

Product Lifecycle Management

- Architecture Landscape
- Capabilities
 - Advanced Formulation Management - [Maturity: MEDIUM]
 - Integrated Regulatory Compliance - [Maturity: MEDIUM]
 - Sustainability and "Green Chemistry" Integration - [Maturity: MEDIUM]
 - Process Scale-Up and Transfer - [Maturity: MEDIUM]
 - Unified Data Management (Single Source of Truth) - [Maturity: MEDIUM]
- Enablers
- Solutions

Architecture Landscape

WIP

Capabilities

1. **Advanced Formulation Management** - [Maturity: MEDIUM]
 - a. Dynamic Formula Building: Directly manage formulations with linked ingredient properties and version histories, replacing static spreadsheets with "living" records.
 - b. Ingredient Traceability: Track raw material sourcing, supplier information, and chemical compositions.
 - c. Automated Calculations: Use built-in formulas to automate data entry for concentration, weight, and volume across different batch sizes.
2. **Integrated Regulatory Compliance** - [Maturity: MEDIUM]
 - a. Global Database Cross-Referencing: Systems can automatically check ingredients against global inventories such as REACH, GHS, or TSCA.
 - b. Safety Data Sheet (SDS) Generation: Automate the creation of SDS and labels based on the specific chemical properties of a formulation.
 - c. Early Compliance Risk Assessment: Identify potential regulatory hurdles early in the design phase to avoid costly late-stage reformulations.
3. **Sustainability and "Green Chemistry" Integration** - [Maturity: MEDIUM]
 - a. CO Footprint Analysis: Estimate emissions for raw materials and finished products during the R&D phase.
 - b. Eco-Friendly Alternatives: AI-driven tools can suggest more sustainable chemical substitutes during formulation.
 - c. Lifecycle Impact Evaluation (LCA): Assess environmental impacts from inception through disposal.
4. **Process Scale-Up and Transfer** - [Maturity: MEDIUM]
 - a. Lab-to-Plant Consistency: Manage critical process parameters (CPPs) and equipment settings as a formula moves from lab scale to pilot and full production.
 - b. Yield & Waste Optimization: Predict and minimize waste through optimized resource management and raw material usage.
5. **Unified Data Management (Single Source of Truth)** - [Maturity: MEDIUM]
 - a. Integration with Lab Systems: Connects R&D data directly with Laboratory Information Management Systems (LIMS) or Electronic Lab Notebooks (ELN).
 - b. ERP Synchronization: Ensures formulation updates and material substitutions are immediately reflected in Enterprise Resource Planning (ERP) systems for procurement and manufacturing.
 - c. Scientific Data Capture: Stores molecular structures, molecular models, and test results alongside standard business documentation.

Enablers

Solutions