

INCREASE PROFITABILITY AND GAIN COMPETITIVE MARKET ADVANTAGES IN FORMULATION

Leverage Advanced AI to Accelerate Production of Lower-cost, More Fuel Efficient Lubricants



HIGHLIGHTS:

CHALLENGES

- + Lengthy & costly process - taking months to years
- + High risk of failure in required tests
- + Resource-intensive & repetitive methods
- + Limited access to experienced formulation experts
- + Experimental processes - leading to low predictive accuracy & less optimized products

SOLUTION

- + Boost product development
- + Better identify top-performing & economic combinations
- + Improve testing outcome prediction
- + Integrated solution to streamline product development processes & quality assurance
- + Facilitate access to historical data to gain better insight
- + Capitalize on powerful visualization & blends analysis tools

BENEFITS

- + Reduced material & program costs
- + Higher predictive accuracy of candidate properties
- + Expedited access to hundreds of viable, new & improved formulations
- + Accelerated time-to-market for optimal lead candidates
- + Standardized process based on best practices - readily accessible across the organization

CUSTOMER

A global oil & energy corporation intended to generate new car engine lubricant blends that meet relatively constrained viscometric targets while reducing their overall cost and improving time-to-market.

CHALLENGE

Formulation is an expensive and time-consuming process that involves selecting several components from a wide range of available ingredients and predicting properties of the final blend to meet a given set of performance targets. The choice is often constrained by price, supplier, regional availability, and other considerations that only an expert formulator can fully envision.

In addition to the intricate nature of developing formulations out of a complex, multi-dimensional space, and limitations in predictive models, formulation problems often involve multiple optimization objectives including performance and cost. Because of the wide range of ingredients and possible combinations, and the complex nonlinear interaction between various parameters, the current predictive models are not very reliable. Lack of accurate predictive models leads to a repetitive approach that is inevitably extensive and resource-intensive. Accomplishing program targets requires a streamlined, integrated approach to blend identification, optimization, and testing procedures with access to a uniform knowledge-base.

The leading energy company realized that reducing costs demands the adoption of advances in technology to develop an integrated digital solution that reflects a more standardized process. Their objectives involved better development of predictive models that yield higher accuracy in terms of test performance and more efficient optimization algorithms. They also recognized that their organization required a commercial, state-of-the-art software solution that brings various steps of product development into one platform, integrates their valuable institutional knowledge, and leverages their most valuable assets (i.e. records of historical data).

SOLUTION

Beyond Limits' pioneering solution was selected by the customer to enhance their processes, develop optimized products, and better position themselves in the market (i.e. maximizing profitability by lowering program and material costs).

Beyond Limits' advanced AI solution leveraged our customer's historical data (historical blend composition and measured properties) to propose new hypothetical blends. Through this process, Beyond Limits incorporated formulation domain knowledge, alongside parameters and directional guidance (such as regional availability of base stock) into the AI-driven solution.

The result was a well-integrated software solution that recommended hundreds of viable blends meeting constrained viscometric targets with high confidence in their predicted properties in a fraction of time compared to the alternative approaches. The solution also explicitly characterized the confidence level in its prediction and recommended a series of optimized blends by considering cost and performance. A few select lead candidates were created and tested with results verified in our customer's laboratories. Laboratory results suggested that Beyond Limits' solution was more than 95% accurate on average.

~95% ACCURACY FOR PREDICTED VISCOMETRIC PROPERTIES

6% MATERIAL COST REDUCTION

BLEND RECOMMENDATIONS FROM WEEKS DOWN TO MINUTES