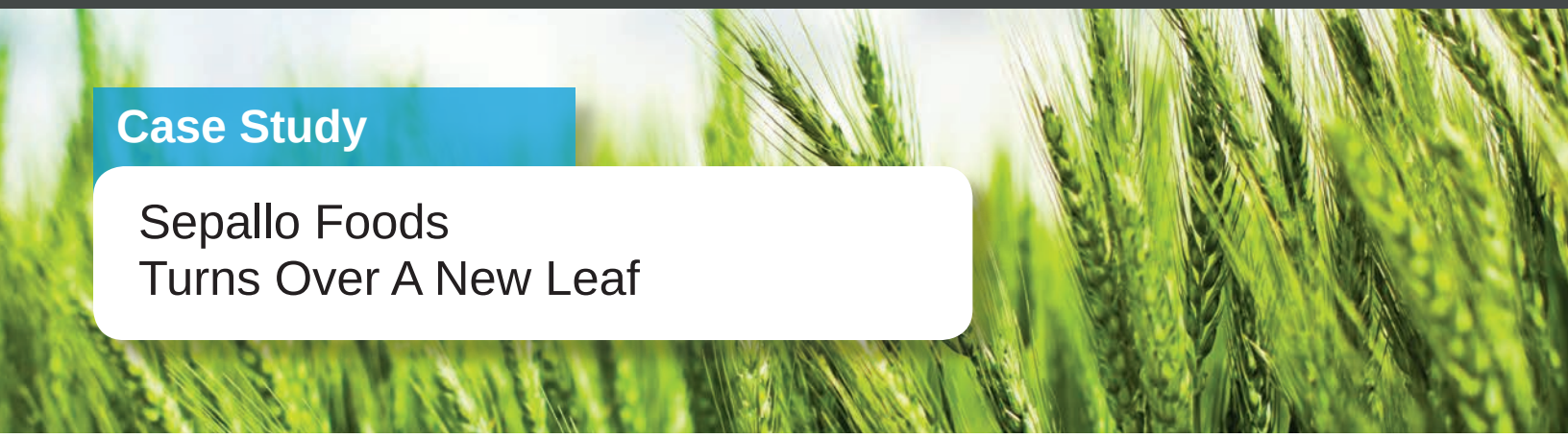


Case Study

Sepallo Foods Turns Over A New Leaf

Project Details

1. Location:
   Barrhead, Alberta, Canada
2. Application:
   Protein Concentration and Extraction from Green Juice
3. Product:
   SUPER-COR Ultrafiltration Tubular Membranes

Overview

Sepallo Food Ingredients produces a successful line of leaf-juice powders made from the leaves of wheat, barley, oat, and alfalfa. Sepallo markets these powders primarily as bulk ingredients to manufacturers in the food and natural products industries throughout North America, either as a stand-alone product or as a base in other products.

When Sepallo discovered that the majority of these leaves contain extremely high levels of protein, a new product opportunity was born. However, extracting the protein from the juice using traditional methods, such as centrifugation or heat processing, presented a number of technical challenges, including low protein yield, maintaining protein structure and purity, and preserving product color.

The Challenge

To create a cold process system to separate protein from other nutrients in green leaf juice in a way that does not denature the protein or damage the substrate (i.e., change the color), extract a protein content of at least 70 percent in the final product, and develop a process that can be executed on a large enough scale to be commercially viable.

The Solution

Koch Membrane Systems (KMS) provided Sepallo Foods with a small, two-membrane “proof of concept” pilot system to determine which membranes would produce the desired end products. Working with KMS’ Process Engineering Group, Sepallo was able to quickly identify the processing parameters that would help shape the final system design.

Satisfied with the success of the pilot project, Sepallo commissioned the KMS Systems Engineering Group to construct a full scale membrane filtration system.

The system is comprised of 24 SUPER-COR™ HFM-513 ultrafiltration tubular membranes, and performs in an exceptional manner. The SUPER-COR membranes, which are designed specifically for clarification of high solids liquids, provide an extremely high product yield – as high as 98 percent in some cases. Product pre-processing is not required in this case, which helps eliminate the use of diatomaceous earth and fining agents, along with their associated maintenance and disposal costs.

