Plant-Based Protein Solutions

Integrated Solutions for Next-Generation Products

KOVALUS
Separation Solutions™

The KSS Advantage

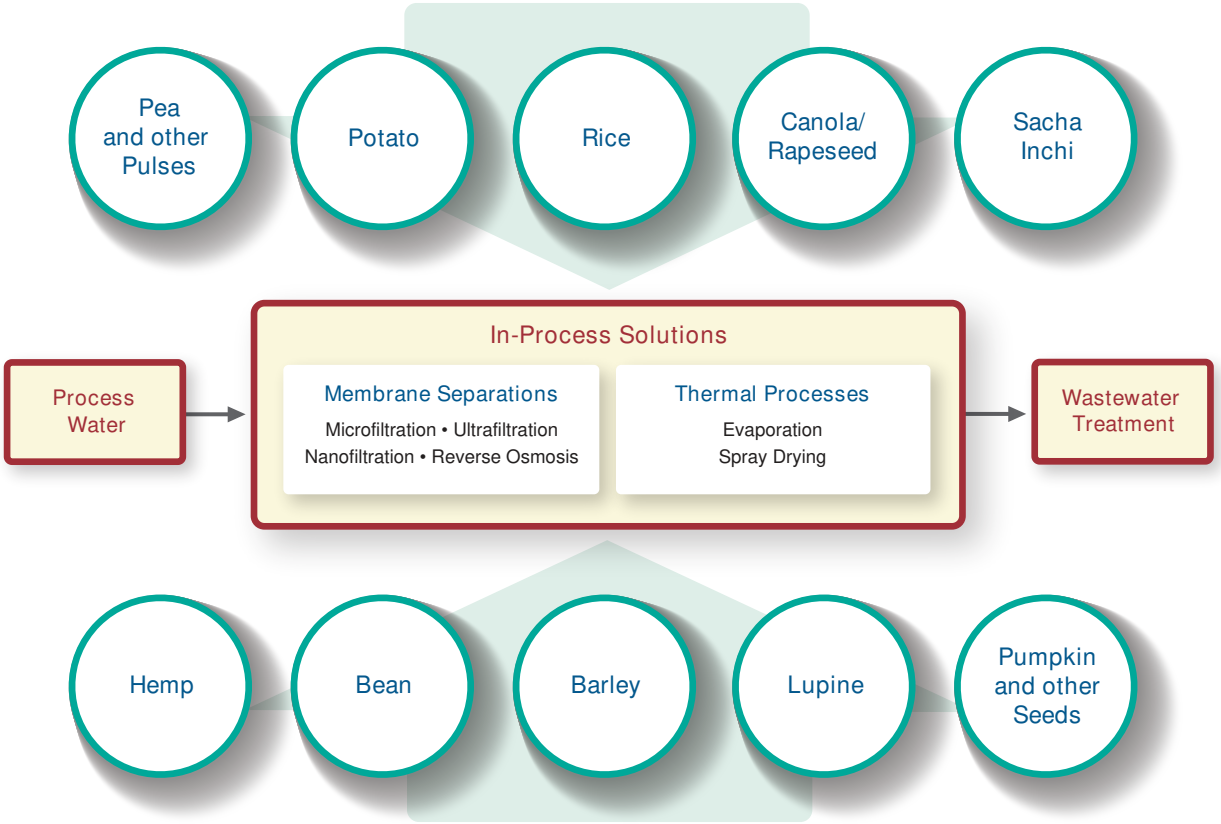
KOVALUS SEPARATION SOLUTIONS™ (KSS) is transforming the landscape of separations by leveraging a synergistic approach using technologies such as membrane filtration, ion exchange, evaporators, and dryers. Our solutions are tailored to improving product quality, increasing process efficiency, and driving down costs in dairy, food, beverage, life science, and industrial markets around the world.

