

# DETERMINATION OF ELEMENTAL CONSTITUENTS FOR THREE HERBAL PLANTS THAT ARE TRADITIONALLY USED TO CURE CANCER

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## ABSTRACT

Elemental constituents of fresh leaves of the three herbal plants used traditionally for treatment of cancer namely: *Guera Senegalense*, *Boswellia* and *Mangifera Indica* were analyzed. Results show that all the three samples contain the highest amounts of calcium in parts per million (*Guiera Senegalensis* 5991 ppm, *Boswellia* 9413 ppm and *Mangifera Indica* 2405 ppm) as compared to other constituents. Further studies reveal that presence of calcium in appreciable amount within the metabolic system of human being helps to reduce the risk of cancer and related ailments. Other benefits of calcium in man include strengthening bones and teeth.

**Keywords:** Herbal Medicine, Cancer, Constituents, Carcinogen

## INTRODUCTION

Cancer is one of the major diseases in the world. It can be classified as carcinoma, sarcoma, lymphoma and leukemia depending on the type of cells that are affected and the location or tissues of the body where the ailment is found. Treatment of cancer might involve a combination of therapies and other palliative measures. Some of such therapies are surgery, chemotherapy, teletherapy, immune therapy and hormone therapy. Despite all these measures to cure cancer the ailment might still be responsible for 13% to 20% of death especially in the developed countries (WHO report, 2015). Globally 7.6 million death was recorded due to cancer in the year 2005 and by projection the death rate due to cancer and related ailments will be 9.01 million and 14.02 million in 2015 and 2030, respectively (WHO report, 2015). This shows that death due to cancer is on the increase due to rapid population increase recorded in the recent years. Similarly, the achievements recorded in machinery and technological advancements in the 20th century might have resulted into pollution of the environment and subsequent contamination of food and water with heavy metals and radionuclides whose ingestion by man would have increased the risk of cancer among people.

Alternative therapies for the treatment of cancer include among others the Chinese acupuncture, moxibustion, herbal medicine and breathing exercise. The traditional or herbal medicine involves strong immune enhancing effects. It also enhances chemotherapy and it kills directly all kinds of cancer. Traditional therapy for the treatment of cancer involves the use of herbs that are obtained from specific plants such as the three plants under study (*Guera Senegalense*, *Boswellia* and *Mangifera Indica*). One

outstanding problem of this method for the treatment of cancer is lack of proper prescription and dosage. However, there are reports of success from cancer patients indicating some level of recovery from the ailment due to the use of herbal remedy (Muhammed, 2015).

## METHODOLOGY

### Sample Preparation

Fresh leaves of *Guera Senegalense*, *Boswellia* and *Mangifera Indica* are thoroughly washed with clean water and allowed to dry under shade. The dried leaves are grinded to fine powder using pestle and mortar. The powdered samples are put into three transparent plastic bags (30 mm × 15 mm) and labeled A, B and C. A hand held XRF machine is used to determine the elemental constituents of the respective leaves which appear on the screen of the machine. The data is transferred to a personal computer using USB code wire for further analysis.

### Determination of Elemental Constituents

A hand held XRF machine pn\_103201 by INNOV X system (Delta TM) is calibrated and used to determine the elemental constituents of the leaves of the respective plants. The plastic containing each sample is placed on a workbench and the nozzle of the machine is directed at the sample and set on to determine the elemental constituents. Data for the constituents of the samples appear on the screen of the machine. The data is transferred to a personal computer using USB code wire for further analysis (Bichi et. al, 2013)

## RESULTS AND DISCUSSION

### *Guera Senegalense*

Table 1 presents the results of *Guera Senegalense*. From the results it shows that calcium has the highest concentration of 5991 ppm, followed by zirconium with concentration of 1944 ppm while potassium has the least concentration of 1.01 ppm.

