



DETECT THE METAL ION PRESENT IN DEFERENT PART OF CARICA PAPAYA BY ATOMIC ABSORPTION SPECTROSCOPY.

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Abstract : Carica Papaya is well known medicinal plant in the west and Asian countries to cope several diseases. Patient were advised to eat papaya fruit frequently during dengue fever epidemic found in market by physicians. These cariac papaya are ayurvedic plant, there exact element are Cobalt (Co) Zinc (Zn) Calcium (Ca) lead (pb) and Coper are known. There has been deep study of other ayurvedic formulation using techniques such as AAS, AES and other spectroscopic method this is study deals with the detection of heavy metal present in the carica papaya. The work also deals with the effect these heavy metals would have on the women body on the basis of quantity of this metal detected by AAS.

Keywords: extract medicinal plant, human helth, anticancer, immunomodulatory, phytochemical, Agrochemical technology.

INTRODUCTION

Ayurvedic medicine have been use as primary health care medicine in India from thousands of year right from the start of vedic periods. This throw light on the fact that ayurveda is not a new technique but has developed through long periods of studies. It is because this long history and the background of ayurveda that has seen in increasingly great demand in other countries as well. There are hundreds of companies and thousand of brands available in the market which sells these ayurvedic products in number of formulations. These are the great demands in Asian countries. ^[1](YardinMR, Kennedy IR, Thies JE (2000) as bio-fertilisers and bio-pesticides. Radiation Physics and Chemistry 57:565-568.)

There are report indicating under undersirable side effects due to the long term consumption of these medicine without proper advice the side effect are mainly due to the presence of heavy metal leads in the medicine.

One can attend knowledge about availability of the transition metal which may be present in the given medicine from the knowledge of various ingredients used in the preparation same of the metal. But there exact amount determine by experimental and spectroscopic technique only where as the knowledge about presence of heavy metal can be achieved. Heavy metal are use in medicine due to toxicity and as they not original presence in the ingredients most of the heavy metal get experimental examination and analytical techniques. ^[2](Mahdi SS, Hassan GI, Samoon SA, Rather HA, Dar SA, et al. (2010). Bio- fertilizers in Organic Agriculture. Journal of Phytology 2:42-54)

Most commonly used technique for the detection of heavy metal his atomic absorption spectrophotometer (AAS) Atomic Emission spectrophotometer (AES) For the detection of metal in the sample which is relatively new technique and is not very much in used for the aim of this study so this technique was selected for the same. Cobalt, zinc, calcium, Lead, copper are same of possible heavy metal whose determination is what lies in the centre of this research.

Present study included detection of metals. These sample were then tested for solution prepared was used for detection of metal by inorganic qualitative analysis. Then the sample ware again put through atomic absorption spectrophotometer for detection of metal and the quantity of respective metal present in the sample the project also puts on the role of human on basis of the quality of each metal recorded by the AAS. The observation are recorded in terms of parts per million of the metal are presence in respective sample along with the spectrum obtained by the AAS. Then all sample are compared on the basis of heavy metal detected, and applications to determine possible best medicine of the sample pass the permissible level as by government of India. ^[3](Alam, G., 2000. A Study of Biopesticides and Biofertilizers in Haryana, India, Gatekeeper Series No. 93. IIED, London)

RESEARCH METHODOLOGY

Generally different part of the plant material cultivar condition papaya fruit, leaves, bark, and root were collected from from selected harvested area. All part of papaya were washed gently with distilled water followed by drying (under shade) and grinding. The drying method was also used to dry peel and pulp.

The 1gm of each dried sample in a beaker added 5ml Conc. HNO_3 . The solution was till the volume was reduced to 1ml. then 2ml Hydrogen peroxide (H_2O_2) was added drop by drop till the solution become clear followed by the dilution with water. Trace and heavy element in the sample of leaf, and pulp were analyzed by the used of Atomic Absorption Spectrophotometer AAS. ^[4](Nicholson GM (2007) Fighting the global pest problem: preface to the specialtoxicon issue on insecticidal toxins and their potential for insect pest control. *Toxicon* 49:413-422.)

