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DSD (Double Solvent Displacement) method for liposomes and Solid Lipid Nanoparticles (SLNs) preparation

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The DSD is an innovative preparation method of lipid nanocarriers. Both liposomes and solid lipid nanoparticles could be produced by varying the operational conditions. However, phospholipids are the only lipid materials used. Cyclosporine, a cyclic polypeptide and immunosuppressive agent, has been encapsulated by DSD. The first solvent displacement is making phospholipids to nanoprecipitate in a free-water media. Supramicelles are self-organised. During the second solvent displacement, an aqueous media is added to trigger the formation of liposomes or SLNs. The cyclosporine is incorporated during the first step with phospholipids in ethanol. Ethanol concentration is the limiting factor orienting toward liposomes or SLNs. Those two nanostructures have been characterized. By using the DSD method with a phospholipid concentration of 8.5 mg/ml, liposomes were formulated with ethanol concentration of 16.6%. SLNs were obtained with up to 10% of ethanol. Both populations are nanosized and homogeneous. Respectively, the liposomes size was 107 nm, with a PI (polydispersity index) equal to 0.24 and the SLNs size was 96 nm with a PI of 0.25. The encapsulation efficiency was between 65%-75%. This new method is based on two steps where phospholipids undergo organisational modifications. The first one passing by an intermediate state, a self-assembly into supramicelles is the critical stage. The DSD is an original and innovative preparation method in which the nanoprecipitation conditions are of paramount importance. To date, none of the research works mention such a technique allowing encapsulating a polypeptide whether into liposomes or SLNs only on varying operational conditions.

Biography

M Sala, after obtaining his Master's degree in Pharmaceutical Technology and Cosmetology at Claude Bernard Lyon 1 University (France), has started a PhD course in Pharmaceutical Technology in 2014 at the same university. Meanwhile, he enrolled in a 4-year Hospital Pharmacy Residency Programme in a teaching hospital (Hospice Civils de Lyon) in Lyon. He has published two papers in reputed international journals.

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