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PREPARATION, SEPARATION AND CHARACTERIZATION OF GOLD NANOPARTICLE ENCAPSULATED LIPOSOMES AND THEIR POTENTIAL APPLICATION AS ANALYTICAL REAGENTS

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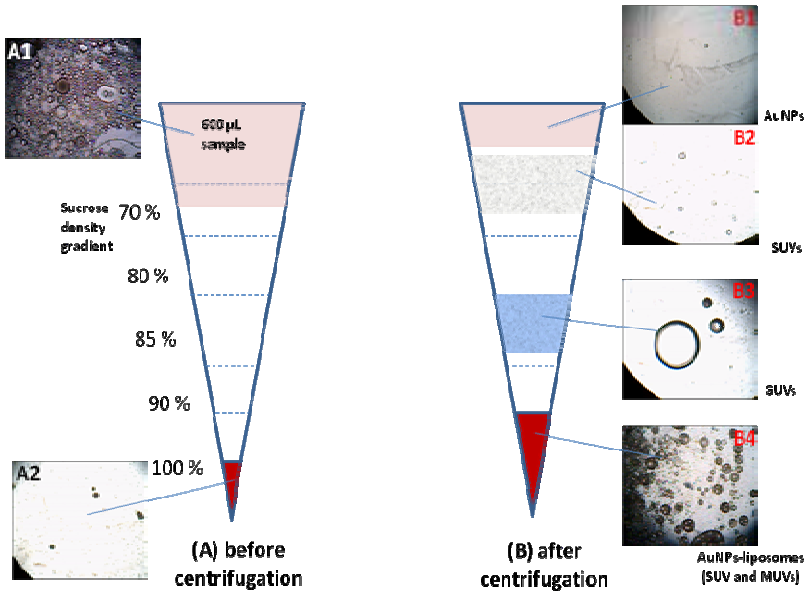
A method for the synthesis, separation and characterization of gold nanoparticle (AuNP) encapsulated liposomes is presented. These NPs were prepared using the conventional citrate method and then were encapsulated into giant unilamellar vesicules (GUVs) by the rapid solvent evaporation method (RSE). The different liposome size populations were separated using sucrose density gradient centrifugation. Extracts of the liposomes were then centrifuged at 4000 rpm at 4 ºC for 15 min by sucrose density gradient centrifugation (SDGC) programmes, which provide efficient liposome separation in different sizes.



Optical microscopy was used for a preliminary study of the AuNP encapsulated liposomes in order to achieve the liposome size populations. As can be seen in Figure A, the liposomes initially obtained show wide size variability (Figure A1) and include encapsulated and empty liposomes. After the SDGC treatment, these liposomes are transformed into nano and microstructures with an established size distribution. The empty liposomes (SUV and GUVs) were adequately separated in the sucrose density zones comprised between 70 and 85 % of sucrose; whereas the AuNP encapsulated liposomes (SUV and MUVs) were placed at sucrose density zones higher than 90 %. Figure B1 shows that the remained AuNPs were found in the top of the eppendorf tube. TEM and AFM techniques will be used to complete the characterisation of the AuNP encapsulated liposomes.

The usefulness of these liposomes as analytical reagents is being checked as amplification probes in competitive affinity reactions. Also, they will be tested in control release assays and liposomes fusion using microfluid systems.