Supporting Information Figure 1: Phase diagram of the NaCl/X-AES/SCS/water/rapeseed oil system as a function of temperature [°C]. The starting formulations, without additional salt, consisted of 62.5 wt% water, 18.0 wt% X-AES, 5.5 wt% SXS, 14.0 wt% rapeseed oil. (a) Na$_2$SO$_4$, (b) NaOAc, (c) NaCl, (d) NaNO$_3$, (e) NaSCN. The clear, liquid crystalline, and turbid regions are shown in the diagram.

Supporting Information Figure 2: Phase diagram of the NaCl/X-AES/SCS/water/rapeseed oil system as a function of temperature [°C]. The starting formulations, without additional salt, consisted of 62.5 wt% water, 18.0 wt% X-AES, 5.5 wt% SXS, 14.0 wt% rapeseed oil. (a) Na$_2$SO$_4$, (b) NaOAc, (c) NaCl, (d) NaNO$_3$, (e) NaSCN. The clear, liquid crystalline, and turbid regions are shown in the diagram.
Supporting Information 3: Calculation of Micelle Sizes

Calculations were made to obtain the size of the micelles, if all the oil is covered by the surfactant (total mass ratio of X-AES/rapeseed oil = 1.3). Therefore, the total available surface area $A$ can be calculated by:

$$A = N[X - AES] \times a[X - AES]$$

with $N$ being the number of moles of X-AES and $a$ the area per molecule. Considering an area per molecule of $90 \text{ Å}^2$/molecule for X-AES\textsuperscript{21,22} the total available surface area $A$ can be calculated to $1.92 \times 10^{22} \text{ Å}^2$.

Furthermore, $A$ is equal to the area of one droplet (with radius $r$) multiplied with the number of droplets $n$:

$$A = 4\pi r^2 \times n.$$

In addition, ignoring the short apolar tail of SXS the total volume of the apolar part $V_{apolar}$ (oil phase + surfactant tail) can be estimated by:

$$V_{apolar} = N[X - AES] \times V[X - AES] + N[oil] \times V[oil]$$

where $V_{apolar}$ was calculated to be $8.99 \times 10^{23} \text{ Å}^3$. Assuming that the total apolar oil volume is equal to the volume of one droplet (with radius $r$) multiplied with the number of droplets $n$:

$$V_{apolar} = \frac{4}{3} \pi r^3 \times n.$$

Thus, the radius can be calculated to be $140.47 \text{ Å}$. This result is much smaller than the sizes obtained from dynamic light scattering experiments in this work. Hence, these solutions must also contain a significant fraction of surfactant in small micelles with only minor amounts of oil.

Taking a radius of 20 nm (obtained from DLS measurements) the volume of one oil droplet can be obtained by:
with a value of $3.35 \times 10^7 \, \text{Å}^3$. Dividing the total oil volume by the volume of one oil droplet, the number of oil droplets in the sample can be calculated to $2.68 \times 10^{16}$. Additionally, the surface of one oil droplet can be obtained using the following expression:

$$A_{\text{oil droplet}} = 4\pi r^2$$

being $5.03 \times 10^5 \, \text{Å}^2$. Multiplying the surface area of one oil droplet with the total number of oil droplets in the solution, the total surface area can be calculated to $1.35 \times 10^{22} \, \text{Å}^2$. Hence the number of surfactant molecules, necessary to cover the oil droplets is $1.50 \times 10^{20}$.

Thus, 68% of the total amount of surfactant is necessary to cover the oil droplets, while 32% is in small micelles with almost no oil.