

Natural Product Extraction Unit Operations Training Pilot Plant

Item Number: LPK-IGNE



Introduction

Integrated natural product extraction pilot plant for chemical engineering training bridges theory and industrial practice with modular extraction and evaporation/concentration units, hybrid touchscreen and manual control, realistic process simulation, and self-contained softened water and vacuum utilities.

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Module	Key Functions & Components	Technical Specifications
Public Unit	Supplies softened water, cooling water, pressurization, and vacuum systems to support the entire plant operations.	- High-quality aluminum alloy frame with casters - Dimensions: $\leq 2200\text{mm} \times 1120\text{mm} \times 2310\text{mm}$ - On-site touchscreen control
Extraction Unit	Performs steam stripping, quantitative solvent feeding, solid-liquid extraction, filtration, and gravity oil-water separation.	- High-quality aluminum alloy frame with casters - Dimensions: $\leq 2200\text{mm} \times 1120\text{mm} \times 2310\text{mm}$ - On-site touchscreen + manual hybrid operation
Evaporation and Concentration Unit	Supports external circulation concentration, internal circulation concentration, solvent recovery, and cyclic solvent utilization.	- High-quality aluminum alloy frame with casters - Dimensions: $\leq 2200\text{mm} \times 1120\text{mm} \times 2310\text{mm}$ - On-site touchscreen control

Pilot Plant Operation / Module	Associated Unit Operation	Relevant Concepts in Classic Textbooks
Solid-Liquid Extraction	Leaching / Solvent Extraction	Mass transfer theories, solvent selection, equilibrium stages, and extraction kinetics.
Steam Stripping & Solvent Recovery	Distillation & Stripping	Vapor-liquid equilibrium (VLE), boiling point elevation, condensation, and fractional distillation principles.
Internal / External Circulation Concentration	Evaporation	Heat transfer coefficients, boiling-liquid heat transfer, single/multiple-effect evaporation, and thermal efficiency.
Gravity Settling / Phase Separation	Liquid-Liquid Separation	Decantation, density-driven separation, phase equilibrium, and fluid mechanics of immiscible liquids.