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morphology as well as the elemental composition of human tissues on a microscopic scale. In addition, complementary ion beam techniques are used to provide information on the major and minor components. This work will describe an overview of bio-medical projects particularly in relation to spatial distribution of trace metals as evaluated by the technique of Dynamic Analysis (DA) [10].

Experimental techniques

Three kind of vegetables (Hibiscus, Corchorus olitorius and wild okra) are collected dried and grinded to powder then pressed into pellets radius of 10mm irradiations were performed on the outer surface of the pellet with 3.0 MeV protons using the NMP at iThemba LABS, Somerset West, South Africa. Since information at high beam resolution was not a requirement, the proton beam was focused to a size of ~3 x4 μm^2. Scanned areas of ~ 200 μm^2 and beam currents ranging between 100– 200 pA (with a integrated total charge of about ~0.3 µC) were used. Beryllium absorber 125 µm thick was interposed

Results and Discussions

Trace elements S, Cl, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Cu, and Zn, were determined by µPIXE. Their concentration levels are shown in Table 1. The PIXE results represented in the table give detailed information concerning the precise location of some elements within the leaf of the three samples. The analyses were directed primarily to the centre of the pellets. In the micro analysis of small pellets areas it is of extreme importance the optimization of experimental parameters which will determine the accuracy and minimisation of the minimum detection limits. Recently there has been a renewed interest in the application of nuclear microprobe in the biomedical field. Further on, the possibility of reaching nano size levels for the proton probe open new avenues for the application of NMP. Elemental mapping was not the primary aim of this investigation, as we were specifically interested in the concentration levels as deduced from the total X-ray yield of the particular irradiated area. The need for microanalysis arises from the fact that the actual variability of elemental content. From the figure 1 the result showed that all the three samples are rich in K and Ca and the concentration of the other elements such as Sc, Ti, V, Cr, Fe and Zn are much closed to each other. between target and the Euryres detector to reduce the high intensity Ca X-ray signals. Pile-up rejection was controlled by a beam-on-demand system, which deflected the proton beam temporarily to allow for correct digital pulse processing at high-count rates. Further details about the

Table1: Elemental concentrations foundbyPIXE

Elements	Samples		
	Wild Okra	Corchorus olitorius	Hibiscus
S	1433±80	1731±130	2095±128
Cl	8416±211	2233±40	2233±40
K	15647±133	37023±304	30335±188
Ca	8431±88	13067±133	10915±44
Sc	89±21	53±36	111±17
Ti	28±3	56±4	76±6
V	11±3	n.d*	21±6
Cr	3±1	n.d*	n.d*
Mn	16±1	130±6	730±7
Fe	230±7	476±12	185±2
Co	n.d*	5±2	n.d*
Cu	4.8±0.5	8±1	3.8±0.6
Zn	35±2	25±2	32.5±0.8

n.d*: not detected

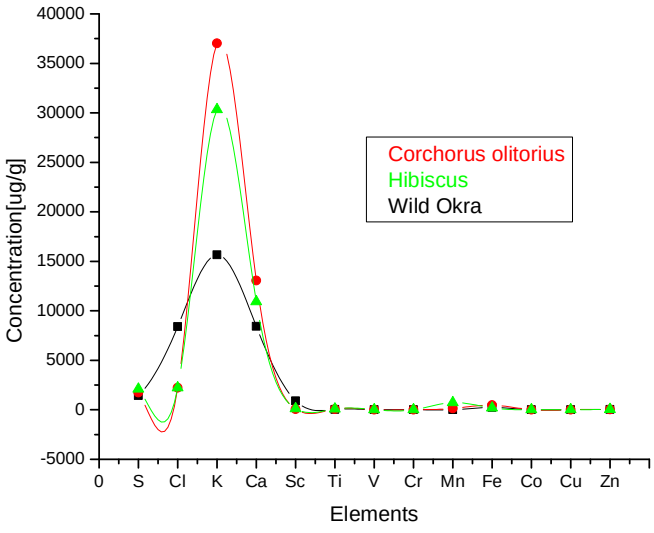

Figure1: The elemental distribution for the three leaves

experimental set-up at the microprobe have been previously reported **[**11,12**].** The dominant elements as determined by PIXE were S, Cl, K, Ca, Fe, Zn and Cu,

using the K_{α} Evaluation of X-ray spectra was performed with the software package Geo-PIXE II **[**13**].**

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