DEVELOPMENT OF A NOVEL NANOSYSTEM OF SiO2-EYSENHARDTIA POLYSTACHYA WITH POTENTIAL ANTI TUMOR PROPERTIES IN MCF-7 BREAST CANCER CELLS

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Fluorescent and non-fluorescent compounds, from a tree known as “palo azul” (Eysenhardtia polystachya (EP), were used to evaluate their anti tumor effects in breast cancer MCF7 cells. These compounds were extracted as a mixture using different solvents and separated through a silica gel column. These fractions were analyzed by UV-Vis spectrophotometry, Raman microscopy and colorimetric assays (Shinoda and Asahina) to identify each component of the extract. Additionally, silica nanoparticles were synthesized using the Stöber method. Silica nanoparticles were doped with the separated compounds from EP using aminopropyltriethoxy-silane (APTEOS) as a coupling agent. Characterization tests as DLD, XRD, FTIR, UV -Vis, SEM, STEM, TEM, were made in the nanoparticles with and without EP extract components.

By UV-Vis, the different fractions presented the typical spectra of flavonoids. The colorimetric probes, confirmed the presence of these compounds. Fluorescence of fractions was confirmed at different pH values, fluorescence was not seen under acidic conditions (pH 4), but at pH 7.4, and pH 8 green fluorescence was observed. Photoluminescence values were approximately 63 000 ua under basic pH, 40 000 ua for pH 7.4, and 12 000 ua under acidic conditions. Size of Silica nanoparticles was about 100 nm, using the Stöber method. X-ray analysis showed that nanoparticles were mostly amorphous, and by FTIR spectra, the typical nanoparticle bands were seen alone and with EP compounds. Silica nanoparticles doped with EP mixture was able to cross the cell membrane of MCF7 cells. Fluorescence was observed in the citoplasm by confocal microscopy at 10X. Cell proliferation will be analyzed by the MTT proliferation assay and by immunocitochemistry against Ki-67. These experiments will be repeated with the separated fractions from the EP mixture.

Keywords: Nanoparticles, MCF-7, Eysenhardtia polystachya

References:

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