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HPLC analysis as a tool for assessing targeted liposome composition

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Graphical abstract

Abstract

Functionalized phospholipids are indispensable materials for the design of targeted liposomes. Control over the quality and quantity of phospholipids is thereby key in the successful development and manufacture of such formulations. This was also the case for a complex liposomal preparation composed of 1,2-dioleoyl-sn-glycero-3-phosphocholine (DOPC), Cholesterol (CHO), 1,2-distearoyl-*sn*-glycero-3-phosphoethanolamine-N-[amino(polyethylene glycol)-2000] (ammonium salt) (DSPE-PEG-2000). To this end, an RP-HPLC method was developed. Detection was done via evaporative light scattering (ELS) for liposomal components. The method was validated for linearity, precision, accuracy, sensitivity and robustness. The liposomal compounds had a non-linear quadratic response in the concentration range of 0.012-0.42 mg/ml with a correlation coefficient greater than 0.99 with an accuracy of method confirmed with 95-105% of the theoretical concentration. Furthermore, degradation products from the liposomal formulation could be identified. The presented method was successfully implemented as a control tool during the preparation of functionalized liposomes. It underlined the benefit of HPLC analysis of phospholipids during