APPLICATION NOTE

DEVELOPMENT AND CONTROL OF COSMETIC AND PHARMACEUTICAL PRODUCTS

The stability of cosmetic and pharmaceutical products is one of the key parameter for the good quality of the product and the satisfaction of the customers. Moreover, the large range of product forms in these fields (milk, cream, foam, *etc.*), their various end-use properties and storage conditions make the stability tests long and tedious. Finally, the important number of components in these products leads to a complex interpretation of the data obtained *via* classical analytical techniques.

Application 1: Long term stability analysis

× **Common method:**

The stability analyses of cosmetic and pharmaceutical products are done by visual observation of samples stored at low (+4°C), ambient and high (+35 to +50°C) temperatures during up to six months, depending on the temperature. The subjectivity of these tests, which highly depend on the operator, and their lack of traceability lead to tedious and sometimes poor quality results. Moreover, as it is necessary to wait all this time before releasing a new formulation to the production, the development times are far too long considering the importance of fashion for this market.

The stability tests are therefore subjective and constitute a long time process that is more and more incompatible with the requirements of the marketing.

× **Turbiscan® method:**

The Turbiscan ags is a fully automated ageing station, which enables to store samples at three different temperatures (from ambient to +60°C) and to perform analyses on its own (from the measurement to the data processing). The analysis is done *via* a Turbiscan LA*b* that identifies and quantifies instability phenomena. Once a correlation has been established between the Turbiscan® and the classical techniques, a warning level can be set in the software, detecting automatically the products that are not fulfilling the requirements. Detection of instability can be done in less than two weeks.

Using the Turbiscan ags, the stability tests of cosmetic and pharmaceutical products are accelerated up to 15 times, enabling to increase the development capacity for new products and to improve their reliability. It is therefore possible to be closer to the market.

Application 2: End-use properties of foam

× **Common method:**

Many cosmetic products are now formulated as foam (hair, shower or shaving foam), and their stability will depend on the end-use property. Therefore, it is important to test the time of breaking of the air bubbles to match the customer expectations. These tests are mainly done visually in a volumetric cylinder using a timer. They are not sufficiently reproducible and remain tedious and subjective.

The control of the breaking of cosmetic foams is done through visual methods that are tedious and subjective.

× **Turbiscan® method:**

The Turbiscan LA*b* is suitable for testing both long and short time foam breaking thanks to the possibility of working in scan or fixed head mode. It is also possible to compute kinetics of ripening of the air bubbles and compare samples very easily. The method is flexible, objective and traceable.

The Turbiscan LA*b* allows a quick and accurate measurement of the foam breaking.

APPLICATION NOTE

Application 3: New product development

- **Common method:**

When developing a new formulation it is important to have as much information as possible on the product in order to be able to anticipate possible stability issues and problems raising while going to large scale. However, bottle tests do not give much information on the instability taking place and it is therefore necessary to use other analytical techniques that are not always suitable to highly complex mixtures like cosmetic products.

The understanding of the stability of cosmetic products is necessary but often very complex.

- **Turbiscan® method:**

The Turbiscan LA*b* enables to identify and monitor destabilisation phenomena (migration or particle size variation) in complex systems as it measures macroscopic parameters directly related to the concentration and the particle size of the system. Therefore, it helps explaining the destabilisation mechanism by determining which instability is taking place in the system and to evaluate its intensity in an objective and traceable way.

Using the Turbiscan LA*b*, product developments are not only shortened but also documented and contain many information helping the formulator to understand his products.

Application 4: Scale-up

- **Common method:**

The scale-up of a new formulation from the R&D lab to the production is a key step in the development of a product. It is costly and sensitive to many various parameters, which makes it a difficult task. The success of this step is usually highly dependent on the expertise of the people in charge and it is difficult to obtain consistent results.

The scale-up process is a difficult step in the development of a product that is rarely optimised through scientific approaches.

- **Turbiscan® method:**

One of the parameters computed with the Turbiscan LA*b*^{Expert} is giving a direct measurement of the dispersion state of the product through a simple measurement that does not require any external parameter. This quick analysis enables to monitor if the product is the same as the one designed by the lab. This parameter being set as one of the specification of the product, it can be checked in the different steps of the production process, enabling a constant control of the quality of the product.

The Turbiscan LA*b* enables to compute parameters that will help the scale-up and the production processes through a global measurement of the dispersion state of the produced batches.

The Turbiscan LA*b* finds applications in the whole life of a cosmetic or pharmaceutical product development, from the formulation of a new system and its understanding to the end-use property testing and the stability analyses for R&D and quality control purposes. It makes it a flexible and useful technique, which enables to shorten the analyses and to perform objective and traceable measurements.