Abstract

The efficient solubilization of triglycerides remains an unsolved problem in fundamental research as well as in technical applications. In this thesis a systematic characterization of non-ionic microemulsions of the type H_2O/NaCl – triglyceride – alcylpolyglycoleether (C_iE_j) was performed. We discovered that efficient triglycerides only form at high temperatures and large surfactant mass fractions. An interesting approach to achieve an efficient solubilization of triglycerides was copied from mother Nature, which involves the hydrolysis of these compounds by utilizing lipases. Interestingly the products of the hydrolysis (fatty acids, mono- and diglycerides) are efficient co-surfactants themselves. The lipases applied were *Candila cylindracea*, *Rhizopus oryzae* and *Rizomucor miehei*. The complete transformation of triglycerides into amphiphilic components leads to pseudo-binary systems of the H_2O – surfactant/co-surfactant type. The phase behavior of H_2O/NaCl – C_8E_5/octanoic acid was examined exemplarily . According to this study, a mixture of short-chain octanoic acid and short-chain C_8E_5 shows the properties of an efficient long-chain surfactant like $C_{12}E_5$. Based on these physico-chemical principles it was possible to understand the so far unidentified process of leather degreasing and to replace the toxic nonylphenoleethoxylates being until now by the more environmentally friendly fattyalcoholethoxylates. This project was done in close collaboration with the BASF AG. The keyresult is that optimal degreasing is closely connected to the appearance of the typical three-phase region and the ultra-low water/oil interfacial tension of microemulsions.