



ALTERNATIVE MILKS

**Engineer the process.
Perfect the pour.**

Soy • Almond • Coconut



From raw ingredient to finished beverage.

Milling • Extraction • Mixing • Homogenization
Pasteurization • UHT • Packaging

One group.

A complete process strategy.

Start with the beverage. Engineer every interface.

01 | AIS

Receive, store and dose bulk ingredients, powders and liquids.



02 | DP

Select size-reduction equipment around feed condition, solids and target particle size.



03 | QuantumX

Batch blending, jacketed holding and formulation vessels.



04 | EmulXion

Powder induction, high-shear dispersion, emulsification and high-pressure homogenization.



05 | PreciXion

Filling and packaging configured for the product and pack format.



06 | InspeX

Metal detection and checkweighing selected for the product and package.



07 | ThermoFlow

Optional drying pathways for suitable ingredients and coproducts.



08 | Fuxion

Optional extrusion for formulated ingredient or coproduct development.



PROC-X LINE ENGINEERING

Define extraction, separation, thermal processing, hygienic storage, CIP, controls and packaging interfaces as one project.

Specialist modules and aseptic scope are specified and confirmed for each line.



Core beverage route first.
Optional value recovery where justified.

Soy milk

**Build the protein base.
Control the flavor.**

From bean to beverage

- 01 Receive and prepare**
Clean and sort beans. Dehull and hydrate where the selected route requires.



- 02 Wet-mill and extract**
Meter water and prepared beans. Control slurry solids, grinding intensity and temperature.



- 03 Manage the heat history**
Select heating before, during or after grinding to manage beany flavor and deactivate trypsin inhibitors.



- 04 Separate or retain fiber**
Remove okara for an extracted beverage, or develop a whole-bean route with appropriate particle-size control.



- 05 Formulate and homogenize**
Standardize protein and solids. Disperse ingredients and develop the required mouthfeel.



- 06 Preserve and package**
Apply the validated chilled or shelf-stable route, then fill, inspect and release.



PROC-X ANSWER

AIS controlled dosing / DP size reduction / QuantumX blending / EmulXion dispersion and homogenization / coordinated thermal and separation scope / PreciXion and InspeX pack handling.



- Track:** protein recovery • flavor • particle size • residual inhibitor activity

Extraction heating and final preservation serve different duties; validate both for the selected recipe.

Almond milk

**Smooth texture. Delicate flavor.
Designed stability.**

Choose the right starting point

01 Whole nut or paste?
Whole or blanched almonds need preparation and grinding. A purchased paste changes the front end of the line.



02 Prepare and wet-mill
Clean and sort. Use hydration or blanching where required, then meter water and reduce particle size.



03 Refine the texture
Select filtration or separation for the desired fiber level. Balance smoothness against ingredient recovery.



04 Blend and homogenize
Standardize solids, disperse recipe ingredients and refine the emulsion. Confirm stability after heat treatment.



05 Heat, fill and protect
Select a validated chilled or aseptic route. Match the package barrier, closure and distribution conditions.



PROC-X ANSWER

DP milling selection / AIS ingredient dosing / QuantumX batch control /
EmulXion powder wetting and homogenization / PreciXion filling / InspeX pack checks.



WHOLE-NUT ROUTE:
preparation, milling and
optional separation.



PASTE ROUTE:
controlled unloading,
dilution and dispersion.

Prove the pour: sedimentation • creaming • mouthfeel • coffee compatibility

Soy and almond changeovers require validated allergen cleaning and recipe control.

Proc-X engineering brings equipment selection,
controls, utilities and line integration together.

procxinc.com | 04



Coconut milk

**Control the fat phase.
Preserve the character.**

From kernel or cream to beverage

- 01 Select the feedstock**
Start with prepared fresh kernel, coconut milk or cream. Define incoming fat, solids and microbiological quality.



