

STUDY OF DIFFERENT ELEMENTS IN GREEN LEAFY AYURVEDIC VEGETABLES FROM FRESH AND DRAINAGE WATER

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ABSTRACT

The green leafy Ayurvedic vegetable medicinal plants have multiple applications for human beings in daily life. Worldwide these samples finds applications as basic remedies for the different diseases from ancient time and also in using as kitchen king materials. At the time of corona, the green leafy Ayurvedic vegetable medicinal plants acted as immunity booster and anti-medicines in the form of cashaya for virus. So, this present study focus on green leafy Ayurvedic vegetable medicinal plants which are collected from Bidar, Kalaburagi and Yadgir districts of Kalyan Karnataka. Here Apiaceae families two samples namely *Anethum graveolens* and *Coriander* are selected and collected from fresh and drainage water from different places of Bidar, Kalaburagi and Yadgir districts for the analysis of actual quantity of elements present in the samples by energy absorption and emission methods. Further the samples are prepared by using the standard procedure of WHO/FAO and analyzed the eleven essential elements in the samples namely Mg, Al, K, Cr, Mn, Fe, Cu, Zn, As, Hg and Pb. The present study noticed that average range of quantitative variations of elements in Bidar samples is 0.01 ppm to 38.62 ppm and in kalaburagi samples is 0.01ppm to 33.95 ppm also in Yadgir samples is 0.01 ppm to 30.84 ppm. These ranges of elemental content in vegetables are very essential for physical and chemical growth of human beings and also used as raw materials of new innovative research.

KEY WORDS:Study Area, Medicinal plants, WHO/FAO, Elements and FAAS method.

INTRODUCTION

The medicinal plants are used in Ayurvedic, herbal system of medicine from ancient period and green leafy vegetable Ayurvedic medicinal plants find usefulness in additional supplements of vitamins, proteins for good health. These medicinal plant materials naturally contain basic resource of essential elements originates from soil, water and air. The essential elements are absorbed by the human body directly from vegetables and indirectly from some other food materials. In the essential elemental system, trace, minor, major and toxic elements are present in medicinal plants and quantity of these are observed into the permissible limits of WHO. Sometimes the quantity of elements was crossing the permissible limits then toxicity increases and effected to the health system. Basic elements improve in the mineral regulation, reduction of cardiovascular diseases, cancer etc, also maintaining the PH Level.

The detection system consists of a monochromator to disperse light of different wavelengths and a photomultiplier tube on which the isolated light falls. Depending on the light intensity, an electrical current is produced, which is amplified and processed electronically, thus producing a signal which is a measure of the light attenuation, this is further processed to give a readout in concentration units. The instrumentation associated with an ICP - OES system is relatively simple.

MATERIALS AND METHODS

Ayurvedic Medicinal plant materials:

The selected two same family green leafy vegetable Ayurvedic medicinal plants collected accordingly WHO guidelines and each sample collected in between the distance of 5 km to 30 km surrounding of Bidar, Kalaburagi and Yadgir districts in Kalyan- Karnataka. The sampling satiation of selected regions situated in the Eastern latitude - longitude is $76^{\circ} 37' - 76^{\circ} 55'$ and Northern latitude - longitude is $17^{\circ} 15' - 17^{\circ} 28'$. In the present study, nearly 1/2 kg of green leafy vegetable leaves samples collected from fresh and drainage water, table 1 shows the Botanical name, family and common names of collected medicinal plants. From Bidar region 04 samples were collected, from Kalaburagi region 04 samples were collected and 04 samples were collected from Yadgir region.

Table: 01 Details of two leafy vegetable Ayurvedic medicinal plants samples

Code	Botanical Name	Family	Common name	Part Collected
Ans	Anethum graveolens	Apiaceae	Sabasi palyaa	Leaves
Ccm	Coriander	Apiaceae	Kotambari	Leaves

Experimental Method

The Flame Atomic Absorption Spectroscopy (Dept.of USIC Gulbarga University) Model-Thermoscientific iCE 3000 Series spectroscopy. It is operated over on SOLAR window software and the flame types are Air- C₂H₂ Air-acetylene flame and N₂O- C₂H₂, Nitrous oxide- acetylene flames with different wavelengths (180-900nm) of the elements. Elemental concentrations calculated on the basis of Beer-Lamberts Law, it is the relation between absorbance and concentrations of an absorbing liquid solution. Detection limits: Flame Type: Air-C₂H₂ Air-acetylene flame and N₂O- C₂H₂, Nitrous oxide-acetylene flame, Band pass: 0.5nm, Unit: mg/L, Burner height: 7.0mm, Al and Cr elements Burner height: 11.0mm and 8.0mm, Al and Cr elements Flame Type: N₂O- C₂H₂. The instruments Atomic Absorption Spectrometer is Absorption Spectroscopy, in this method the Hollow-Cathode Lamp used as a source, Emits light of specific wavelength to be absorbed by the elements. FAAS instrumentation setup shown in below figure 01.