Together with RELCO®, a trusted manufacturer of evaporators and dryers, KSS offers a comprehensive, start-to-finish solution for food industry customers. Our combined separations expertise allows us to offer superior concentration and purification technologies to emerging plant-based ingredient manufacturers. KSS is committed to working collaboratively with customers, seeking out the greatest value-add solutions that fit their unique processes.

Achieving Sustainability in the Plant-Based Protein Market

The market for plant-based protein is rapidly growing as the popularity of animal-based protein alternatives expands and drives consumer trends. Health and environmental benefits of plant-based foods contribute to the increased demand as consumers strive to eat sustainably and producers aim to reduce emissions.

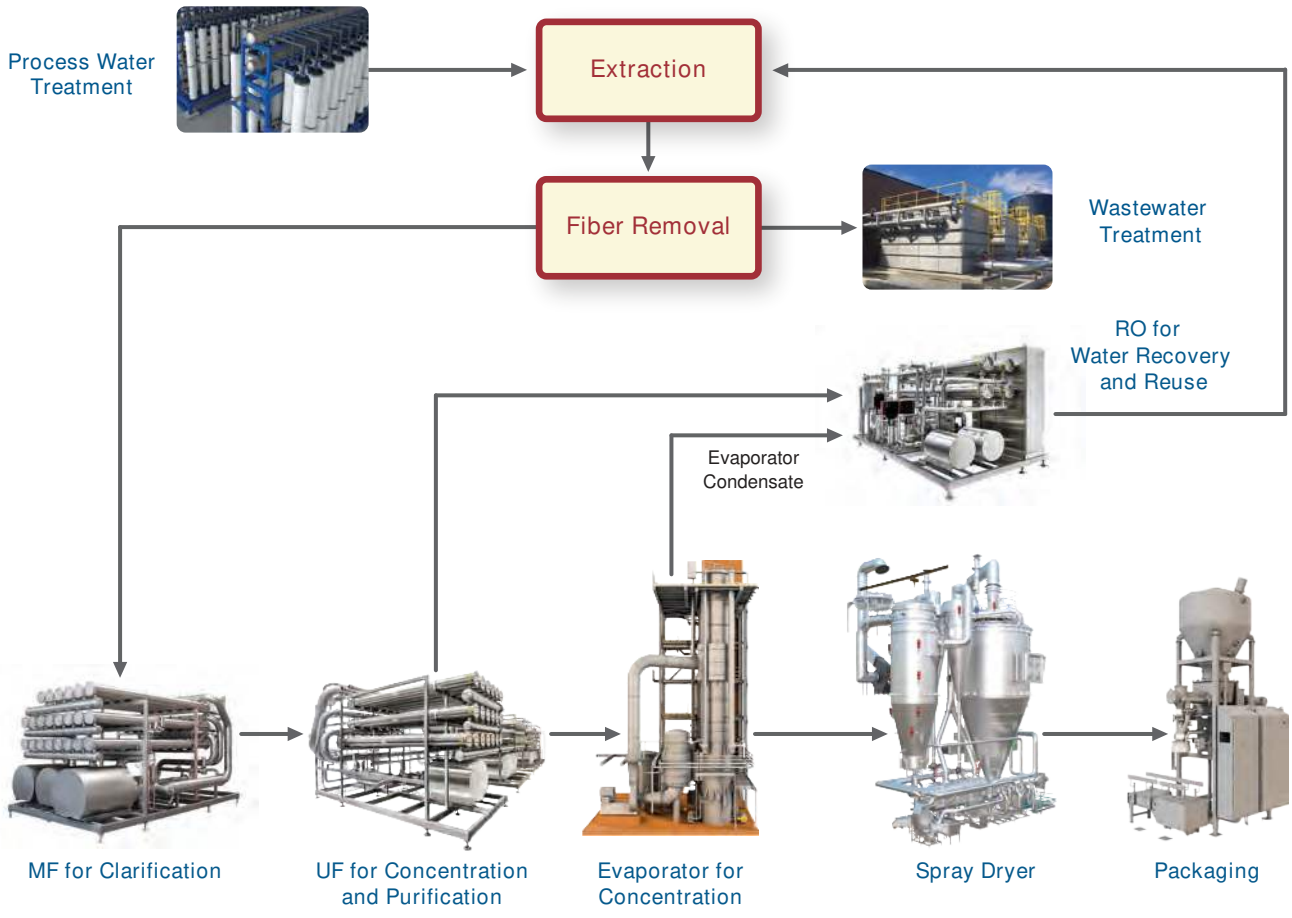
At KSS, we share this commitment to achieving sustainability through innovative separation solutions. Our membrane and thermal technologies have been designed and engineered to meet the high processing standards and overcome the complexities unique to the plant-based protein market.



