Application report

ECA – Emulsion Characteristic Analyzer

Stability consideration and drop-size-measurements in original concentrated homeopathic highly complex formulations of cosmetic disperse-phasing-systems and emulsions

Experiment

In the following tests, different cosmetic (partly homeopathic) emulsions were assayed concerning their stability. The measurement configuration was not changed.

Measurement Configuration:

The sample is placed on a shaker and the sensor is dipped into it. In each case the entire data analysis takes place over several hours.

Measurement Accomplishment:

The 50ml sample is measured with a dip sensor on a shaker at 52 RPM. The sample is continuous in motion by the movement of the shaker.

Sensor: insitu ECA - Sensor 18 mm Diameter,

Measurement Range: Drop-diameter <60 micron

Evaluation

Test 1

Assay of a homeopathic Formulation – sample 1

Measurement from 11:10 to 19:12

Demonstration: several fractions as surface-distributions of the drop-size in percent over time are inscribed on the abscissa

Result: unstable formulations

The fraction 0 to 4 µm (blue graph) increases over the measurement duration. The number of counted drops (dark green line) rises on until 13:50 but then it slowly decreases. The formulation breaks after 2 hours (12:30 to 13:10).

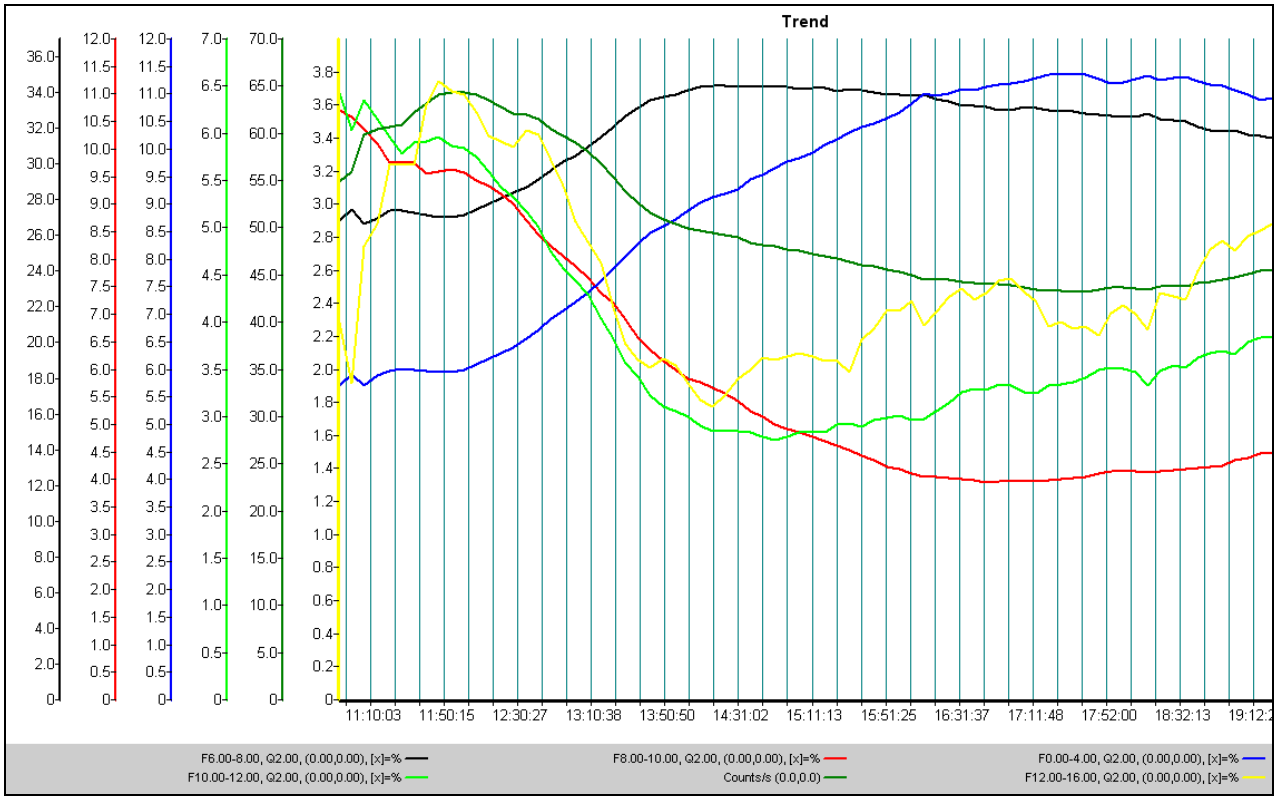

Fig. 1 demonstration of an unstable formulation

Test 2

Assay of a homeopathic formulation – sample 2

Measurement from 19:52 to 8:56

Demonstration: surface-distributions of the drop-size in percent over time on the abscissa

Result: partly stable formulations

The fraction 0 to 4 µm (blue graph) increases until 20:52 but after this point it falls rapidly. From 23:00 on, the raw-fraction (green curve) of the husks increases continuous, but simultaneously the other fractions continue constant.

