Elemental Status on Medicinal Plant from *Tribulusterrestris (L)* by AAS method

G. Thiruppathi*[1], R.Selvaraju[2],R.Ganapathi Raman[3] and A. Raja[4]

[1]Department of Engg.Physics, Bharathiyar Inst. of Engg.for Women, Deviyakurichi-636112.
[2]Department of Engg.Physics, Annamalai University, Annamalainagar-608 002.
[3]Department of Engg.Physics, Noorul Islam University, Kumarakoil-629 180.
[4]Department of Engg.Physics, Bharath University, Chennai-600073.
*Corresponding author: physicsthiru86@gmail.com

Abstract

Tribulusterrestris is a traditional medicinal plant available in all over the world. It is highly useful to prevent urinary track disorder, particularly urinary stones formation. In the present study, Elemental like Cr, Cu, Fe and Zn concentrations of *Tribulusterrestris*plant's of different parts (Leaf, Flower and Seed) were studied through Atomic absorption spectroscopy (AAS) techniques.

Keywords:Tribulusterrestris, Elemental status, AAS, Statistical analysis.

1. Introduction

Traditional medicines have been used to treat various diseases for more than thousand years. The World Health Organization (WHO)[1] reported that 80% of world population relies on traditional medicine for their primary health care needs. The use of herbal medicine in Asia represents a long history of human interactions with the environment. Plants used for traditional medicine contain a wide range substance that can be used to treat chronic as well as infectious disease. The medicinal value of plants lies in some chemical substances that produce a definite physiological action a human body. Medicinal plants contain both the organic and inorganic constituents. The bioactive compounds like alkaloids, flavanoids, fannies and phenolic compounds are present in plants.

The pharmalogical properties of the medicinal plants have been attributed to the presence of active chemical constituents which are responsible for important physiological function in living organisms[2]. Trace elements concentrations present in medicinal plants are of great importance of understand their pharmalogical actions[3]. *Tribulusterrestris* is a perennial plant, grown predominately in India and Africa. It has been widely used in the treatment of different diseases (skin disease, Gonerria, heart disease, liver and urinary tract infection)[4].

1.1. Traditional uses

Diuretic, tonic, cooling, aphrodisiac and the dried fruits are used in cases of spermatorrhoea, phosphaturia, diseases of genito-urinary tract such as dysuria, gonorrhoea, chronic cystitis, calculous affections, urinary disorders, incontinence of urine, gout and impotence also in uterine disorders after parturition. The seeds are strengthening and the ash of plant is good for external application in rheumarthritis[5].

The present work investigates to *Tribulusterrestris* plants and its relationship with element status analysis of AAS method. In this work,the elementsof Cr, Cu, Fe, and Zn in different parts of *Tribulusterrestris* plants were found. The quantitative of elements these parts of plants showed a different distribution for each part. This information could be used to identify which parts of plants are more effective for therapeutic use.

2. Materials and method
2.1 Sample collection and preparation
In the present study, AAS techniques areused for the quantitative estimation ofelements like Cr, Cu, Fe, and Zn present in*Tribulusterrestris* plants. The procedures of sample collections andpreparations are given below.

Five plants were chosen from different places of Botanical garden, Annamalai University, Annamalai Nagar. From 15 samples (leaf-5, flower-5 and seed-5) of *Tribulusterrestris* plants preparation for the standard procedures (Fig.1).

Fig. 1.*Tribulusterrestris* **plant sample.**

The different part of the plant were washed with distilled water and dried at 110 °C for four hours. After the constant weight is obtained, the dried plant material was then ground to powder. 0.5 gram of oven dried powdered plant sample like seed, leaf and flower is transferred to a Teflon beaker and 10ml concentrated nitric acid and 2.5 ml concentrated perchloric acid are added. The sample is then brought very slowly to boiling on a hot plate and heated to dryness. If sample blackening occurred during the fuming stages, nitric acid is added drop wise. The sample is than cooled, redissolved in 10 ml distilled water and 1 ml concentrated hydrochloric acid and brought to a volume of 25 ml in a volumetric flask. The solution is than analyzed against calibration curves established. The present work has been performed using Atomic absorption spectrometer (ELICO CL - 176 models) is available at Department of Earth science in Annamalai University.

3. Results and Discussion
The fifteen *Tribulusterrestris* samples (leaf-5, flower-5 and seed-5) have been subjected to AAS analysis using the standard procedure already described. All found to show quantitative amount of the following elements viz., Cr, Cu, Fe and Zn.

