

## Optimization of cosmetics formulations

### Task

For a specific project aiming at the formulation of a body lotion from natural ingredients, Beiersdorf had already attempted earlier to solve it by conventional approaches, but the formulation experts failed to come up with a stable formulation based on the standard approach used in the laboratory. After at most three months, all of the formulations that had been tried earlier became instable.

Originating from the constantly changing market requirements, the needs to come up with a creative way of discovering new product formulations, and the expectation to shorten product development time, Beiersdorf engaged the team of Thomas Bäck of the former NuTech Solutions GmbH for applying their data analysis and optimization technology – now known as ClearVu Analytics – to those challenges in product development.

### Solution Approach

Based on using ClearVu Analytics, a predictive model for stability was derived from Beiersdorf's existing experimental data on formulations and their stability. This model was then used for predicting stability of new formulations, derived from existing ones through modifications. Those modifications include both the replacement of ingredients by others as well as changes of ingredient concentrations. A new formulation predicted to be stable was then used as the starting point for the next modification.

Using a virtual formulation development process, models predict characteristics of suggested combinations of ingredients and quantities, improving the resulting recipe by reincorporating the desirable attributes with each subsequent model. As a result, ingredients not considered by traditional approaches are suggested by ClearVu Analytics.

### Results

Based on a complete integration (including specific customization to integrate into Beiersdorf's IT infrastructure) of ClearVu Analytics into the product development process at Beiersdorf, formulation developers are able to develop a new formulation in a surprisingly short amount of time. The new formulation satisfies all requirements on stability and viscosity. In addition, the experts are able to derive new knowledge about formulations, and have revised their assumptions concerning the impact of certain ingredients on stability.

In addition, product development time (in terms of the number of experiments required in the laboratory) is significantly reduced, because using predictive models reduces infeasible experiments (yielding unstable products, for example) and significantly increases the probability for finding feasible formulations.

## Beiersdorf AG

### The company

- Globally operating enterprise of consumer goods with their headquarter in Hamburg
- More than 20,000 employees
- Umbrella brand of different products, for example Nivea, tesa, Hansaplast, Eucerin, Labello

### Applications

- Optimization of formulations
- Prediction and optimization of microbiological characteristics
- Determination of essential influencing parameters
- Analysis of data from consumer evaluations (CLT/HUT)
- Analysis of sensory data
- Data driven optimization of production processes

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### Testimonial

»Our past experience limited our trials to include only familiar ingredients, and the lengthy process of attempting each combination had led us to declare the desired product infeasible after three months of research«

»However, with divis' ClearVu Analytics engine, we satisfied all the technical requirements faster than with traditional processes, and now have a new product we will bring to the market.«

Dr. Thomas Hillemann, PhD, Head of Study Coordination,  
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