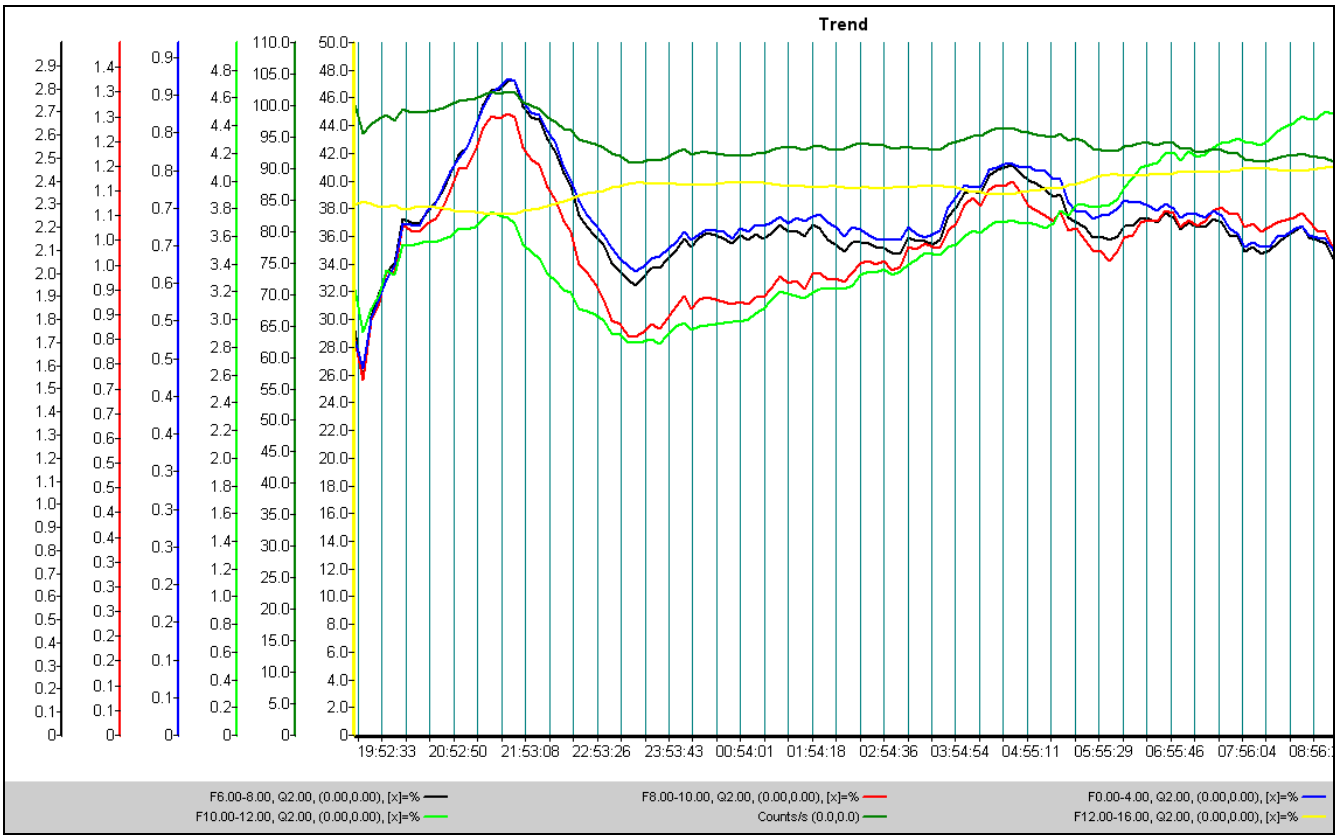

Fig. 2: partly stable formulation with homogeneous distribution of the husks.

Test 3

Assay of a homeopathic formulation – sample 3

Measurement from 5:23 to 10:44

Demonstration: surface-distributions of the drop-size in percent over time on the abscissa

Result: unstable formulation

Right from the start of the measurement all fractions are in a migration area.