The KSS Advantage

Plant-Based Protein Separations

KSS offers complete, integrated solutions for the plant-based protein market. Whether it be for clarification to remove starch or bacteria, concentration and purification of the target protein, or spray drying to achieve an optimal powdered protein product, KSS is ready to help every step of the way to develop an innovative and effective solution for achieving the desired product quality.



Major Applications

Advanced Membrane Filtration

The use of membrane technology in the plant-based protein industry is growing as producers realize its benefits over conventional separation methods. The highly selective nature of membranes allows for precise separation of targeted components such as valuable proteins, which helps overcome challenges posed by conventional technology.

Challenge	Benefits of Membrane Technology
Protein yield and purity	• High protein retention ensures minimal protein loss • Selective concentration of native protein while contaminants are discarded
Protein functionality	• Enhance protein functionality and value through more gentle processing technique
Equipment lifetime and chemical consumption	• Eliminate chemicals required for isoelectric precipitation, extending equipment lifetime and driving down repair costs
Waste generation and process sustainability	• Simplify wastewater treatment by reducing chemicals found in waste streams • Improve process sustainability through water reuse

Clarification, Concentration, and Purification of Protein with Membranes

KSS can help you select the most suitable membrane from our diverse portfolio of configurations and pore sizes to achieve optimal separation of your desired protein. We offer membranes in hollow fiber, tubular, and spiral wound configurations. Organic (polymeric) and ceramic options are available.

- **Clarification:** Microfiltration (MF) can be used to remove starch, fat, bacteria, enzymes, and other large contaminants from protein solutions while maintaining protein quality and functionality.
- **Concentration & Purification:** Our spiral or hollow fiber ultrafiltration (UF) membranes can be used to concentrate proteins to achieve a high-purity final product.
- **Permeate Recovery Or Evaporator Condensate Recovery:** KSS reverse osmosis (RO) membranes improve process sustainability through reduced water consumption while promoting water recovery and reuse.

Major Applications

Best-in-Class Membrane Systems

KSS membrane systems are the optimal solution for plant-based protein separation processes around the world. We offer both standard and custom-designed and engineered systems to meet customers' specific needs. With our product diversity and wealth of expertise in membrane technology, our team is positioned to identify the best solution for a range of plant-based protein processes.

Benefits:

- High productivity
- Energy efficient operation
- Reduced operating costs and water consumption
- Advanced remote monitoring and control options
- Unparalleled customer service and support through KSS ASSIST™
- Long operating life
- Robust sanitary construction

Water & Wastewater Treatment

KSS offers industry-leading water and wastewater membrane-based solutions to improve process economics and promote sustainability. Our wastewater systems are robustly designed to reduce contaminants

- **Process Water Treatment:** Our PURON® MP hollow fiber system offers a low maintenance, cost-effective, and reliable solution for incoming process water treatment. The system features a strong, virtually unbreakable hollow fiber membrane for extended membrane lifetime.
- **Wastewater Treatment:** The INDU-COR™ HD external MBR features a tubular crossflow membrane for optimized system performance and footprint. For a low-energy operation, our PULSION® immersed MBR features our virtually unbreakable hollow fiber membrane for effective removal of organics and solids.
- **High-Purity Water Applications:** The FLUID SYSTEMS® NF and RO systems polish effluent from MBR, MF, or UF to produce high quality water for reuse.