From the quantitative analysis of plants, it has been found that the elements like Cr, Cu, Fe and Zn are found to be present in major quantities, whereas the elements like Fe, Cu and Zn and Cr are found to be present in minor quantities, (Table 1) in all the fifteen samples of the plants.The trace elements present in the three part of plants leaf, flower and seed are compared and presented in a bar diagram (Fig.2) the relative distribution of elements in AAS.

159

The leaves are having higher concentration of Fe, moderated concentration of Zn, Cu less concentration of Cr present. The flowers are having higher amount Cu, Fe and Zn are present in compared with Cr. The seeds Cu, Fe and Zn are present in excess amount, when compared to the rest of element Cr. The overall three part plants major amount Fe, Cu and Zn compared with Cr.

The elements Cr, Cu, Fe, and Zn present in all the plants samples are necessary for maintaining healthy metabolism[6].Cr plays an important role in diabetes treatment. It is an important element required for the maintenance of normal glucose metabolism[7]. Cr is one of the known environmental toxic pollutants in the world. The problems that are associated with Cr are skin rashes, upset of stomach, ulcers, weakened immune systems, kidney and liver damage, alteration of genetic material, lung cancer and ultimately death.

In humans, Cu deficiency can cause anaemia. Cu is also involved in the functioning of the nervous system, in maintaining the balance of other useful metals in the body[8]. Fe is a very essential element for plants and animals. Its deficiency can cause problems in metabolism such as haemoglobin, ferredoxin and various diseases.Zn deficiency is characterized by recurrent infections, lack of immunity and poor growth. Growth retardation, male hypogonadism, skin changes, poor appetite and mental lethargy are some of the manifestations of chronically Zn-deficient human subjects[9].

Table 1: Elemental status of *Tribulusterrestris* plant.

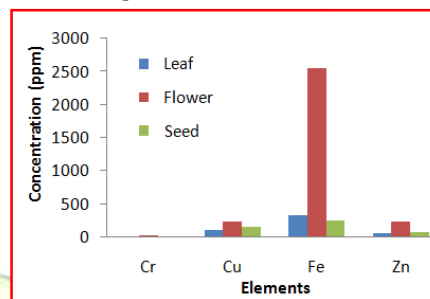| Element	*Tribulus terrestris*						'P' Value
	Leaf		Flower		Seed		
	Mean	SD	Mean	SD	Mean	SD	
Cr	15.59	4.42	33.94	5.84	15.45	2.36	0.00ˢ
Cu	113.70	28.14	242.80	33.12	161.10	19.90	0.00ˢ
Fe	331.60	47.69	2551.20	802.90	256.50	70.82	0.00ˢ
Zn	71.30	15.34	246.54	97.19	77.10	5.20	0.00ˢ

$p < 0.05$ level of significant.

Fig.2. The relative distribution of elements in *Tribulusterrestris* plant.

3.1. Statistical analysis

In three parts of *Tribulusterrestris* plant and AAS data obtained for the *Tribulusterrestris* plants part were statistically analyzed by one way ANOVA method. In the case of Cr, Cu, Fe and Zn the probability value is less than 0.05 ($P < 0.05$) i.e. table value; there is significant relationship among the elements.

4. Conclusion

The established analytical method using Atomic absorption spectroscopy (AAS) technique could be used for elemental determination of medicinal plants. The high values in standard deviation in some elements could be attributed to heterogeneity.The choice of the particular plant is highly medicinal plant.From the above result, i.e. the required availability of such element to the particular disease may be chosen from particular part of the plant material. In this study primary one, further research is needed to justify the statement.

References

1. WHO-World Health Organization. Traditional Medicine, Fact sheet No. 134, May (2003).

2. Seror-Armah Y,Nyarko BJB, Akaho EHK, Kyere AWK, Osae S, Oppong-Boachie K,Osea EKJ (2001),*J.Radioanal. Nucl.Chem.*250 (1):173-176.

3. Seror-ArmahY,Nyarko BJB, AkahoEHK, Kyere AWK, Osae S, Oppong-Boachie K (2002), *J.Trace Microprobe Tech.*,20 (3): 419-427.

4. Hussain I, Khan I, Wali-Ullah (2005), *J.Chem.Soc.Pak.*,27: 5-8.

5. Indian Medicinal Plants (1997), A Compendium of 500 species,Orient Longman Ltd., Madras, 5: 311.

6. Singh V, Garg AN (1997), *Applied Radiation and Isotopes*, 48(1): 97-101.

7. Zetic VG, Stehlik-Tomas V, Grba S, Lutilsky L, Kozlek D(2001), *Journal of Biosciences*, 26(2): 217-223.

8. Alikhan S and Lajbarkhan(2008), *Pakistan Journal of Weed Science Research*, 14(2): 101-110.

9. Prasad AS (1998), *Molecular and Cellular Biochemistry*, 188: 63-69.

161