Synthesis of High Stable Gold (198) Nanoparticles for Radiotherapy

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Cancer has become a problem in the last years, is expect be diagnosed more than 500 000 new cases in 2017, only in Brazil, according to Brazilian Cancer Nacional Institute. Among women breast cancer is the most common and among men the most representative is prostate cancer, and although treatments for both cancers have been already developed, new methods more efficient and that causes less damage to the patient are always being searched. Gold nanoparticles (AuNps) have many different applications on chemistry, biology, medicine, etc; their low reactivity and toxicity and high stability become it very interesting for bioapplications, such as drugs delivery and biosensing. In this work, we had developed a new method to prepare ^{198}AuNps, from a leaf of gold bombed by neutrons, adapting Turkevich method, these nanoparticles were modified with bovine serum albumin (BSA) and characterized by multiple techniques, after 30 days (eleven half-life decays). This methodology was capable of generate AuNps with almost 14 nm and Zeta potential higher than -37 mV, very stable. BSA can be used for different applications, like a simple stabilizer or to increase cellular uptaking, but in our case its chromophore groups were utilized to follow damages caused by radiation, as a sensor for radiation damage, a dosimeter. Bellow are presented TEM image, Zeta potential measures and fluorescence spectroscopy of the ^{198}AuNps-BSA samples.

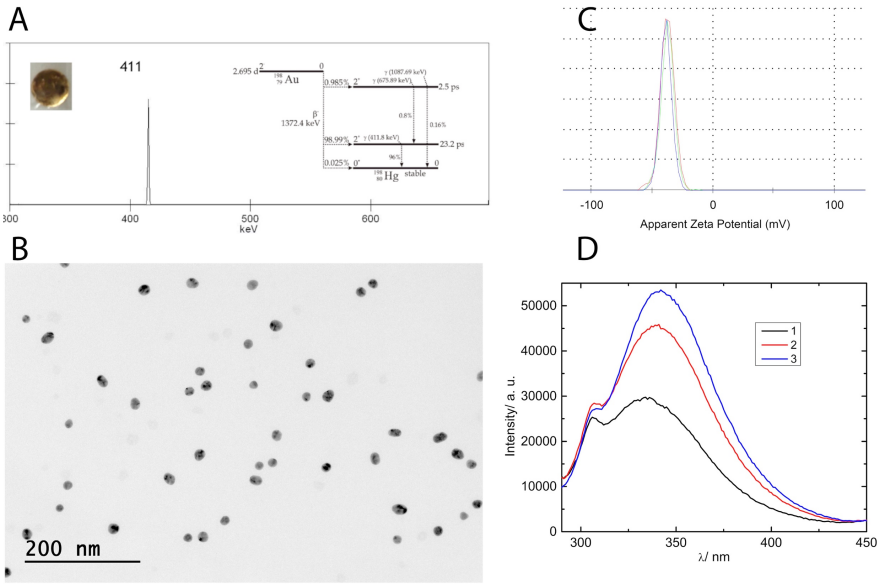

Fig. 1. A) Gamma spectrum of Au leaf, B) TEM image of AuNps, C) Zeta potential of AuNps and D) AuNps-BSA fluorescence spectra of different AuNps samples: 1 prepared by 25% of ^{198}Au atoms, 2 prepared by 100 % ^{198}Au atoms but modified with BSA after 1 half-life and 3 prepared by 100 % ^{198}Au atoms.

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