# Applications Overview

## Physical Stability of pharmaceutical dispersions

The world of drug delivery is getting more and more efficient every day with new forms of products, which are directly targeting the deficient organs. Dispersed systems such as emulsions (simple or multiple) or nanoparticle suspensions (metal oxides, etc.) are now widely used as drug carriers or nutritional solutions in this purpose. These new forms of products allow better targeting and assimilation for the patient, and give rise to new solutions for drug designers. However, the stability of these inherently unstable colloidal systems makes them complex to formulate and study.
Turbiscan enables to detect, qualify and quantify any destabilisation of drug dispersions from product development to quality control.

### APPLICATIONS

- **Vaccines**: Kinetic of particles aggregation and sedimentation (proteins, metal oxides….)
- **Skin lotion and cream:** Detection of coalescence and creaming up to 200 times faster than visual test
- **Ophthalmic suspension:** Study of the re-dispersion of active ingredient after storage
- **Inhalers (pMDI):** Study of particles aggregation & sedimentation in pressurized measurement cells

### STRENGTHS

- Measure the **true stability** : analysis at rest (storage stability)
- Shorten analysis time: up to **200 times faster** than visual test
- **Detect** and **quantify** any destabilisation (sedimentation, flocculation, creaming, agglomeration, size variation)
- **Turbiscan Stability Index:** to compare quickly different samples
- Small sample volume: **1 ml**
- **High pressure** measurement for inhalers
- **Versatile**: Analyse all kind of dispersions : emulsions, suspensions & foams

### KEY NUMBERS

1200+ publications
200+ patents
50+ countries representation

### REFERENCES

*Application notes:*

- Overview of various stability studies of pharmaceutical dispersions ***Click here***
- Effect of an Antibiotic on the Stability of Injectable Emulsion ***Click here***
- Effect of Electrolyte Introduction on Injectable Emulsion Stability ***Click here***

*Publications:*

- Study of emulsion stabilization by graft copolymers using the optical analyzer Turbiscan®, 2003 (C.Lemarchand, P. Couvreur, C. Vauthier, D. Costantini, R. Gref) ***Click here***
- Stability of emulsions for parenteral feeding: Preparation and characterization of o/w nanoemulsions with natural oils and Pluronic f68 as surfactant, 2009 (M. Wulff-Pérez, A. Torcello-Goomez, M-J. Galvez-Ruiz, A Martin-Rodriguez) ***Click here***
- Effect of polymer viscosity on physicochemical properties and ocular tolerance of FB-loaded PLGA nanospheres, 2009 (J. Araujo, E. Vega, C Lopes, M.A. Egea, M.L. Garcia, E.B. souto) ***Click here***
- Assessment of pressurized metered dose inhaler suspension formulations using the Turbiscan®, 2002 (N. Govin, S. Liljedahl) ***Click here***

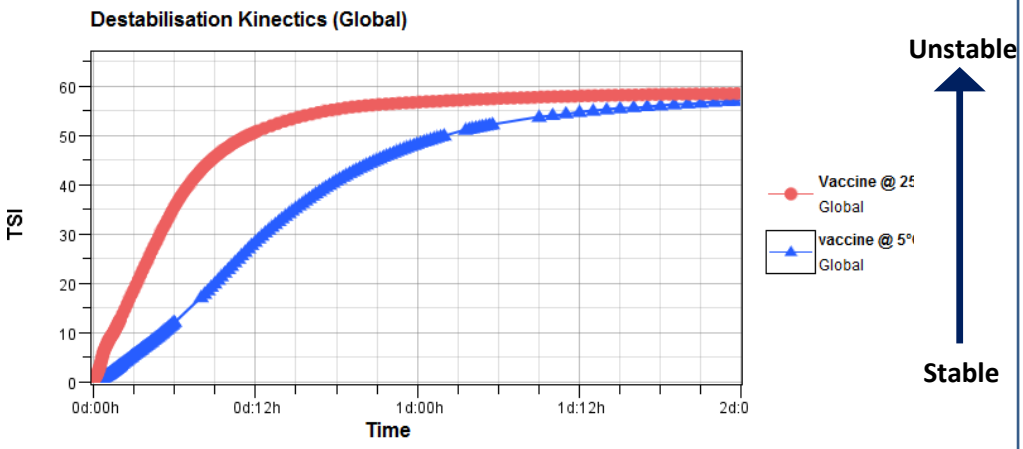
*Note: For more applications notes & publications, www.formulaction.com*

# Physical Stability of pharmaceutical dispersions

## ONE CLICK STABILITY NUMBER

**The Turbiscan Stability Index** is a one-click feature providing a key number depending on the global stability of the sample. It is a quick and easy way to characterise the sample stability. The TSI takes into account any destabilisation. The higher is the TSI, the lower is the stability.

Stability of a vaccine stored at 5°C and 25°C




tsi COMPUTATION

| | TSI @ 10 min | TSI @ 2 days | STABILITY |
|---|---|---|---|
| Vaccine 5°C | 0.2 | 57 | GOOD |
| Vaccine 25°C | 0.7 | 58 | WEAK |

Conclusion:

The TSI is an easy tool to compare and rank all samples. In this example we observe that the stability of a vaccine stored at 5°C is good within the first 10 minutes whereas the same vaccine stored at 25°C is unstable.

## SPECIFICATIONS

| | TURBISCAN CLASSIC | TURBISCAN LAB | TURBISCAN TOWER | TURBISCAN AGS |
|---|---|---|---|---|
| Emission (Light Source) | 850nm | 880nm | 880nm | 880nm |
| Detection | MLS | MLS | MLS | MLS |
| Cell Volume | 7ml | 4 or 20ml | 20ml | 20ml |
| Quantitative monitoring of dispersion stability | • | • | • | • |
| Turbiscan Stability Index (TSI) computation | • | • | • | • |
| Migration velocity & hydrodynamic diameter | • | • | • | • |
| Disposable glass cells | • | • | • | • |
| Automatic reporting | • | • | • | • |
| Automatic samples recognition (bar-code) | | • | • | • |
| Temperature control | | T,E (RT+5°C to 60°C | 4 to 80°C | RT+5°C to 60°C |
| Mean diameter and volume fraction | | E | • | • |
| Multi-samples | | | 6 | 54 |
| Storage at 3 different temperatures | | | | • |