Preliminary test:

Confirmatory test in Inorganic Qualitative Analysis

Test for Pb^{2+} : Sample solution + Acetic acid + $\text{K}_2\text{CrO}_4 \rightarrow$ yellow ppt of PbCrO_4

Sample solution + KI \rightarrow yellow ppt of PbI_2

Pb^{2+} Present and confirmed

Test for Cu^{2+} : Sample solution + dilute Acetic acid + $\text{K}_4[\text{Fe}(\text{CN})_6]$ solution \rightarrow Radish brown ppt

Cu Present and confirmed

Test for Zn^{2+} : Sample solution + Acidify the solution. By few drops of Acetic acid and then pass H_2S gas. White ppt.

after ppt Acidify by few drop of acetic acid and add 4 drop of $\text{K}_3[\text{Fe}(\text{CN})_6]$ solution and few drop of diphenyl amine \rightarrow A green ppt

Acidify the green ppt. with few drop of dil HNO_3 and add few drops of $\text{Co}(\text{NO}_3)_2$ solution. Heat to dryness a green mass,

Zn Present and confirmed

Test for Co^{2+} : Sample solution + solid NH_4Cl + Ammonia and $\text{K}_3[\text{Fe}(\text{CN})_6]$ solution \rightarrow Radish brown ppt. on heating

Two drops of solution on a watch glass + one crystal of $\text{Na}_2\text{S}_2\text{O}_3 \rightarrow$ Blue colour around the crystal

Co Present and confirmed

Test for Ca^{2+} : Sample solution + few drop of ammonium oxalate dilute \rightarrow white ppt.

Prepare a conc. Solution. And add one drop of conc. HCl to it. This solution imparts a red colour to the flame.

Ca Present and confirmed

Detection using spectroscopic technique

The sample is subjected to study by spectroscopic technique. There are many techniques undertakes for detection material of metals. This included AAS, AES, And EDS.

It is the study of the interaction between matter and electro-magnetics radiation. Spectroscopy originated through the study of visible light dispersed according to its wavelength, by a prism. Later the concept was expanded greatly to comprise any interaction with radioactive energy as a function of its wavelength or frequency, spectroscopic data is often represented by a spectrum, a plot of the response of interest as a function of wavelength and frequency. ^[5](UNDESA (United Nations Department of Economic and Social Affairs) (2009).The 2008 revision, highlights, working Paper No. ESA/P/WP.210. New York,UN.

Atomic absorption spectrophotometer or spectroscopy AAS: the spectroanalytical procedure for the quantitative determination of chemical element using the absorption of optical radiation light. The technique is used for determining the concentration of a particular element in the sample to be analysed. ^[6](Ahmad,I.,Pichtel,J.,Hayat,S.(Eds.),2008) *TechniquetoPromotePlantGrowth*. Wiley-VCHVerlagGmbH&Co.KGaAhttps:// doi.org/10.1002/9783527621989)

The technique make use of the absorption spectrometry to asses the concentration of analyte in the sample. It is require standard with known analyte content to establish the relation between the measured absorbance and analyte concentration. The electron of atoms in the atomizer can be promoted to higher orbital excited state by absorbing quality of energy radiation of given wavelength. In his technique. ^[7](Alam,G.,1994.*BiotechnologyandSustainableAgriculture:LessonsfromIndia*.Tech.Pa- per No. 103 OECD Dev. Ctr.,Paris)

Deficiency and Excess Health in human body of metal

There are reports on the deficiency in the U.S, one review indicate approximately 25% of the adolescents, adult and people over 65, do not meet the Recommended Dietary allowance for copper a federal survey of food consumption determined that for women and men over the age of 19, average consumption from foods and beverages was 1.11 and 1.54 mg/day respectively. For women 10% consumed less than the Estimated average requirement, for men fewer than 3%

Copper deficiency has recently been implicated in adult-onset progressive myeloneuropathy and in the development of severe blood disorder including myelodysplastic syndrome. Copper deficiency can be confirmed by very low serum metal ceruloplasmin concentration in the blood. ^[8](Kumar S (2012) Biopesticides: a need for food and environmental safety. JFertilPestic3:e107.)

Population susceptible to copper deficiency include those with genetic defects for Menkes disease, low-birth-weight infants, infant fed cow's milk instead of breast milk or fortified formula, pregnant and lactating mother, patient receiving total parenteral nutrition, individuals with "malabsorption syndrome" (impaired dietary absorption), diabetics, individuals with chronic diseases that result in low food intake, such as alcoholics, copper deficiency due to special needs that increase the daily requirement. Vegetarians may have decreased copper intake due to the consumption of plant food in which copper bioavailability is low. Fetuses and infants of several copper deficient women have increased risk of low birth weights, muscle weaknesses, and neurological problem. Copper deficiencies in abnormalities, impaired growth, weight gain, frequent infection. ^[9](Kumar S (2012) Biopesticides: a need for food and environmental safety. JFertilPestic3:e107.)

