Abstract

This diploma thesis deals with the analysis of three different types of liposomes using capillary electrophoresis with UV-VIS and laser induced fluorescence detection and the use of liposomes as a pseudostationary phase for analyte separations by liposome electrokinetic chromatography method.

In experiments with DSPC-DSPG-PEG2000-DMPE liposomes encapsulating 5-fluoruracil, the peak of liposomes with encapsulated 5-fluoruracil and the peak of free 5-fluoruracil were successfully identified in the electropherograms. Both peaks showed the same absorption spectrum in the UV region, thus confirming their identity. It was proved that capillary electrophoresis with UV-VIS detection is useful for the separation and detection of free and encapsulated drug, which is necessary to determine the efficiency of encapsulation.

By monitoring the change of effective analyte mobility after the addition of liposomes to the background electrolyte the applicability of the investigated liposomes in liposome electrokinetic chromatography was evaluated. A change in mobility was observed for negatively charged 5-fluoruracil and positively charged tryptamine and p-toluidine. The absolute value of the effective mobility of negatively charged 5-fluoruracil decreased by 18.2 % due to interactions with liposomes and effective mobility of positively charged tryptamine and p-toluidine by 9.2 and 16 %.

Empty DSPC-DSPG-PEG2000-DMPE-NBDPC liposomes with fluorescent label were finally analyzed using capillary electrophoresis with laser induced fluorescence detection. In experiments with these liposomes it was found that by applying voltage to the capillary two different fractions of liposomes are separated and lowering the pH of the background electrolyte led to a reduction in the ratio of more mobile fraction to the less mobile fraction. Thus, it has been shown that this detection technique can be also used for the detection of empty labeled liposomes, which is important for their characterization.

Keywords

Liposomes, capillary electrophoresis, liposome electrokinetic chromatography