

Procurement Planning and Blending Optimization for Tea and Coffee Manufacturing

Tea and coffee manufacturers operate in highly volatile environments where raw material quality, crop yield and specifications, and market prices change continuously. Despite this variability, every blend must consistently meet strict taste and quality expectations.

Procurement and blending decisions are tightly connected. Sourcing choices directly influence formulation feasibility, cost exposure, and final product quality. Unlike fixed-recipe manufacturing, tea and coffee blends are defined by taste and quality specification boundaries rather than exact formulations, requiring continuous adjustment as material conditions evolve.

When recipes are flexible and conditions shift rapidly, fragmented data and static planning approaches make it difficult for teams to respond with confidence.

ICRON's AI-driven Procurement Planning and Blending Optimization brings structure, visibility, and analytical clarity to this complexity. By optimizing procurement options and blend formulations together, it enables manufacturers to balance quality, cost, and supply resilience in fast-changing conditions.

Key Challenges

› Origin and Seasonal Variability

Flavor, aroma, moisture, and yield attributes vary by origin, harvest, and season. This variability reduces the reliability of historical assumptions and complicates consistent blend design.

› No Fixed Recipes, Only Boundaries

Tea and coffee blends evolve continuously based on material availability and quality, and planning must manage this flexibility without increasing operational or quality risks, while keeping blends within defined acceptable quality boundaries.

› Procurement Cost Volatility

Prices fluctuate by origin, grade, and contract volume. Long-term sourcing decisions must balance cost exposure with quality requirements under uncertain market conditions.

› Disconnected Decision-Making

Procurement, quality, and blending data often reside in separate systems. This fragmentation slows decision-making and limits visibility into how sourcing choices affect final blends.

› Balancing Quality and Margin

Maintaining a consistent taste profile while controlling material costs requires tight coordination between procurement and blending decisions, as even a very small change in sourcing can impact taste consistency and brand perception.



The ICRON Solution:

Procurement Planning and Blending Optimization for Tea and Coffee Manufacturing

ICRON's AI-driven Procurement Planning and Blending Optimization connects sourcing and formulation decisions within a single planning framework. The solution captures real-world constraints across material attributes, quality specifications, procurement conditions, and operational limits to reflect how tea and coffee manufacturing truly operates.

Rather than relying on fixed recipes, the solution evaluates blends within defined sensory and quality boundaries, allowing planners to adapt formulations while preserving taste consistency.

By evaluating procurement options and blend formulations together, planners gain clear, data-driven guidance on which combinations are feasible, cost-effective, and aligned with quality targets. Scenario-based analysis allows teams to compare alternatives, anticipate risks, and respond proactively to market volatility and material variability.

This integrated approach replaces reactive adjustments with structured, transparent planning and strengthens confidence in every procurement and blending decision.



Capabilities

Dynamic Blend Generation

- Creates feasible blends within defined sensory and specification boundaries
- Accounts for flavor, aroma, moisture, and attribute ranges specific to tea and coffee
- Adapts formulations based on changing origin quality and availability
- Reduces manual trial-and-error in blend design

Integrated Planning Inputs

- Combines procurement, inventory, and quality data
- Aligns sourcing decisions with blending feasibility
- Ensures consistent decision logic across teams

Cost and Carbon-Aware Sourcing Optimization

- Evaluates sourcing options across origins, grades, and suppliers
- Balances quality targets with raw material cost constraints
- Supports trade-off analysis between premium quality inputs, cost and carbon efficiency

Scenario-Based Planning

- Evaluates the impact of price volatility and harvest variability
- Compares alternative sourcing and blend strategies under changing sensory constraints
- Supports proactive planning under uncertainty

End-to-End Decision Transparency

- Explains why blends meet or fail specifications
- Highlights key constraints influencing each decision
- Improves collaboration between procurement, quality, and blending teams through shared decision logic



Results

➤ Up to **30%** reduction in raw material and purchasing costs

➤ Up to **27%** improvement in carbon efficiency

➤ **85%** faster planning and optimization cycles

➤ Consistent blend accuracy meeting quality requirements

➤ **5%** reduction in overall inventory levels

➤ Stable taste and aroma across batches