- 02 Grind and extract**
For a kernel route, wash and comminute, then press or extract and remove coarse fiber.



- 03 Standardize the recipe**
Meter water and coconut base. Control fat and solids; disperse permitted recipe ingredients uniformly.



- 04 Build the emulsion**
Control mixing temperature and homogenization duty. Test creaming, oiling-off and heat stability.



- 05 Preserve and fill**
Use a validated chilled, UHT-aseptic or in-container sterilization route matched to the package.



Proc-X ANSWER | Coconut milk beverage line

AIS metering / DP preparation and milling selection / QuantumX blending and temperature control / EmulXion emulsification and homogenization / coordinated thermal processing / PreciXion filling and InspeX checks.



A COCONUT BEVERAGE IS NOT COCONUT WATER.

Coconut milk is an extracted fat-containing emulsion. Its stability and thermal behavior require a different process.

- Track:** • fat content • droplet size • creaming • flavor • package integrity

Milling & extraction

Release the value. Refine the texture.

| 01

DEFINE THE FEED

Whole beans, nuts, kernel, flour and paste need different preparation. Match the mill to moisture, fat, fiber and incoming particle size.



| 02

CONTROL THE SLURRY

Meter water and solids together. Manage residence time, temperature rise and recirculation to avoid inconsistent extraction.



| 03

CHOOSE THE SEPARATION

Screening, pressing or centrifugal separation may follow extraction. Select the method around fiber level, solids recovery and hygiene.



| 04

CLOSE THE MASS BALANCE

Measure beverage yield, solids in the liquid and losses in the residue. More intense grinding is not automatically the best route.



DP + AIS + PROC-X ENGINEERING

Feed preparation and size-reduction selection, controlled dosing and coordinated extraction interfaces.



EXTRACTED BEVERAGE

Separate coarse solids to target smoothness; manage wet residue promptly.



WHOLE-INGREDIENT BEVERAGE

Retain more solids where the product concept supports it; prove particle size, viscosity and storage stability.

Build the beverage.

Engineer the stability.

Mixing, dispersion and homogenization have distinct jobs.

01 Dose to the recipe

AIS meters the base, water and minor ingredients. Record additions and batch identity.



02 Wet and disperse

EmulXion powder induction and high shear help disperse proteins, cocoa, stabilizers and fortification premixes.



03 Hydrate and blend

QuantumX vessels provide controlled agitation, temperature and hold time suited to the formulation.



04 Refine the emulsion

EmulXion high-pressure homogenization reduces fat-droplet size. Select pressure and staging through trials.



05 Manage entrained air

Evaluate vacuum deaeration where foam or oxygen affects processing, filling or product quality.



TEST THE FINISHED PRODUCT

Confirm viscosity, droplet and particle distributions, creaming, sedimentation and sensory quality after the selected heat treatment.



Barista formats:
test steaming,
foam and coffee
compatibility.

Homogenizer position depends on the thermal route. Downstream aseptic operation requires an aseptic-rated system.

Preserve the beverage.

Validate the heat process.

Pasteurization and shelf stability are different design duties.

01

CHILLED PASTEURIZED

Validated pasteurization, rapid cooling and hygienic filling. Maintain the specified cold chain through distribution.



02

UHT + ASEPTIC

Validated UHT treatment with aseptic downstream equipment, sterile product handling and an aseptic package system.



03

IN-CONTAINER STERILIZATION

Fill and hermetically seal a compatible package, then apply a validated retort process where the product concept supports it.



PRODUCT

pH, solids, viscosity, particles and initial microbial load.



QUALITY

flavor, color, protein stability and emulsion behavior.



EQUIPMENT

heat-transfer duty, fouling, cleanability and recovery.



CONTROL

verified temperature, flow, holding time and deviation handling.

Pasteurization alone does not make a low-acid plant milk shelf-stable.

The recipe, thermal process, hygienic system and package must be validated together.



