Title: **Optimization of a PSresin for the selective analysis of Ni-63.**

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Nuclear power plants have a finite life around 30 years beyond which it is not feasible to operate them. Nowadays, there are nuclear plants which will be dismantled in Europe during the next years. The last step in the lifetime of a nuclear power plant is the decommissioning which imply a large economical investment that involve dismantling, radiological characterization, decontamination of structural material among others. Cost can be reduced by a well characterization therefore less material will be disposed.

Radionuclides in building materials are difficult to characterized because they are in a complex matrix, even more whether they emitted low energy. This is the case of ^{63}Ni, which is a pure betta emitter radionuclide produced as activation product. ^{63}Ni has a low energy emission, 66.95 KeV and a half-life of 100.1 years, therefore it present a problem as a long-life isotopes.

Currently, ^{63}Ni is mainly measured by liquid scintillation preceded by chemical separation using complexation chemistry. This process takes time and produces mixed waste. Therefore, in previous studies, alternatives have been seek based on plastic scintillator coated with an extractant (PSresin). Plastic scintillator microspheres functionalized covalently by 2-(1H-imidazol-2-yl) pyridine have been proven a separation and measurement method for ^{63}Ni in a single step but detection efficiency, retention and capacity can be improved.

This work wherein attempted to optimize a nickel selective PSresin by improving its detection efficiency and retention. To optimize the Nickel PSresin, reducing the diameter from 60 µm to 20 µm and increasing the amount of fluorescent solute from 2.5% to 10% in the core of the microsphere were done. By this work, radiometric studies of 20 µm microspheres achieved a good efficiency but when adding IPYR didn't present a better result than 60 µm. 10% PPO PSresin presented the best result with a detection efficiency of 5 % and a retention value of 40% at a concentration of 1 g per g of resin.

Keywords: PS resin, ^{63}Ni, low beta emitter, detection efficiency, capacity, retention.