BIG CHEMISTRY

Accelerate formulation innovation

Science, autonomous labs and AI
for the formulation challenges industry needs to solve.



WHY BIG CHEMISTRY?

Formulation development is becoming increasingly complex. New sustainability requirements, changing ingredients, cost pressure and higher performance expectations require us to explore formulation spaces that are difficult to address through conventional experimentation alone.

Big Chemistry is building a new approach: predictive, data-driven and increasingly autonomous formulation development.

AI models are only as good as the data behind them.

Chemical data is often incomplete, inconsistent, or poorly standardized.

That's why we build our models on high-quality, self-generated data, ensuring the accuracy and reliability our customers need.

Our autonomous high-throughput laboratories generate structured and reproducible datasets, providing the foundation for predictive models, and Chemical AI.

FROM FORMULATION CHALLENGES TO SMARTER SOLUTIONS

Whatever your formulation challenge, Big Chemistry combines autonomous experimentation, high-quality data and AI to help you find better solutions faster.

REFORMULATE
Replace restricted or undesirable ingredients without losing performance.

OPTIMISE COST
Reduce formulation cost while maintaining quality and function.

GO GREEN
Explore bio-based, biodegradable and lower-impact alternatives.

DESIGN FOR SAFETY
Integrate human and environmental safety into formulation choices.

INCREASE ROBUSTNESS
Develop formulations that tolerate raw-material, processing and application variability.

ACCELERATE INNOVATION
Explore larger formulation spaces and identify promising solutions with fewer experiments.

OUR APPROACH

YOUR FORMULATION CHALLENGE → AUTONOMOUS LABS (High-throughput, self-driving labs) → HIGH-QUALITY DATA (Structured, reproducible, proprietary) → PREDICTIVE MODELS (AI & advanced analytics) → OPTIMISED FORMULATION

WE DON'T JUST AUTOMATE EXPERIMENTS.
We create data driven models that help you formulate better, faster and more sustainably.

Discover more on www.bigchemistry.nl

BIG CHEMISTRY

Autonomous labs
From experiments to predictive formulation.



Our autonomous labs drive high-throughput experimentation that turns formulation questions into high quality data, predictive models and optimised formulations.

DEFINE Scientific foundation → **EXPLORE** Autonomous experimentation → **LEARN** High-quality data → **PREDICT** Predictive models → **VALIDATE** Model validation → **OPTIMISE** Formulation optimisation

One platform, 26 autonomous labs in development, 6 ready to market, each designed around its specific formulation challenge.

Pendant Drop
SURFACE TENSION AUTONOMOUS LAB

The Pendant Drop autonomously measures the surface tension and interfacial tension between a solution and gas or between two liquids. Rapid characterisation across formulation space. Combined with automated formulation and AI, the system rapidly maps and optimises surfactant systems, reduces formulation development time and scales to high-performing formulations.

Formulon
FORMULATION SCREENING AND OPTIMISATION LAB

Formulon autonomously explores how formulation composition affects product features, sampling hundreds and stability, faster than traditional push/pull test cycles. It explores vast and diverse formulation spaces across a full suite of analyses to optimise multi-attribute, accelerating formulation optimisation.

COATMAT
COATING PERFORMANCE AUTONOMOUS LAB

COATMAT autonomously creates dry-coated particles at scale, enabling high-throughput formulation and analysis across a wide range of polymer chemistries. It delivers rapid insights into coating performance, allows precise control over coating performance, the platform enables data-driven optimisation of coating formulations.

PhaseXplorer
PHASE BEHAVIOUR AUTONOMOUS LAB

PhaseXplorer autonomously maps phase behaviour both rapidly and at formulation-relevant scales (g – L). It uses microfluidics and computer vision to enable high-throughput screening of phase diagrams up to 10 times faster than manual mapping, while maintaining full relaibility.

Foamatron
FOAM AND BUBBLE AUTONOMOUS LAB

Foamatron autonomously explores foam and bubble behaviour across formulation space. Automated generation and characterisation allows for formulation optimisation using AI, generating high-quality experimental data for formulation development and scale-up.

HLD
EMULSION DESIGN AND STABILITY AUTONOMOUS LAB

The HLD platform autonomously explores surfactant and oil combinations, structurally analyses emulsion systems, and rapidly generates phase behavior data. By mapping formulation spaces, HLD helps formulate stable emulsions with desired properties, optimises surfactant systems, and drives smarter, faster, data-driven emulsion development.

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