PROC-X ANSWER

Coordinate formulation, homogenizer location, heat-exchanger selection, utilities, controls and filling interfaces. Confirm specialist thermal and aseptic modules in the project scope.

Protect the pour. Finish with control.

Packaging is part of the preservation system.

01 Match the package

Select bottle, carton or other format around the preservation route, oxygen and light barrier, closure and distribution.



02 Control the fill

PreciXion filling scope addresses viscosity, foam, fill accuracy, pack format and changeover requirements.



03 Protect hygiene

Define the filling environment and product-contact cleaning. Aseptic products require a validated aseptic filling system.



04 Inspect and verify

InspeX metal detection and checkweighing are configured for the product and pack. Confirm reject handling and challenge checks.



05 Code, release and trace

Verify closure integrity, coding, batch identity and release records. Maintain the required storage conditions.



PLACE INSPECTION WHERE IT WORKS

Conductive products and metalized or foil packaging affect metal detection. Select upstream or finished-pack inspection from application trials.

PROC-X ANSWER

Coordinate filling, closure, conveyors, inspection and line controls around the finished package.

| A conventional hygienic filler does not become aseptic simply by filling a UHT-treated product.

Three products. Three process strategies.

Build the line around the recipe and route to market.



01 | CHILLED SOY MILK

Clean and prepare / wet-mill and extract / controlled heat treatment and okara separation / formulate and homogenize / validated pasteurization and cooling / hygienic filling / inspection / cold chain.

Focus: protein recovery, flavor and validated heat history.



02 | ASEPTIC ALMOND BEVERAGE

Prepare nuts or unload paste / mill or disperse / optional fiber separation / formulate and homogenize / validated UHT / aseptic handling and filling / pack checks.

Focus: smoothness, sedimentation, heat stability and package integrity.



03 | COCONUT MILK BEVERAGE

Unload coconut milk or cream / meter water and ingredients / blend and emulsify / homogenize / validated thermal route / compatible filling and sealing / inspection.

Focus: fat standardization, creaming and sensory quality.



ONE ENGINEERING BASIS

AIS + DP + QuantumX + EmulXion + PreciXion + InspeX, with extraction, separation and thermal modules defined for each project.



SIZE THE WHOLE LINE

Raw-material form • hourly output • batch strategy • pack format • storage route • cleaning cycle • available utilities

Concept sequences are refined through trials. Homogenization and heat-treatment order may change with the product and equipment.

Prove the process. Then scale with confidence.

Define acceptance before equipment selection.

01

Product trials

Use the intended raw materials and recipe. Measure solids recovery, particle size, viscosity, emulsion stability and sensory quality.



02

Thermal validation

Establish the process with qualified specialists. Confirm microbial targets, temperature-time performance and deviation handling.



03

Hygiene and changeover

Design for cleanability. Validate CIP coverage, cleaning parameters and allergen removal for the actual product range.



04

Factory and site acceptance

Agree FAT and SAT criteria for dosing, controls, throughput, filling and reject functions. Separate equipment tests from shelf-life validation.



05

Shelf-life and release

Evaluate microbiology, separation, flavor and package integrity under the intended storage and distribution conditions.



ENGINEERING DELIVERABLES

Process basis • equipment specification • GA • P&ID • utilities • control philosophy • cleaning strategy • acceptance plan



OPERATING VALUE

Assess yield, energy, water, cleaning time, product loss and service access together.

Your ingredients. **Our process expertise.** Let's build your next plant-based beverage line.

From milling and extraction to formulation,
thermal processing and the finished pack.



OFFICES & REGIONAL PRESENCE

United States — Kansas City • Phoenix
United Kingdom • Poland
United Arab Emirates • India • Brazil

REGIONS WE SERVE

North America • UK & Europe • Middle East • South Asia • Latin America

www.procxinc.com

john.paul@procxinc.com

Office: +1 872 260 5071

Direct: +1 872 260 6701