

## AUTOMATED SYSTEM TO ASSESS STABILITY OF COMPLEX FORMULATIONS AT MACRO SCALE

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### Abstract:

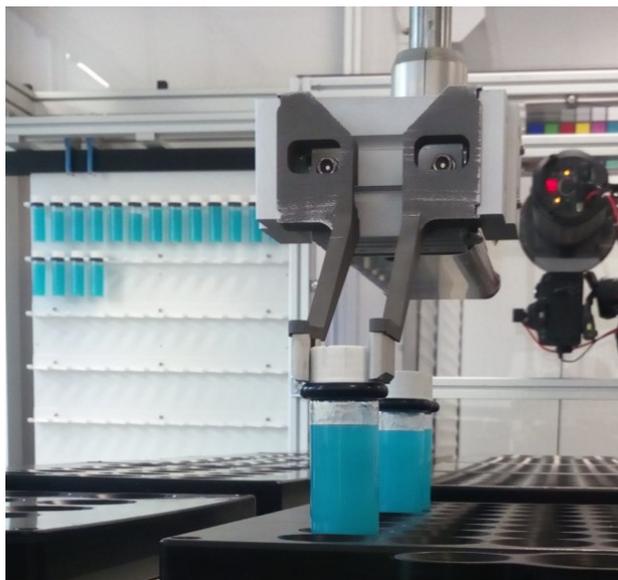
Liquid formulations are some of the fastest growing product forms, anticipating sustainability and consumer preference trends. They often display complex rheology behavior and a broad spectrum of physical and chemical properties.

The stability of formulations (such as dispersions, emulsions, etc.) is increasingly challenging with the widening of global market conditions. However, the methods to predict product stability have not evolved at the pace of technological progress. They are largely based on visual inspection of products performed over extended time periods. These approaches are time-consuming, labour-intensive, require large quantities of products and the obtained data are not conducive to predictive modelling of stability. In many projects, they are limiting the pace of innovation.

While the generation of formulations through automated systems is now well-known and applied in the industrial R&D, our project aimed to answer the clear need for a better understanding of the physico-chemical interactions and the long-term evolution of the formulated products at an accelerated pace.

Combining automation expertise, stability know-how and high-throughput methodologies, we developed a unique fully automated platform to assess the stability of liquid formulations. The platform is designed to age samples and test properties 24/24 and 7 days per week under limited supervision. On the actual system, rheology, pH, digital imaging and turbidity can be measured at any time on a formulation to evaluate its stability and follow the evolution of its physico-chemical properties. Incubators are present on the system to accelerate ageing process or trigger instabilities by applying elevated or low temperatures.

Based on a modular architecture, the unique system opens a new field in predictive modelling of stability for all type of formulations. Its capacity, going up to 1600 samples, together with intensive characterizations are used to generate a large database on stability data and feed machine learning systems.



Central robot of the stability platform handling samples on the automated system combining ageing and characterization