**Table 1:** Concentration of Elemental Constituents in *Guiera Senegalense*

Detected	Part per million (ppm)	±
S	1808	150
CL	1530	57
K	1.01	-1
Ca	5991	57
Ti	70	8
Mn	375	4
Te	542	5
Cu	83	7
Zn	119	5
Rb	34.0	0.9
Sr	46.1	1.0
Zr	1944	12
I	96	17

**Boswellia**

Table 2 presents the results for *Boswellia*. These results also show that calcium still has the highest concentration in ppm compared to other elemental constituents. In fact calcium has the concentration of 9413 ppm, followed by chlorine with 2348 ppm while potassium has 1.769 ppm.

**Table 2:** Concentration of Elemental Constituents in *Boswellia*

Detected	Part per million (ppm)	±
S	1668	161
Cl	2348	70
K	1.769	1
Ca	9413	76
Ti	37	8
Mn	23	2
Fe	135	3
Zn	15	3
Bb	28.9	0.8
Sr	114.4	1.5
Zr	325	3
Mo	10.7	1.4
I	112	21
Ba	19	4

**Mangifera Indica**

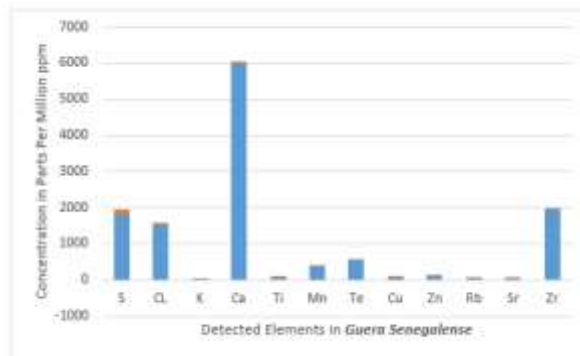
Table 3 presents the results for *Mangifera Indica*. It is clear from the results that calcium dominates the elemental constituents of the plant *Mangifera Indica*. It has the percentage composition of 2405 ppm. The next highest percentage by composition is zirconium with 1904 ppm. Potassium still has the least concentration of 1.19 ppm.

**Table 3:** Concentration of Elemental Constituents in *Mangifera Indica*

Detected	Part per million (ppm)	±
S	996	119
Cl	491	38
K	1.19	1
Ca	2405	39
Ti	96	7
Mn	81	2
Fe	418	5
Cu	48	6
Zn	78	4
Rb	33.7	0.9
Sr	38.1	0.9
Zr	1904	11
Mo	19	3
Cd	13	4
Sb	23	6
I	43	12

**Guera Senegalense**

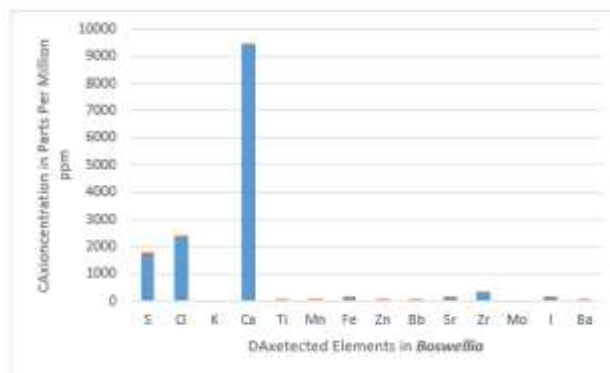
Fig. 1 shows the bar chart for concentration of elements in ppm against the detected elements in *Guera Senegalense*. It shows that the element with highest concentration is calcium while the one with the least amount is potassium



**Fig. 1:** Concentration of Elemental Constituents in *Guiera Senegalense*

**Boswellia**

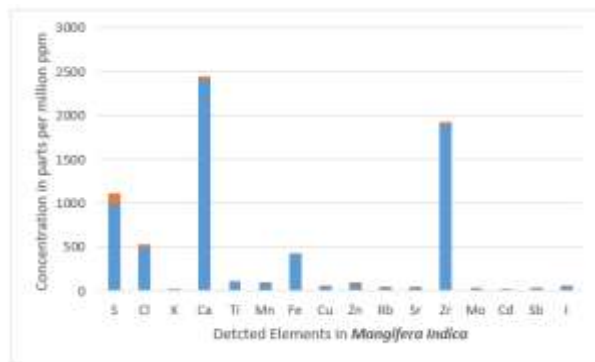
Fig. 2 illustrates the bar chart for the concentration in ppm of the detected elements in the leaves of *Boswellia* against the elements. Calcium dominates the concentration such that the height of its bar is more than three times greater than those of chlorine and sulfur which follow calcium in concentration



