# Abstract

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Title of the diploma thesis: Automated monitoring of sulisobenzone liberation through model membrane

This diploma thesis deals with the monitoring of biologically active substance liberation through a model membrane using sequential injection analysis. A UV – VIS spectrophotometer was used for the detection. The tested biologically active substance was sulisobenzone (one of the UV filters used in sunscreens) and the permeation through the polycarbonate membrane was monitored using a Franz cell.

At the beginning of the work, a calibration curve was created in two media – water and phosphate buffer of pH 7.4. According to these curves, the concentrations – which were further used in the liberation tests - were selected. The given concentrations of sulisobenzone were prepared in different solvents, namely in water, in 10% ethanol, in 10% propylene glycol and in 5% propylene glycol. The tested solvents were selected based on the assumption of increasing the permeability of the membrane for the liberation of substances with limited solubility in the liberation medium. Each tested solution was measured for 2 hours, with individual samples for release profiles taken at five-minutes intervals. Tables and graphs were drawn up from the measured results, where the greatest attention was paid mainly to the rate of release of substances, the concentration of the released substance during a certain time and their differences between individual concentrations and media. The results show that 10% ethanol is the least suitable solvent in terms of the repeatability of the results because the standard deviation is there much higher than for the other solvents. Furthermore, we can see that the equilibrium state on both sides of the model membrane is achieved only partially in all the cases. The highest permeability is found at 0.2 mM concentration dissolved in water and conversely the lowest permeability is evidenced at 1 mM concentration dissolved in 5% propylene glycol. However, for all the tested concentrations and solvents, there is a direct correlation between the liberation time and the concentration increase in the lower compartment of the Franz cell. The longer the tested solution is on the membrane, the more it permeates through the membrane. 10% propylene glycol appeared to be the best solvent for the highest 1 mM sulisobenzone in terms of better permeability of the polycarbonate membrane.