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Stearylamine-based nanoemulsion: preparation, characterization and physical stability investigation

Merima Sirbubalo¹, Amina Tucak¹, Edina Vranić¹, Andreas Zimmer²

¹University of Sarajevo, Faculty of Pharmacy, Department of Pharmaceutical Technology

²University of Graz, Institute of Pharmaceutical Sciences, Department of Pharmaceutical Technology and Biopharmacy

Oil-in-water cationic nanoemulsions (CNE) are fine dispersions consisting of an oil core (from natural or synthetic origin) stabilized by a single cationic lipid or a mixture with phospholipids, non-ionic surfactants, and/or PEG-lipids. CNEs are considered to be suitable and potential delivery system for nucleic acids in gene therapy field due to their positively charged surface which complex with negatively charged gene material through electrostatic interactions [1]. The aim of the present study was to evaluate the effect of cationic lipid-sterylamine (SA) on mean droplet size, zeta potential and pH of the CNEs. Formulations containing various concentrations of SA were prepared on high-pressure homogenizer. The mean droplet size and zeta potential of the emulsions were determined by photon correlation spectroscopy and electrophoretic light scattering, respectively (Malvern NanoZs Zetasizer). The mean droplet size of emulsions varied from 126 to 129 nm while the polydispersity index varied from 0,068 to 0,137. As expected, zeta-potential increased from +43,7 mV to +53,7 mV with the SA concentration increase from 0,25 to 0,75 % (w/w). During the 60-day storage period at 25 °C, the droplets stayed in the nanometer range with only a minor size increase (~10 nm), no significant changes in droplet size distribution nor zeta potential or any difference in their visual appearance (no creaming or phase separation) proving therefore a satisfactory formulation stability.

References

1. Teixeira H. et al. Int. J. Pharm. 534, 356-367 (2017)

Supervisor(s): Prof. dr. Edina Vranić and Univ.-Prof.dr. Andreas Zimmer