EFFECT OF RAW MATERIALS ON A SUNSCREEN FORMULATION

INTRODUCTION

In order to meet the specification requirement, cosmetics preparations are usually complex dispersion (suspension or emulsion). The addition of one raw material directly modifies the stability of the dispersion and so each formulation must be analyzed and validated. For example in sunscreen application, the choice of the sun blocker directly affects the final stability of the dispersion.

In this note, using the Turbiscan™ technology, the effect of two different sun blockers on the final stability was studied. Moreover, the mean diameter of the particles was measured directly in the final product without dilution.

PRINCIPLE

Measurement with Turbiscan®

Turbiscan™ instrument, based on Static Multiple Light Scattering, consists in sending a light source (880 nm) on a sample and acquiring backscattered and transmitted signal. Combining both detectors (BS & T) enables to reach wider concentration range. The backward reflected light comes from multiple scattering as the photons scatter several times on different particles (or drop).

This signal intensity is directly linked to the diameter (d), according to the Mie theory:

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

More information

METHOD

To monitor the effect of different raw material on the final sample, we analyzed two sunscreens using the same process of formulation but with two different inorganic physical sun blockers:

- ZnO
- TiO_2

Samples are analyzed using the Turbiscan during 2 days at 40°C

RESULTS

By scanning the 3 samples according to the method described in the previous paragraph, the following results are obtained:

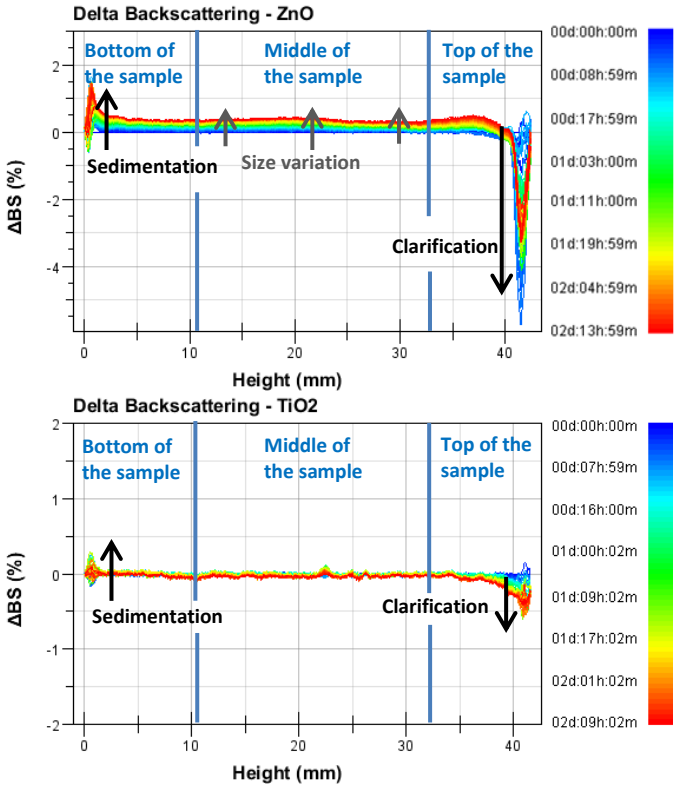

Figure 1: backscattering variaiton versus sample height for sample with ZnO (top) & TiO_2 (bottom)

From the graphs in Figure 1, we can observe the effect of the pigment on the emulsion stability. For the same emulsion, more destabilization is visualized for the pigment ZnO than the pigment TiO_2.

- At the top of the sample, due to the sedimentation of the pigment, a clarification appears and so a decrease of the intensity of the light is observed. Moreover, an increase of the light intensity is measured at the bottom meaning an increase of the concentration.
- All over the height of the sample, a global increase of the intensity of the light is observed meaning a particle size variation. The pigments tend to agglomerate.