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Abstract: Metallic nanoparticles (NPs), such as silver, gold, and platinum, are being studied for use in cancer therapies, particularly in radiotherapy treatments. The purpose is to increase the effectiveness of the treatment while reducing the radiation dose to healthy tissues surrounding the target volume. However, there are still challenges that need to be overcome for a wide clinical application, such as measuring the dose escalation factor caused by the presence of these NPs. This study aims to investigate the sensitivity of the MAGIC-f gel detector in the dosimetry of silver nanoparticles (AgNPs).

Various concentrations of AgNPs were added to the MAGIC-f gel dosimeter and irradiated using both conventional X-ray equipment and a linear accelerator. The dose absorbed by the MAGIC-f gel dosimeter was quantified using UV-Vis spectrophotometry equipment. Additionally, a Black Piranha meter was used to measure the dose delivered by the conventional X-ray equipment during the experiment.

The AgNPs were synthesized and identified through UV-Vis spectrophotometry and exhibited patterns in the order of 10-20 nm. The addition of AgNPs to the MAGIC-f gel detector was done during its production, and a calibration curve was established for reading the absorbed dose for the MAGIC-f gel without the presence of AgNPs.

With successful characterization of the gel with AgNPs, it will be possible to validate the use of the MAGIC-f gel detector for dosimetry of AgNPs in mega and kilovoltage X-ray beams. This will provide a new methodology for measuring the dose enhancement, a fundamental parameter for the application of NPs in radiotherapy treatments.

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Title of the abstract: First dates from the Guaibituguçu archaeological site, Japaratinga, Alagoas, Brazil

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Abstract: The archaeological site, Guaibituguçu, located in the State of Alagoas, Brazil, is an open air site that revealed artifacts indicating an indigenous presence in context with objects of European and local non-indigenous manufacture. This study seeks to define chronological parameters for the site and to correlate the pottery chronology with the stratigraphic layers identified during excavations. Four pottery fragments were dated using Thermoluminescence techniques (TL). Each fragment was subject to mechanical treatment that removed approximately 2 mm of the artifact's surface and the samples were ground and the grains sieved to obtain a size of >150μm. Chemical treatment to screen and select quartz grains of

75-150μm employed hydrogen peroxide, chloric acid and fluosilicate acid. The samples were used to determine the accumulated dose (Da) using multiple aliquots by way of regenerative dose method (MAR). The sediment collected associated with each fragment was sealed in a plastic container for a period of four weeks to determine the level of U, Th and K using gamma spectrometry. From these values, the external dose was inferred. Additionally, the internal dose was determined using the neutron activation technique from the U, Th and K concentrations of the artifact fragment. The sum of these two values and the cosmic radiation permitted determination of the annual dose (TD), and the calculation of sample age from the Da and TD values. All of the TL measurements were conducted using the Harshaw TLD 3500 Reader, heat rate of 5 oC/s at the Departamento de Energia Nuclear (DEN) of the Universidade Federal de Pernambuco (UFPE). A Canberra Hyperpure Germanium (GeHP) detector, coupled with and Eagle 5004 multichannel analyzer in laboratory conditions with low background radiation was used to determine the concentration of the levels of U, Th and K. The individual fragments were sent to the Instituto de Pesquisas Energéticas e Nucleares (IPEN) of the Universidade de São Paulo (USP) to determine the concentrations of U, Th and K of the samples. Analysis and discussion of results took place at the Laboratório de Estudos Arqueométricos (LEARQ) of UFPE. At this time, the age of three samples has been estimated, with accumulated doses of: 0.74±0.36 Gy; 0.79±0.12 Gy; 1.03±0.13 Gy and the TD dose levels of 0.669 mGy/year; 1.108mGy/year; 1.419 mGy/year. The resultant ages are 1148, 712, 723 and 739 years AP, considering samples S-949, S-1107 and S-1109, respectively. Sample S-5747 has not been finalized, though the ages already estimated indicate a direct relation between the age and depth where the sample was obtained. Provenance of S-949 at the deepest level and the other two at the same level may indicate two occupations. Ongoing investigations involving excavations, sampling and laboratory analysis continue with the objective of refining the chronology of Guaibituguçu.

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Title of the abstract: PEDIATRIC IN VIVO DOSIMETRY IN COMPUTED TOMOGRAPHY USING TLD

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Abstract: According to the latest United Nations report, the computed tomography (CT) imaging technique is responsible for only 10% of the number of procedures and examinations performed worldwide. However, its contribution to an effective dose in the population reaches 62%, which motivates dosimetric research to optimize doses and reduce the probability of stochastic effects. This fact gains even more attention when considering radiosensitive tissues, such as pediatric patients, since some publications suggest an increased risk of leukemia and other cancers associated with the amount of pediatric CT scans. Therefore, this study aimed to analyze in vivo skin entrance doses using thermoluminescent dosimeters