Optimization of
product development

Task

In early 2006 it became apparent to J&J's product formulators that traditional modeling techniques did not produce the level of insight needed to understand all the parameters that influence the functionality and performance of its wipe products. Identifying and understanding the interactions between all raw materials – the chemicals in the lotion and the fibers of the nonwoven fabrics – and the resulting effects of these interactions to the wipe's efficacy presented such a significant challenge that the company sought a more intuitive and predictive modeling solution. Reducing J&J's standard product development cycle, which spans eight to twelve months, as well as a further improvement of product performance were the key project goals.

»We turned to the scientists at (at that time) NuTech Solutions with their ClearVu Analytics technology, because we heard of their success in developing predictive models that truly optimize product formulations.« said Dr. Matthias Hauser, R&D Fellow in the R&D Consumer Europe organization.

Solution Approach

Working closely with J&J's product formulators, divis scientists designed a ClearVu Analytics model using existing formulation data collected from J&J developers in Germany and France. The primary goals of the model were to identify as many possible parameters and scenarios that influence the wipe development process, and to predict the resulting effects of these parameters on the wipe's functionality, performance, and efficacy. Critical to this study was including the large raw material portfolio used in development – more than eighty components at this time – and quantities of each component and for optimal prediction as much various compositions as possible.

Using ClearVu Analytics and formulation data of J&J, a corresponding predictive model of the microbiological stability of formulations was derived. Using J&J's existing data, divis studied the interactions between ingredients, and the behavior of substances when applied to the wipe's fabric. For example, the model simulates the effects of applying different lotions to both synthetic and natural fibers of a wipe, and also the effects of applying various microorganisms that might reduce the wipe's performance more quickly. The model uses formulas that are based on the input of ingredients and preservatives, and generates a set of "rules" that product formulators can use to test ingredients, predict characteristics and behaviors of these ingredients when combined and applied to the fabric, and predict log reduction rates for the preservative's efficacy. Using the new model formulators can see what results might look like based on a combination of named ingredients, fabric components, and other parameters such as temperature and test interval. As a result, the »right« ingredient concentrations can be defined. Furthermore, formulators can discover previously unknown effects or dependencies among all wipe components, which can be prevented or encouraged as appropriate in future formulation.

Johnson & Johnson GmbH

The company

— Part of the globally operating company Johnson Johnson, producer of pharmaceutical and consumer goods with their headquarter in New Jersey

— Part of one of the biggest healthcare companies in the world

— Umbrella brand of many brand-name products, for example bebe, LISTERINE, Neutrogena, nicorette, o.b., Penaten, Visine

Applications

— Optimization of formulations

— Prediction and optimization of microboilogical 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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Results

With the ClearVu Analytics model, Johnson & Johnson product formulators can

— improve the selection of fibers for wipe fabrics with greater insight into how the
— fabric is affected when interacting with various ingredients,
— test and »play with« different combinations of ingredients and components in
— lotions to predict their behavior on the fabric,
— reduce the number of product development "trials", to deliver products to the
— market quicker and
— respond more quickly to changing industry regulations and competition.

»While our initial goal was to optimize our formulations for wipes, we also see further uses for this model« said Dr. Hauser. »The more data we would collect and input into the model, we could test and predict for product stability and even some skin reactions, and potentially even optimize our products to consumer preferences.«

Testimonial

»We are still implementing and evaluating our new model, but clearly we can now predict micro results for new formulations using known components at this time. We will continue to expand our use of the model, but critical to this process is internal data collection. But even this early in the project, we have a better picture of how our materials interact and the effects to the wipe. And we have a set of working rules for our formulators«

Dr. Matthias Hauser, PhD, Associate Director Scientific Relations, Johnson & Johnson GmbH