The trace amounts of cobalt are found in most foods. Foods high in vitamin B-12 are the only source of cobalt used by body. Anemia is a main cause of a cobalt and vitamin B-12 deficiency. Cobalt is measured in the (mcg) microgram. the average adult intake of the cobalt is 5 to 8 mcg per day.

The trace amounts of zinc are found in most foods. In take the Cobalt content food so what happen. Our immune system to work well to fight off infection, hear growing and test, smell and good vision. The UK department are advises that intake of zinc 10-12 mg per day.

The trace amounts of calcium are found in most foods. In take the Calcium content food so that the bone development from child and adult. Maintain weight, strengthens teeth, heart health blood clotting and transports nutrients. Calcium is measured in the (mg) miligram. the average adult intake of the calcium is 1000 to 1200 mg per day. ^[10](Bruinsma J (2009) The resource outlook to 2050: By how much do land, water and crop yields need to increase by 2050? FAO Expert Meeting on 'How to Feed the World in 2050', Rome.)

Effect of heavy metal in human body:

Lead:- As a result of human activities, such as fossil fuel burning, mining and manufacturing, lead and lead compound can be found all parts of our Environment.

Copper, Zinc, Cobalt and Calcium:- the human activity for the copper, Zinc, Cobalt and Calcium compound are material in environment and eating like food material of such as fruits. ^[11](Al-Zaidi AA, Elhag EA, Al-Otaibi SH, Baig MB (2011) Negative effects of pesticides on the environment and the farmers awareness in Saudi Arabia: a case study. J Anim Plant Sci 21:605-611.)

Health Effects :-

EPA has determined that is problem human carcinogen. Lead affect the every organ and system in the body.

1. Exposure to high lead level can severely damage the brain and kidneys and ultimately cause death.
2. In pregnant women, high level of exposure to lead may miscarriage.

Regulatory limits:- 1 EPA- 15 part per billion (ppb) in drinking water, 0.15 microgram per cubic meter in air,

1. The liver is the primary organ of copper induced toxicity. The genetic disorder of copper metabolism and Wilson disease.
2. Hemodialysis patient and individual with chronic liver disease.
3. The excess zinc present in the body then have Indigestion, Diarrhea, Headache, Vomiting etc. disease.
4. Irritate the skin, eyes, nose and throat and asthma-like allergy
5. If the high level makes calcium so your kidneys work harder to filter it. This is causes excessive thirst and frequent urination. ^[12](Hubbard M, Hynes RK, Erlandson M, Bailey KL (2014) Thebiochemistry)

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(AAS) Qualitative analysis of heavy metal :

Copper (Cu)

Sr. No.	Name	Conc. (ppm)	Absorbance
1	STD	2	0.138
2	STD	4	0.259
3	STD	6	0.371
4	Leaf	0.273	0.040
5	Peel	0.122	0.032
6	Root	0.373	0.046

Zinc (Zn)

Sr. No.	Name	Conc. (ppm)	Absorbance
1	STD	2	0.138
2	STD	4	0.259
3	STD	6	0.371
4	Leaf	0.273	0.039
5	Peel	0.122	0.032
6	Root	0.373	0.046

Cobalt (Co)

Sr. No.	Name	Conc. (ppm)	Absorbance
1	STD	2	0.148
2	STD	4	0.259
3	STD	6	0.371
4	Leaf	0.243	0.032
5	Peel	0.322	0.041
6	Root	0.173	0.020

Calcium (Ca)

Sr. No.	Name	Conc. (ppm)	Absorbance
1	STD	2	0.138
2	STD	4	0.259
3	STD	6	0.371
4	Leaf	0.273	0.033
5	Peel	0.422	0.045
6	Root	0.376	0.026

Lead (Pb)

Sr. No.	Name	Conc. (ppm)	Absorbance
1	STD	2	0.022
2	STD	4	0.039
3	STD	6	0.057
4	Leaf	0.007	0.002
5	Peel	0.028	0.004
6	Root	0.029	0.004

RESULTS:

The experimental and present study of Copper, Zinc, Cobalt, and Calcium Content in the given sample was found to less than 1ppm. And lead content in the given sample was found very low.

CONCLUSION:

The current study research report confirmed shows that different part of carica papaya of heavy metals. The metal detection of sample include various essentials and biological advantageous metal like lead Pb, Zn, Co, Ca and Copper (Cu) were detected in high quantity. The excellent source for beneficial drugs, medicinal plant, human health, anticancer, immunomodulatory, phytochemical Some of the metal were beyond the daily requirement level. All the sample also contain hazardous like pb and transition metal (Cu) beyond the required.

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