**Fig. 2:** Concentration of Elemental Constituents in *Boswellia*

**Mangifera Indica**

Fig. 3 is the bar chart for the detected elements on the x-axis and the concentration in ppm on the y-axis for the elements detected in the *Mangifera Indica* leaves sample. Calcium still dominates the chart because the size of its bar is longest followed by zirconium and sulfur, the bars for potassium and cadmium are hardly noticed.



**Fig. 3:** Concentration of Elemental Constituents in *Mangifera Indica*

**Concentration of Calcium**

Fig. 1, 2 and 3 are bar charts showing the elemental constituents in parts per million (ppm) for *Guera Senegalese*, *Boswellia* and *Mangifera Indica* respectively. It is evident from the bar charts that the analyzed samples for the leaves of the three plants (*Guera Senegalese*, *Boswellia* and *Mangifera Indica*) each contains highest concentration of calcium compared to concentrations of other elements in the samples. In *Guera Senegalese*, calcium has the highest concentration of 5991 ppm followed by zirconium with 1944 ppm. In *Boswellia*, calcium is 9413 ppm followed by chlorine with 2348 ppm while *Mangifera Indica* has 2405 as concentration for calcium with zirconium having the concentration of 1904 ppm.

**Relevance of Calcium intake to Treatment of Cancer**

Several studies have suggested that food with higher percentage in calcium might help reduce the risk for colorectal cancer. Further studies have shown that women with higher dietary calcium intake seemed to have lower risk of breast cancer (NIH report, 1994), Calcium supplement may be important for some people with cancer, depending on their stage, cancer type and type of treatment they get (Rahmatollah and Mbobeh 2014). It is medicinally recommended to supplement our calcium intake such that the intake conforms to the values in table 4. According to institute of medicine (IOM), we should consume calcium daily at the amount as shown in table 4.

**Table. 4:** Recommended Dietary Allowance (RDAS) For Calcium per Day

S/N	Ages	Male	Female	Pregnant Woman	Lactating Mother
1.	0-6 month	200mg	200mg		
2.	7-12 month	260mg	260mg		
3.	1-3 years	700mg	700mg		
4.	4-8 years	1000mg	1000mg		
5.	9-13 years	1300mg	1300mg		
6.	14-18 years	1300mg	1300mg	1300mg	1300mg
7.	19-50 years	1000mg	1000mg	1000mg	1000mg
8.	51-70 years	1000mg	1200mg		
9.	71+	1200mg	1200mg		

**Source:** journal, calcium absorption in women relationship to calcium intake

It is evident from the results so far obtained that leaves of the three plants under investigation contain highest concentration of calcium compared to other elemental constituents. It has also been investigated that appreciable amount of calcium in the metabolic system of a person renders cellular composition in the

tissues and organs of that person resistant to cancer infection. It is therefore not surprising that the ailment cancer is called *Sääbáráá*, in Hausa Language which is also the name for the plant *Guera Senegalese* in Hausa Language (Roger, 2007).

**Conclusion**

It is evident from the forgoing that the three plants under investigation contain calcium element in higher concentrations compared to other elemental constituents. There is an inverse relationship between the amount of calcium in the metabolic system of a person and the risk of the person being infected by cancerous cells. It is therefore not surprise that the Name *Sabara* being used to name *Guera Senegalese* in Hausa language is also used to name *carcinoma* in the same language. It has been established that the three plants under investigation exhibit some similarities. One of such similarities is the fact that all the plants contain the element calcium in highest amount compared to other elements.

**Recommendation**

One shortcoming of traditional medicine especially for the treatment of cancer is the lack of knowledge for the right amount of the herbs to be taken and how frequent. Further studies/investigation should be carried out with a view to determine the correct dosage of the leaves of the plants that are meant to cure cancer.

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