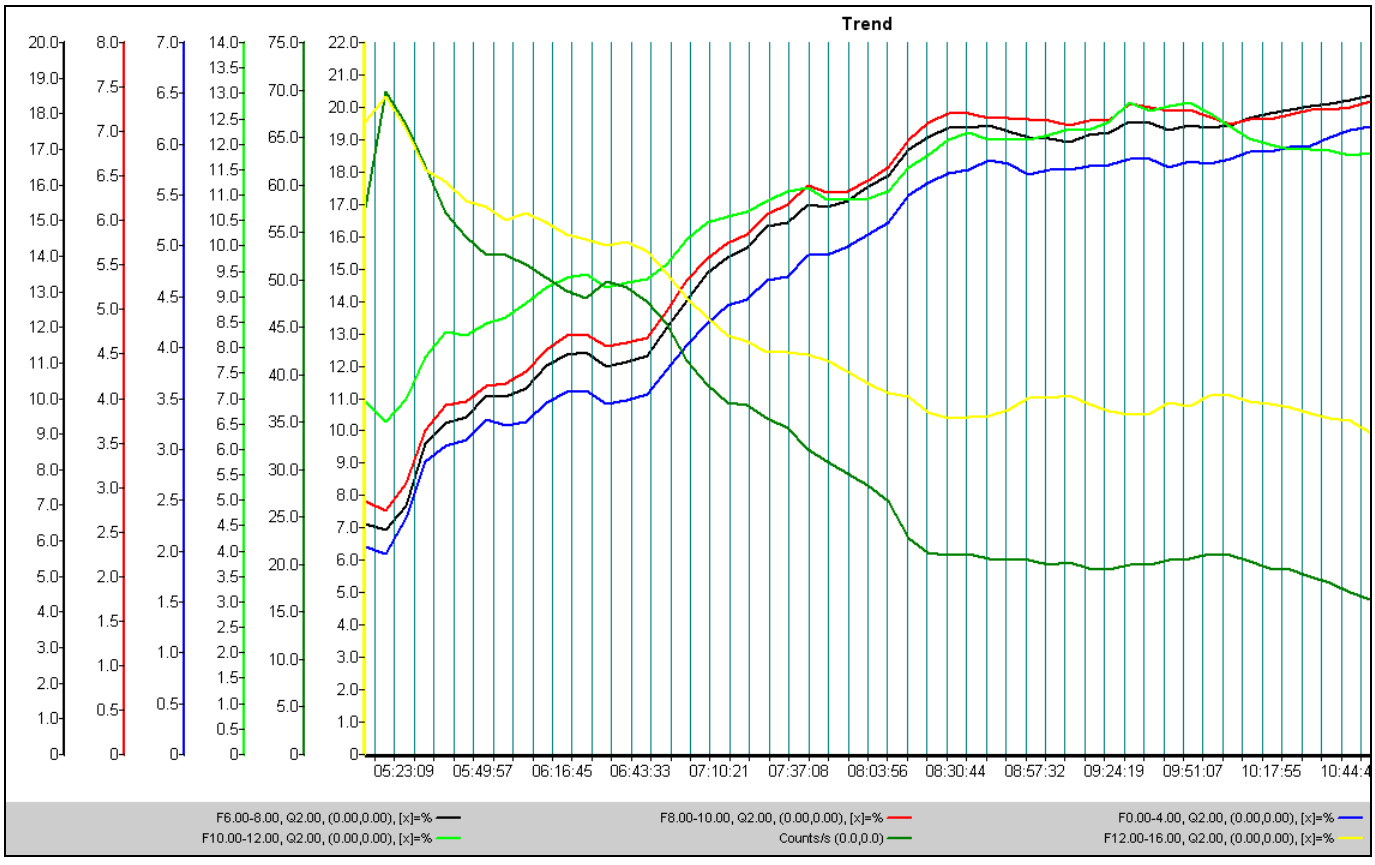

Fig. 3: prime example of an unstable formulation

Test 4

Assay of a homeopathic formulation – sample 4

Measurement from 9:42 to 7:08

Demonstration: surface-distributions of the drop-size in percent over time on the abscissa

Result: labile but stable formulation

Right from the start of the measurement all fractions are in a migration area over a period of 3 hours and they display equality over an 18 hour – progress.

