K S Al Mugren, J Phys Chem Biophys 2017, 7:3 (Suppl)
DOI: 10.4172/2161-0398-C1-022



# XRF measurements of heavy elements in some archaeological samples collected from different parts of Saudi Arabia

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We study elemental concentrations in some archaeological samples, linked to interest in essential element homeostasis and uptake of potentially harmful elements; the study of elemental concentrations in ancient skeletal remains can potentially be linked with modern studies, providing a reference to high exposure levels no longer common today. The samples, were obtained from historical area which discovered in east of Saudi Arabia at 1977 G, Called Al-RAKKAH and eight archaeological artefacts fired clay were recovered. Using a measurement arrangement consisting of a low-energy mini-X-ray generator and a Si-PIN detector, results are obtained from periosteal concentrations, the influence of the post-mortem environment being clearly differentiated from *in vivo* uptake. Also, by using an HPGe detector gamma-ray spectrometer, the activity concentrations of 226Ra 232Th and 40K were found in surface soil samples ranged from 17.4±1.2 Bq/kg to 28.3±2.3 Bq/kg with an average value of 23±1.6 Bq/kg, ranging from 1.1±1.8 Bq/kg to 81.0±1.7 Bq/kg with the average value 20±1.4 Bq/kg and from 218±11 Bq/kg to 255±18 Bq/kg, with the mean value of 233±12 Bq/kg respectively. The mean radium equivalent (Raeq) and outdoor radiation hazard index (Hex) for the area under study were determined as 69.52 Bq/kg and 0.16 respectively. The total absorbed dose rate due to three primordial radionuclides lies in the range of 17.74-72.24 nGy·h$^{-1}$ with a mean of 32.69 nGy.h$^{-1}$, which yields total annual effective dose of 0.37 mSv·y$^{-1}$ Thermo Scientific Quant'X EDXRF spectrometer were used also to determine the concentrations of the elements Si, Al, Fe, Ti, Ca, Na, S, Pb, Sn, As and Zn. as major, trace and toxic elements. We hope that the data presented here will be useful to those dealing with Portland cement, phosphate fertilizer chemistry and related fields.

## Biography

K S Al Mugren is an internationally well-known Scientist in the area of Nuclear Science & Radiation. She has worked and contributed in various projects related to Nuclear, Materials Science and Radiation in Environments. She has extensively used nuclear spectroscopy, ion beam analysis, ion implantation, fast neutron activation analysis, cyclotrons and their applications, production of radioisotopes for medical applications, cross section measurements for charge particles nuclear reactions. She is also interested in the work of the following studies and research projects like analysis of various samples using methods of neutron activation and X-rays fluorescence, measuring radon concentrations for various environmental samples using alpha Guard, rad 7, E. Perm and Cr-39. She has contributed in the areas such as estimating the concentrations of radium in different water samples, measuring the natural radioactivity of the various environmental samples using gamma ray spectrometer, radiation shielding, radiation detection and radiation effects on materials. She has recently developed single crystal diamond detectors aimed at their application in X-ray and medical dosimeters. She has more than 30 publications (in Journals, Book chapters, Conference proceedings, etc.) and presented more than 20 technical lectures in various scientific forums (International & National).

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