

VIRTUAL EVENT

International Conference on
**Management of Naturally
Occurring Radioactive
Material (NORM) in Industry**

19–30 October 2020

#NORM2020



Contribution ID: 226

Type: Poster

Determination of low levels activities of natural alpha emitting radionuclides such as Uranium isotopes in Angolan environmental samples (Water, Fish, Uranium Ores Bodies and Sediments) by Alpha-Particle Spectrometry & *Gamma Spectrometry..

Main objectives

1. To determine low levels activities of natural alpha emitting radionuclides such as Uranium isotopes in Angolan environmental samples (Water, Fish and Uranium Ores Bodies) by Alpha-Particle Spectrometry due to: Radioactive contamination hazards and unknown effects of low radiation doses; Regular (daily) monitoring of environmental radioactivity for the protection and well-being of humanity and the environment.
2. To implement reliable and accurate methods of radioactivity determination of specific natural radionuclides in Angolan environmental samples.
3. To evaluate the quality of Angolan Uranium Ore Bodies.

For Angolan water samples (Sea water, Tap water & River water) we obtained good peaks and high resolution & we measured high recoveries above 90%. For Angolan Fish Samples we also obtained good peaks & we measured fairly good recoveries {Horse Mackerel Fish (20% - 40%), Caxuxu Fish (50% - 60%) & Sardine Fish (70% - 90%)}. Aqua-regia (3:1 HNO₃/HCl) digestion method was used to digest water and fish samples.

For Angolan mineral samples we obtained peaks with high resolution and good recoveries in all reference materials (IAEA312, IAEA RGU-1 & IAEA RGTH), & in Uranothorite, Cornotite, Gumite and Thorite Samples we also measured good recoveries above 90% & we also obtained good peaks.

But for Monazite, Torite Var Uranothorite, Pechblenda & Pirocloro mineral samples we measured low recoveries because the samples had a lot of silicates and the activities of radionuclides of interest were very high. The low recoveries can be attributed to the following reasons: i) amount of sample (2g) used during the analysis; ii) incomplete digestion of the samples; iii) lower activity of the tracer. The mixture of HNO₃/HF/HClO₄ digestion method was used to digest mineral samples. To improve the recoveries for those 4 mineral samples in which we measured low recoveries, its recommended to increase the digestion time/hrs (period) or use another digestion method, reduce once again the amount of the sample, to increase also the activity of the tracer since the activity of radionuclides of interest in the samples was very high and then evaluate recoveries. Due to the high activity concentration that was measured in mineral samples it's also recommended to analyse a small amount of sample (0,1 –0,2 g) in order to avoid over saturation of the UTEVA separation columns.

The highest activity measured in mineral samples was above 90340836 mBq/g and the Lowest activity was not less than 20337 mBq/g.

*(We used Gamma Spectrometry to estimate the activities in 2 mineral blue samples)

NOTE: In the total of 100% of Uranium that exists in the Universe, 50% is distributed in the Earth's crust, Air and in living beings (plants & animals) and ***50% of uranium forms the inner core of the Earth (50% of Uranium makes up the inner core of the Earth or the inner core of the Earth is a solid sphere made out of Uranium) and it's a land reserve, while the outer core of the Earth is liquid layer made of iron and nickel.

(OBS: This characterization & measurement in this type of samples is being carried out & evaluated for the first time in Angola)

Primary author: Mr MARIO, INACIO CHICOLA (ANGOLAN NATIONAL ATOMIC ENERGY AUTHORITIES)

Presenter: Mr MARIO, INACIO CHICOLA (ANGOLAN NATIONAL ATOMIC ENERGY AUTHORITIES)

Session Classification: Session IV - Characterization in Industrial Facilities and in the Environment

Track Classification: NORM Characterization, Measurement, Decontamination