by apparatus of XRF.

Reagent and material

For dilution, demineralized water provided by a Milli-Q Plus filter apparatus (Millipore, USA) was used. All chemical were of analytical reagent grade (Merck, Germany). Element test solutions and calibration standards were prepared from commercially available (Titrisol, Merck, Germany) $^{ml}/_{g}$ stock solution using adjustable micropipettes (Gilson, France). Standards were acidified to 1% with nitric acid.

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Equipment

Flame atomic absorption apparatus model PU 9100X, made in England by Philips Company, VGA 77 made in Australia by Varian Company ,XRF apparatus Model D&Advance made in Germany by Broker company

Statistical analysis

Measurement of mineral elements was done in triplicates to test the reproducibility of them. All results are presented as mean ±S.E.Statistical analyses were performed by Student^{s} t-test.The values of $P<0.05$ were considered statistically significant.

RESULTS AND DISCUSSION

Decomposition of the soil of growing place of *Artemisia* was carried out for element of Carbone with the way of elemental analysis .The amount of Carbone in soil sample of *Artemisia*. *sieberi* Boiss species was estimated 0.27% and that of *Artemisia Santolina* was identified 0.54% for identifying metal oxides in the soil of growing place. The identified of Zn 90 mg/kg for soil of growing place of *Artemisia sieberi* and 80 mg/kg for the XRF technique was used the amount of Zn by technique of Flame atomic absorption was that of *Artemisia Santolina* .Results show that the growing place soil of *Artemisia*. *sieberi* Boiss is slightly more calcareous than the soil of growing place of *Artemisia Santolina* for identifying the mineral elements of aerial parts of Artemisia.

Species the sample which was prepared as a solution by the way of wet-burning (pH=1), was analyzed by flame atomic absorption technique (Table 1).

The results show the quantities of iron, sodium, magnesium and manganese as being less than the quantities of above-mentioned metals and calcium and potassium as being more than the above-mentioned metals in the growing place soil of plant it suggests the long life of plant Calcium is constructional and fixed constituent of all plants and can remove the toxic effects of potassium sodium and magnesium ions. According the U.S.Pharmacopoeia, the lead limit for pharmaceutical products is 10 ppm.It is acceptable limit for plant products, drugs and dietary supplements [6].Since it exists in the soil can influence on soil alkali and improves the growth of plant. In addition the ash of aerial parts of two species was prepared by the method of dry-burning and then analyzed by the XRF technique that is consistent with the results from Flame atomic absorption technique [7,8].

Table 1: Identification of the amounts of mineral elements in the aerial parts of *Artemisia sieberi* and *Artemisia santolina* plants and growing place soil by flame atomic absorption technique

Metal ion	The amount of metal ion in *Artemisia sieberi* plant (mg/kg per dry)	The amount of metal ion in *Artemisia santolina* plant (mg/kg per dry)
Ag	5.62±0.02	4.48±0.02
Bi	0.5>	0.5>
Cr	6±0.02	4±0.02
Cu	8.55±0.03	10.30±0.03
Mn	131±0.08	151.30±0.08
Ni	6±0.03	8±0.03
As	0.96±0.01	1.07±0.01
Fe	362.36±0.05	352.47±0.05
Co	4.33±0.03	6.78±0.03
Sb	0.4>	0.4>
Zn	52.77±0.04	77.48±0.04
Pb	0.2>	0.2>
Cd	0.2>	0.2>

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Table 2: Measurement of metal oxide in the aerial parts of two Artemisia plant and growing place soil by XRF technique

Metal oxide	The amount of metal oxide in *Artemisia sieberi* plant(w/w% per dry)	The amount of metal oxide in growing soil place of *Artemisia sieberi* (w/w %)	The amount of metal oxide in *Artemisia* santolina plant(w/w% per dry)	The amount of metal oxide in growing soil place of *Artemisia* santolina (w/w %)
SiO_2	6.04	67	5.81	68.70
Al_2O_3	1.78	11.50	1.23	11.30
MnO	-	0.11	-	0.11
TiO_2	0.03	0.74	0.04	0.82
K_2O	0.98	1.99	0.77	2.04
Na_2O	0.47	1.20	0.39	1.32
MgO	0.64	1.88	0.60	0.91
CaO	1.25	7.89	1.12	6.81
Fe_2O_3	0.347	6.03	0.345	5.97

Table 3: Measurement of metal and scarce metals in the aerial parts of two Artemisia plant and growing place soil by XRF technique

metal and scarce metals	The amount of metal and scarce metals in *Artemisia sieberi* plant(w/w% per dry)	The amount of metal and scarce metals in growing soil place of *Artemisia sieberi* (w/w %)	The amount of metal and scarce metals in growing soil place of *Artemisia* santolina (w/w %) per dry)	The amount of metal and scarce metals in growing soil place of *Artemisia* santolina (w/w %)
Zn	-	90	-	80
Sn	0.00011	0.000389	0.000106	0.000454
Y	0.000369	0.002449	0.000324	0.000207
Hf	0.000111	0.000902	0.000276	0.000896
Th	0.000152	0.000689	0.000093	0.001441

CONCLUSION

Artemisia is a plant which possesses a considerable amount of essential oil especially in the essential oil there are important compositions such as 1, 8- cineole and α-pinene, β-pinene and camphor that are utilized in producing important medicines. There for at first step the amount of contaminants should be control because the high percentage of them is toxic and harmful for lives of Human and other animal in this research organic materials of plants were removed by two different methods then by two techniques which were accurate and sensitive to low amounts of metal ions measurement was performed.Calcium is alsonecessary for blood coagulation,milk clotting and regulation of cell permeability (Yagi et al.,2013; Shahnawaz et al .,2012).

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REFERENCES

[1] Mogimi,Javad"In troducing some of pasture species in Iran"Arvan publishing, 2007;94-102.
[2] Zargari,A .Medicinal Plants, volume3, sixth edition, publish university of Tehran, 1997;80-106.

[3] Ranjbari A.Identifcantion of mineral elements of dominant pasturing plants in four major regions of the province of Isfahan, M.A.dessertation, Faculty of Agriculture, university of Tarbiat Modarres Teacher truining .1994.
[4] Sardashti Alireza, Sangtarash Mohmamd Hossien, Asadi Amir . IJACS,2015;,8**(**2):142-148.
[5] Halverson JF,Smith J. Soil sociely of Arnerican Journal.1997; 61: 287-294.
[6] Tangahu BV, Sheikh SR, Basri AH , Idris M, ,Anuar N, and Mukhlisin M. international journal of chemical engineering,2011;31.
[4] Blicharska E , Kocjan R , Sowa I . Journal of .Annales.2006; Vol 1,N0 1 ,67: 329-333.
[5] Baranowska, K.Srogi, A.Wlochowicz, K.Szczepanik. ,Polish Journal of Environmental,2002; ,11, 5: 467-471.
[6] Yagi S,Alia ARE,Elhassan GOM.andAbdelhafeez MA .Journal of Applied and Industrial Sciences.2013; 1(1) 49-53.
[7] Shahnawaz M,Sheikh SA,Nizamani SM,Bhanger MI,Afridi I.and Ahmed E.Pakistan journal of nutrition.2012;11(2) 181-186.