Precise Shelf Life Determination of THC-Infused Beverages

- In collaboration with Tarukino, LLC, Seattle, WA, USA -

FOOD & BEVERAGES

Introduction

The fast-paced and growing market of THC- and CBD-infused beverages provides several challenges for a formulator. Aside from working in an entirely new market with new materials, guidelines are not yet in place to monitor and regulate the potency of such beverages as they age – the destabilization of the oil inside of the beverage can create zones where the dosage is higher than in other regions. Chromatographic techniques require an invasive process to quantify this stability. Here, we will show how the Static Multiple Light Scattering technique utilized in the Turbiscan device can be used to quantify the volume fraction evolution of a destabilizing THC-infused emulsion and letdown beverage.

KEY **BENEFITS**

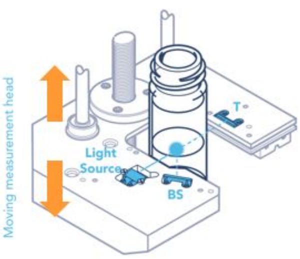
ACCURATE

NO DILUTION

VERSATILE

Reminder on the technique

Turbiscan® technology, based on Static Multiple Light Scattering, consists on sending a light source (880nm) on a sample and acquiring backscattered (BS) and transmitted (T) signal over the whole sample height. By repeating this measurement over time with adapted frequency, the instrument enables to monitor physical stability.
The signal is directly linked to the particle concentration (ϕ) and size (d_{SMLS}) by the Mie theory knowing refractive index of continuous (n_f) and dispersed phase (n_p):



$$BS = f\,(\phi, d_{SMLS}, n_p, n_f)$$

Materials & Method

A single THC-infused emulsion product was analyzed with the Turbiscan at temperatures of 3, 25, and 40 °C over a period of nearly 200 days. The data is then analyzed to quantify a local volume fraction of the THC-infused oil content in the clarification layer occurring at the bottom of the sample vial.

Particle size analysis of the oil droplets was also monitored and seen to be consistent at 1.33 µm, on average, throughout the evolution of the sample.

Results

Raw data

The fluid, opaque samples remained free of any visual phase separation for the entire 200-day experiment. The change in the backscattering signal (ΔBS) still provides insight into the kinetics associated with particle migration away from the zone at the bottom of the sample.

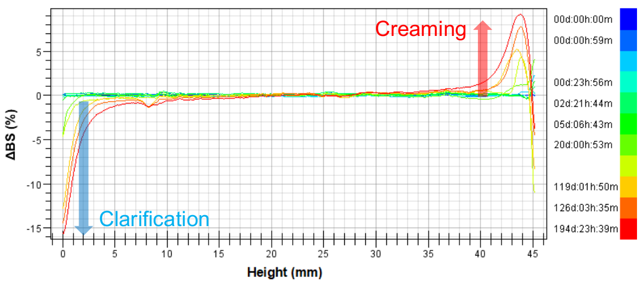


Figure1: Delta of Backscattering at RT of a THC-infused emulsion

At the top of the sample (right portion of the graph) the positive evolution of the backscattering signal can be observed. This indicates that particles are migrating towards this zone - a creaming phenomenon is seen.
Likewise, the negative evolution of the sample at the bottom of the sample (left of the graph) is an indication of oil droplets migrating away from this region.