Major Applications

RELCO Evaporation & Drying Solutions

KSS offers RELCO® technology including evaporators and dryers for dairy, food and beverage, and life science applications.

RELCO evaporator systems combine cutting-edge technology with basic thermal concentration principles to provide no-hassle systems and equipment that increase production while using less energy.

- A variety of configurations to meet specific requirements
- Custom systems available for a range of total solids concentrations
- Suitable for stand-alone processing or integrated with drying or other functions
- Operate with high efficiency and produce stable final concentrations

RELCO dryers are ideal for processing high-value products such as protein concentrates, isolates, and hydrolysates made from a variety of plant sources.

- A variety of dryer types and configurations to meet specific requirements
- Customizable to meet specific quality standards and product properties
- Low capital and operating costs
- Designed with operator safety and feasibility in mind

Powder Handling & Packaging Equipment

For a complete processing solution, we provide conveying systems, packaging systems, bulk bag fillers, powder gassing and blending equipment to fulfill food processing needs.

- High-rate transfer of fragile powders by pressure or vacuum
- Hygienic semi-automatic or automatic powder packaging lines
- Stable and accurate bag filling, simplified bag transport, and robust bag unloading
- Complete mixing, blending, and gassing of powders

Collaborative Innovation

For emerging businesses within the plant-based ingredients industry, KSS is the ideal partner to plan, develop, and build an effective and long-lasting process. From incoming process water treatment to in-process separations and wastewater treatment, KSS has the experience, technology, and drive to provide a comprehensive solution based on integrated complementary technologies.

We take a collaborative approach with our customers, combining our deep applications knowledge with their unique process expertise to develop the most transformative and value-added solutions. Through this approach and our wide selection of separation technologies, KSS is best positioned to offer customers a complete solution for producing a competitive plant-based protein product without the need to rely on multiple vendors.

EARLY-STAGE DEVELOPMENT

- Understand challenge & identify desired outcomes
- Evaluation of separation properties & bench testing
- Access to Process and R&D experts

FIELD TESTING

- Pilot testing
- Process optimization
- Full scale costing and design recommendation

FULL-SCALE EXECUTION

- Project management & execution of capital projects
- Construction and installation
- Commissioning and operator training

LONG-TERM SUPPORT

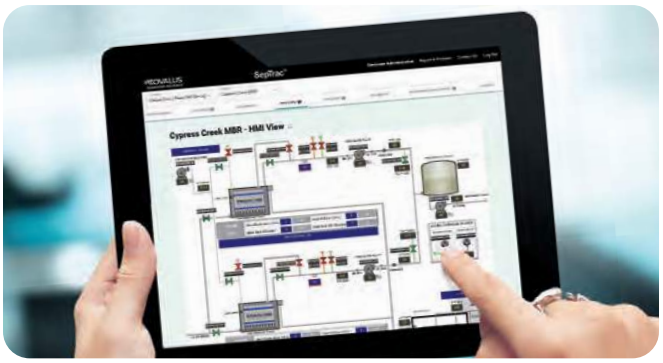
- Complete after-sales services
- System troubleshooting
- Performance optimization through remote digital monitoring program

KOVALUS SEPARATION SOLUTIONS

KOVALUS SEPARATION SOLUTIONS™ (KSS) is a global leader in separation technologies. With best-in-class domain expertise, technologies and systems, KSS is uniquely positioned to help customers purify and recover valuable process streams and achieve sustainability goals across food and beverage, life science, and general industrial markets.

Services & Support

After-Sales Services & Maintenance Programs • SepTrac™ Smart System



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KOVALUS
Separation Solutions™

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