SUPER-COR’s unique transparent module housing makes it easier for operators to inspect the product during processing and the durability of the membranes translates to long operational life.

KOCH MEMBRANE SYSTEMS®

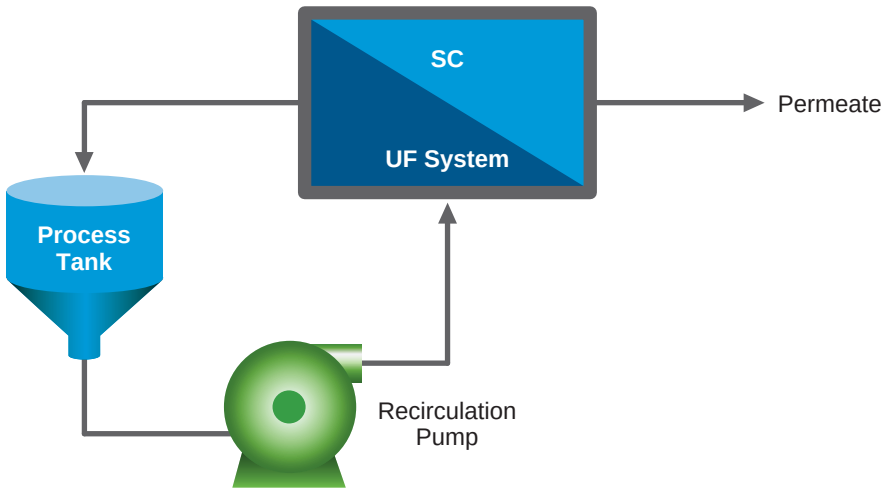
According to Brad McNish, Founder and President of Sepallo Food Ingredients, the system has exceeded expectations, as has the service KMS provided along the way. “Koch Membrane Systems really stepped up to the plate in terms of problem solving and tweaking the system,” he says. “Considering the unique parameters of the application for KMS, I’d have to give them extremely high marks for their performance.”

The Membrane System

To begin the process, the leaves are pushed through a large screw press to extract the juice which is immediately chilled in an agitated tank. The next step concentrates the juice, preparing it to enter the filtration system. The juice is pumped into the “feed side” of the SUPER-COR modules and the pressure differential between the inside of the SUPER-COR tubes and the permeate or low pressure side pushes the liquid through the membranes. Typically, what is removed via the permeate stream are sugars, small carbohydrates, ash and various minerals.

The fluid is recirculated through the membranes until the desired concentration is achieved. The permeate is collected in the permeate tank. Sepallo personnel are able to determine how close they are to completing a batch based on levels of specific targeted components in the permeate.

Process Flow Diagram



For every 4 liters of juice that enters the system, about 1 liter of protein concentrate is generated. Thus, starting with 11,000 to 12,000 liters of juice per day, Sepallo produces about 450-500 kilos per day of finished powder. Turnaround time on a typical batch is about 16 hours; that is, from the time the system is switched on, the membranes are in use approximately 16 hours, after which they go through a Clean-in-Place (CIP) cycle to restore throughput and to maintain processing efficiency.

Monitoring of system operating parameters, including permeate flow rate, is handled via instrumentation designed and provided by KMS.

Product Overview

The use of SUPER-COR membranes for juice processing eliminates the need for pretreatment and the associated handling equipment and maintenance, saving time and money. SUPER-COR modules have a robust construction that supports the extended processing requirements of modern juice processing plants.

Each SUPER-COR system permits easy installation and comescomplete with pumps, motor, controls, piping, valves and instrumentation to control a continuous topped-off batch process.

- Higher product yield
- Long membrane life
- Three membrane pore sizes available
- Three and 4.3-inch diameter modules in 10 and 12-foot lengths.
- Six modular system sizes for any production requirement.

KOCH MEMBRANE SYSTEMS®

Koch Membrane Systems, Inc.
850 Main Street, Wilmington, MA 01887-3388
Main: 1-978-694-7000 • Fax: 1-978-657-5208
Toll Free: 1-888-677-5624
Visit Our Web Site for International Contacts:
www.kochmembrane.com