Fig. 01 FAAS Instrumentation

Sample preparations for FAAS

The sample solution was prepared by adopting standard instrumental sample preparation procedure i.e 1gm of powder samples of Medicinal plants + 10ml of AR grade conc.-H₂SO₄ + 90ml of Double Distilled water (1:10:90=100 ml) and finally 100 ml solution was subjected to the analysis of major, minor and trace elemental content.



The collected leaves part of the medicinal plants washed with a distilled water in this present study it is nearly 1/2kg and washed with distilled water to clean dust and mud and the cleaned samples were dried in the airtight lab at room temperature for 20 days. The dried leaves part were mechanically powdered using a mixer grinder and finally sheaved with a mesh of size 355 µm to get a fine powder and then stored in an airtight polyethene plastic. The above figures 2 (a), (b) and (c) shows the samples preparation methods.

RESULT AND DISCUSSION

The resultant of the present study is observed in two same family leafy vegetable Ayurvedic medicinal plants at different places of Bidar, Kalaburagi and Yadgir districts. Here total 11 very essential mineral elemental content were observed in ppm level viz., Mg, Al, K, Cr, Mn, Fe, Cu, Zn, As, Hg, and Pb are under the limits of national and international medicinal plants quality control bodies' viz., WHO/FAO. From the present data analysis it is came to know that the elemental content varied with respects of soil, water, environment and artificial fertilizers and the toxicity of all elements it is found under the permissible limits. The present examined medicinal plant leaves samples contain high metabolic activity with pure surface morphology and maintains the healthy epidermal, anatomy cell.

Table.02 Elemental content in fresh and drainage water samples of Bidar region.

Code no	Mg	Al	K	Cr	Mn	Fe	Cu	Zn	As	Hg	Pb
FBAns	1.25	1.45	29.36	0.09	0.09	0.75	0.03	0.2	0.05	0.24	1.56
DBAns	0.98	1.00	38.62	0.03	0.39	2.82	0.17	0.41	0.52	0.86	0.13
FBCcm	1.11	0.97	16.20	0.04	0.20	1.70	0.02	0.07	0.06	0.30	1.46
DBCcm	0.87	1.02	13.07	0.02	0.24	4.97	0.13	0.26	0.12	0.78	0.01

Table.03 Elemental content in fresh and drainage water samples of Kalaburagi region.

Code no	Mg	Al	K	Cr	Mn	Fe	Cu	Zn	As	Hg	Pb
FKAns	2.20	0.08	13.88	0.02	0.11	0.47	0.05	0.07	0.02	0.24	1.61
DKAns	2.53	2.74	10.89	0.07	1.11	4.82	0.38	0.54	0.24	0.09	0.12
FKCcm	0.96	1.05	13.21	0.03	0.10	1.14	0.05	0.04	0.04	0.08	1.21
DKCcm	0.98	13.30	33.95	0.01	0.61	5.49	0.30	0.36	0.15	0.25	0.11

Table.04 Elemental content in fresh and drainage water samples of Yadgir region.

Code no	Mg	Al	K	Cr	Mn	Fe	Cu	Zn	As	Hg	Pb
FYAns	1.73	0.08	10.49	0.03	0.09	0.28	0.01	0.04	0.11	0.36	1.37
DYAns	1.42	1.01	24.44	0.01	0.15	3.18	0.19	0.23	0.98	0.25	0.15
FYCcm	1.20	1.64	11.35	0.04	0.11	0.47	0.02	0.06	0.03	0.63	1.75
DYCcm	0.75	0.92	30.84	0.01	0.41	3.00	0.17	0.43	0.28	0.52	0.23

The above tables 2, 3 and 4 shows detailed abundances of essential elements in two same family medicinal plants which are collected from Bidar, Kalaburagi and Yadgir districts. Here, the elemental variation range is shown at different regions of same samples.

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