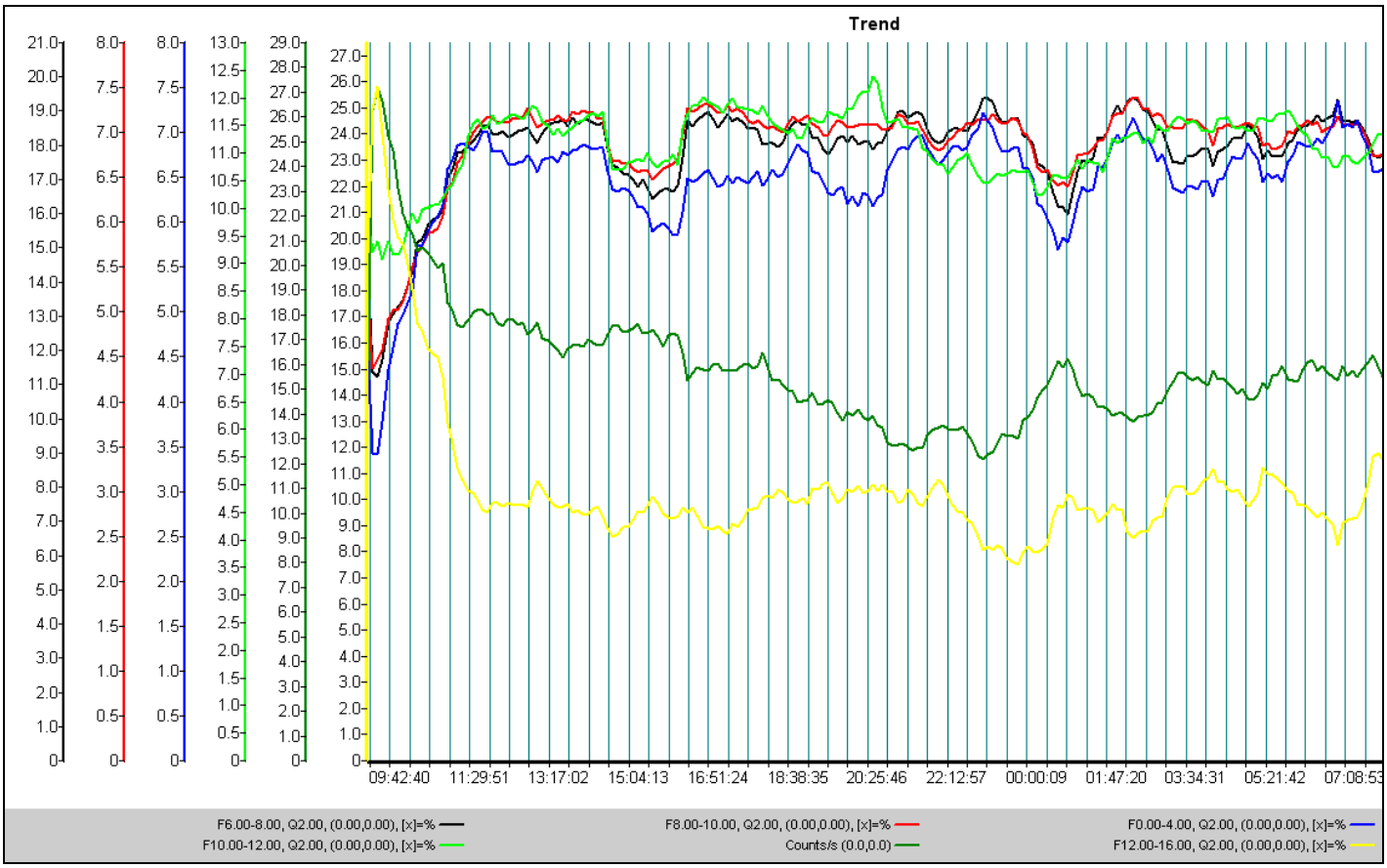

Fig. 4: example of an oscillating structure, a labile but stable formulation

Test 5

Assay of an ALOH suspension – sample 5

The question that now arises is: How would a homogenization generally affect the formulation?

Result: stable suspension with homogeneous stirring speed

Based upon the same system technique that was used in Fig. 1 to 4, the measurement of an ALOH suspension of 20g in 400ml H_2O (after the homogenization of the stirring speed) shows us the following diagram:

