Impact of Nonionic Surfactants on Valsartan Solubility and Membrane Permeability

In this work, we investigate the impact of six nonionic surfactants on the solubility of poorly water-soluble drug Valsartan. To mimicking conditions occurring during drug absorption in the gastrointestinal tract, time evolution of drug concentration in supersaturated solution is combined with the drug permeability measurement through the porous membrane and the characterization of drug particles precipitating from the supersaturated solution. It was found, that the drug solubilization inside the surfactant micelles significantly reduces the free dissolved drug concentration. This has consequence of reducing the drug permeability through the porous membrane. To support the observed trend, a mathematical model considering drug dissolution in the water, drug solubilization inside the micelles and drug permeability through the membrane is formulated and validated against experimental data.