

## Micellar growth in green surfactant systems

**This master thesis work was carried out as a joint project between Lund University and CR Competence AB. The research focused on characterizing and tackling the challenges found in a promising green surfactant.**

Surfactants are everywhere in our daily lives, they are found in food, personal care, pharmaceuticals, oil industry, etc. The studied green surfactant,  $\alpha$ -Olefin Sulfonate (AOS), is more easily biodegraded and could theoretically be used to substitute traditional sulphated ones, making a leap towards a more sustainable future. However, its usage is being held by its incapacity to build up viscosity by simple salt addition like the sulphated surfactants. In contrast, when AOS is used in formulation, it required the addition of other surfactants to achieve the same properties.

In the thesis, a purification method was used to enhance the properties of AOS. When testing the purified AOS against the commercial AOS, much better results were obtained. Implying that the problematics came from the impurities present in the AOS, rather than the surfactant itself.

Through a combination of analytical techniques, the major components of the technical grade AOS and the most likely culprit of the hindrance, were found. The culprit was a by-product generated from the synthesis of AOS. That molecule modified how the surfactant self-assembled and gave rise to the problematics.

Additionally, the surfactant was tested in multiple formulations including varying salt concentration and the presence of a co-surfactant. Also, those formulations were further characterised to gain a deeper understanding of its physical-chemical properties.

The knowledge gained through this work will help formulators incorporate the greener alternative to their products. Moreover, it aids producers understand the root of the problem and hints at how to manufacture a better product. Overall, this thesis is a small step towards a more environmentally friendly future.