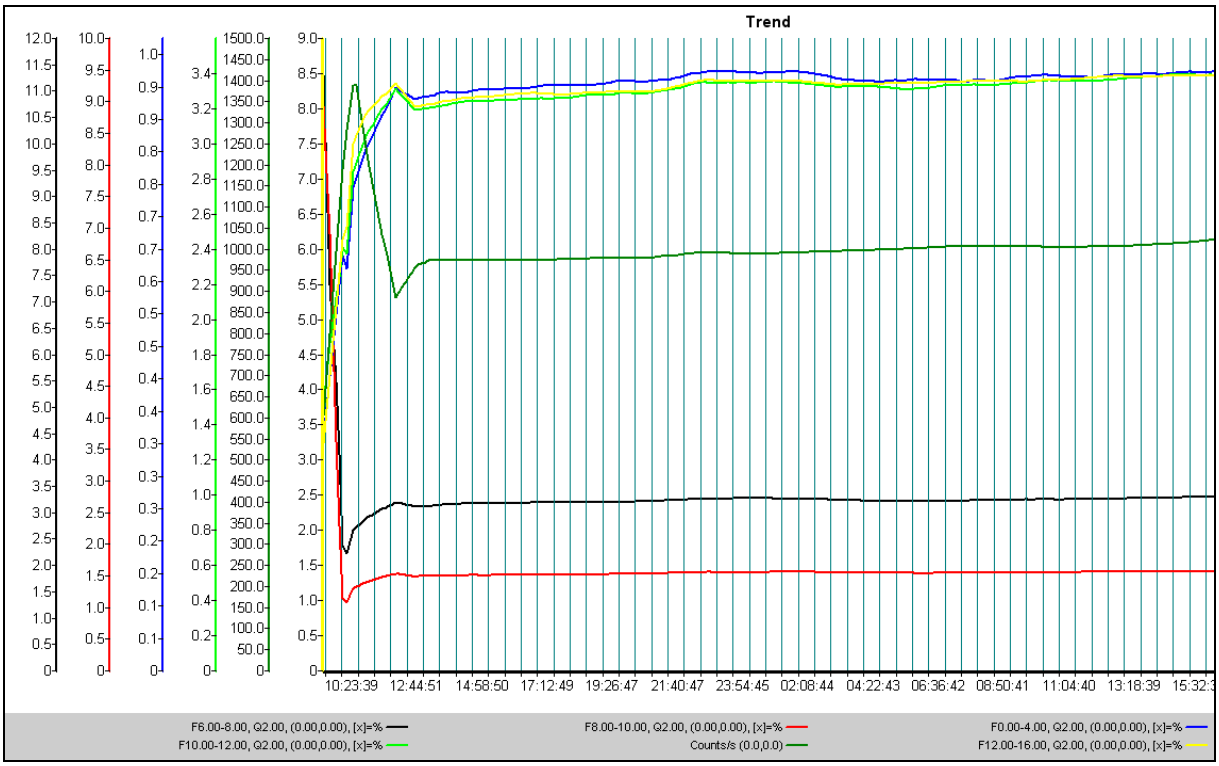

Fig. 5: stable suspension with homogeneous stirring speed

Test 6

Assay of a cosmetic emulsion – sample 6

Result: stable emulsion

Constant graphs suggest us a stable emulsion.

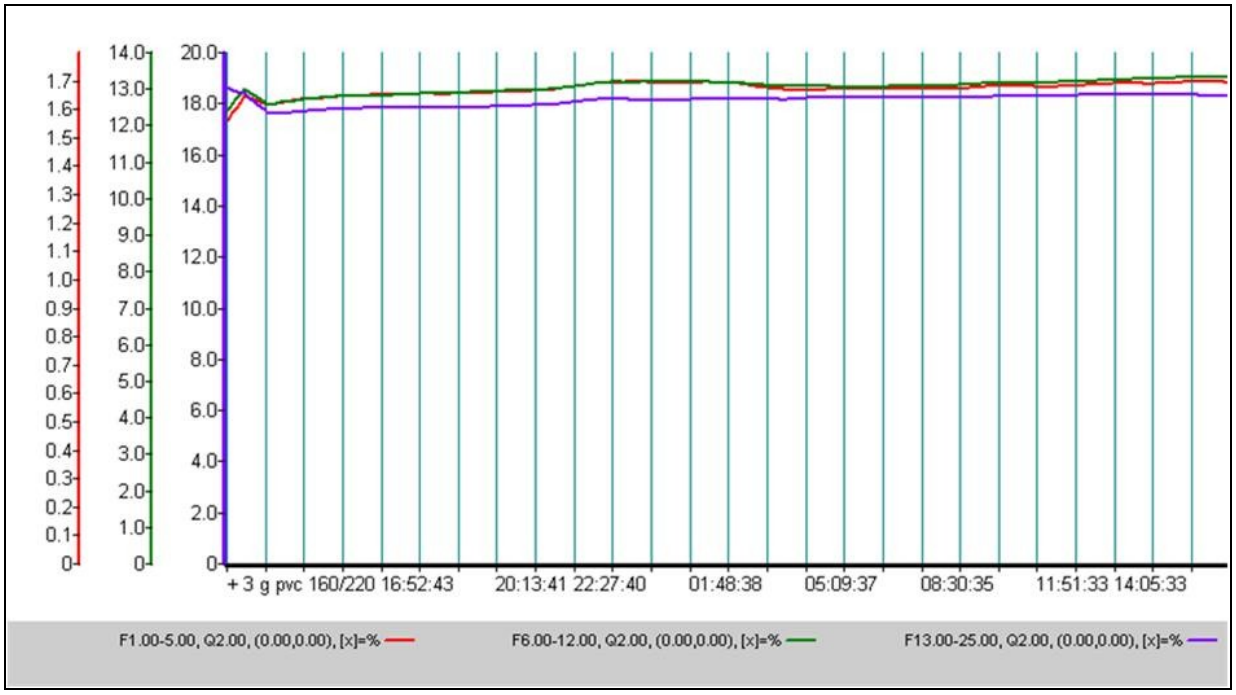

Fig. 6: stable emulsion

Recapitulation of the advantages:

The authors assume (on the 14th October, 2009):

- The drop-distribution kinetics of the complete system are measured under insitu conditions in original concentration;
- The whole configuration of the sensor technique delivers repeatable signal distributions to internal substance systems;
- The whole configuration of the sensor technique delivers repeatable signal distributions to reticles;
- The measurement data is applicable on exercises in the development of emulsions, because compareable kinetic demonstrations have been displayed at 68 subsequent formulations of cosmetic emulsion products;
- Independent users get the same results;

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