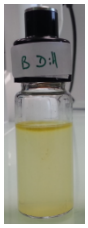

EVALUATION OF NEW WEIGHTING AGENT TO STABILIZE BEVERAGE EMULSIONS

INTRODUCTION

Beverage emulsions are prepared in a concentrated form and later diluted to produce the finished beverage. These diluted emulsions are quite unstable. The most common deterioration process is a ring formation around the neck of the container (creaming), corresponding to a thin concentrated phase formation just below the meniscus. Weighting agents (like BVO for Brominated Vegetable Oil, EG for Ester gum…) are largely used to minimize the density difference between oil droplets and the aqueous phase and stabilize the emulsion. They also contribute to opacity, which is an important property of fruit beverages as it enhances their juice-like appearance.

Most of the manufacturers work on new ingredients to remove classical weighting agents as they are considered not to be healthy. In this study, we propose a method to assess the efficiency of a new natural weighting agent (NWA) at three concentrations, compared to Brominated Vegetable Oil (BVO).

MATERIALS & METHOD

Materials

Vegetable oil and weighting agent were mixed to create oil phases with a range of densities. Weighting agent is added at three increasing concentrations from NWA 1 to NWA 3. The emulsions are then diluted to produce low concentrated emulsions corresponding to consumer versions. These three samples are compared to a reference, with BVO and the same vegetable oil.

Measurement with Turbiscan

Turbiscan is based on SMLS technology (Static Multiple Light Scattering) and enables to analyze concentrated and diluted samples thanks to both detectors in backscattering (BS) and transmission (T), at the wavelength 880 nm.

By monitoring the samples versus time, Turbiscan enables to compare samples in terms of physical stability.

Turbiscan also enables to measure directly the mean spherical equivalent diameter (d) without dilution, with the signal intensity and by inputting the refractive indexes of continuous (n_f) and dispersed phase (n_p) and the particles concentration (φ) according to the Mie theory:

$$d = f(BS\ (or\ T), \varphi, n_p, n_f)$$

with BS for Backscattering Intensity and T for Transmission Intensity.

RESULTS

Emulsion Opacity

The clarity of the diluted emulsions can be evaluated by assessing the transmission level of the emulsions after preparation.

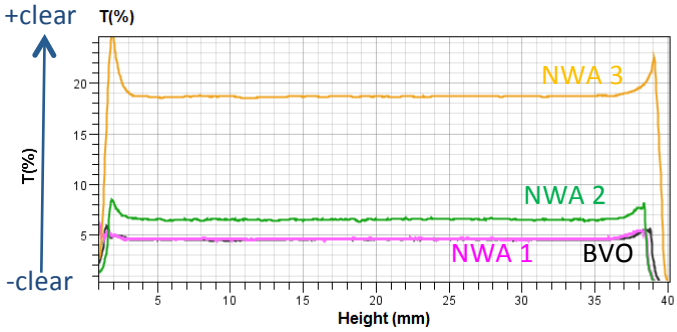

Figure 1: Transmission level (%) for emulsions with NWA at increasing concentrations and BVO

NWA 1 is the best emulsion with NWA, with a similar clarity than the reference BVO.

Mean spherical equivalent diameter

The following table gives the mean diameter values measured with Turbiscan after preparation for the four products.