

Case Study

A Clear Solution for Peterson Farms' Juice Making Operation



Project Details

Location: Shelby, Michigan

Application: Juice Clarification

Product: SUPER-G® Ultrafiltration Tubular Membranes

Overview

Peterson Farms is well-known for its line of frozen products, including apples, tart and sweet cherries, blueberries, peaches, and plums. The company, based in Shelby, Michigan, annually produces and markets over 125 million finished pounds of frozen fruit and asparagus.

In 1999, Peterson Farms established a juice processing operation to complement its frozen fruit production. More than five million gallons of juice flow each year from a state-of-the-art juice processing facility. Here, the by-products of the fresh-cut and frozen fruit production, including peels and cores, are processed along with whole apples to make juice of exceptional clarity and quality.

For nine months of the year, the system operates 24/7 and filters three 15,000-gallon batches of apple juice each day and up to 20,000-gallon batches per day during peak periods. Processing this volume of juice requires a durable and highly efficient filtration system.

The Challenge

To provide robust juice clarification technology able to handle a high volume of juice and yield an exceptional product.

The Solution

Koch Membrane Systems (KMS) SUPER-G® tubular membrane modules offer juice clarification technology for all juices and production requirements, and provide a significantly increased yield of high quality juice with less maintenance than conventional methods. KMS juice processing membrane systems remove suspended solids, colloidal haze particles, microorganisms, and undesirable proteins, leaving a crystal clear, flavorful juice. Peterson Farms employs a once-through batch process utilizing a system containing 96 horizontally-mounted SUPER-G modules. Each of the three-inch diameter modules contains four one-inch diameter tubes, ten feet in length, for a total membrane surface area of 9.3 square feet.

“We chose the SUPER-G tubular membranes because we wanted a filtration system that could maintain high flow rates,” said juice plant manager Abran Farias III. “That meant choosing a robust membrane system that would not clog easily. The SUPER-G membranes have far exceeded our performance expectations.”

“Our wholesale customers require that we deliver juice below 5.0 NTU, but we do much better than that, regularly exceeding our internal specifications

which call for less than 1.0 NTU. At Peterson Farms, we are very happy with the performance and maintainability of our membrane system,” says Farias. “We are getting three to four years of life out of the membranes, and the bottom line is that we have been able to consistently produce a high quality product. With apple juice, that means a juice with better clarity and color. And that means that people can enjoy drinking juice that is of the quality that people have come to expect of Peterson Farms.”

The Membrane System

Tubular membranes are designed to resist fouling and plugging in spite of the high concentration of solids in the feed stream, allowing the system to generate very high yields. During filtration, the juice is pumped along the inside of the tube while filtered juice permeates through the membranes to the outside of the tube. Tubular membranes use a tangential, or crossflow, design whereby process fluid is circulated along the membrane surface in a sweeping action.

This high tangential flow across the membrane surface helps limit membrane fouling. Moreover, the relatively large one-inch diameter SUPER-G® tubes enhance plugging resistance and improve yield. An additional advantage is that the SUPER-G tubular membranes are constructed of durable polyvinylidene fluoride (PVDF), which has been shown to be less prone to fouling than other membrane materials.

The resistance to fouling facilitates high stable flux rates and easy cleaning. The Peterson Farms juice plant is able to filter 50 gallons per minute.

“The only pretreatment implemented is to run the juice through a centrifuge in order to maintain high flux rates and to extend time between cleanings,” said Farias. “We are happy to avoid diatomaceous earth, fining agents, and other cumbersome and expensive pretreatment methods.”

At the end of each batch, the system is flushed with water. A once daily clean-in-place operation is required to remove fouling and avoid fermentation that could affect the taste. The CIP process uses caustic and caustic plus chlorine cycles. “The excellent cleanability of the membranes is critical, as any residual solids would quickly ferment at 120 degrees Fahrenheit, the temperature at which the juice is filtered,” explained Farias. The clear housing of the tubular membranes allows the operators of the filtration equipment to easily determine the existence and location of any problems. This has instilled confidence in the operators, who can ensure that the system is operating properly at all times.

Product Overview

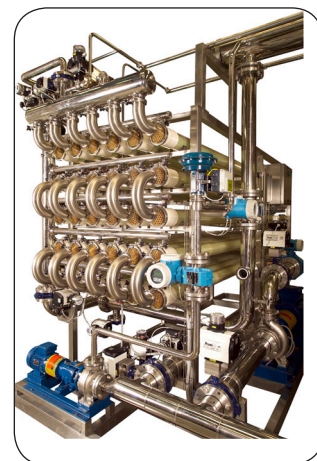
KMS offers the SUPER-COR® and SUPER-G UF and MF tubular membranes for clarifying light and dark juices. The proven performance and durability of the SUPER-COR and SUPER-G have made these modules the unsurpassed solution for superior juice clarification.

The SUPER-COR and SUPER-G modules enhance color, flavor, and stability without prefiltration, diatomaceous earth, or fining agents. SUPER-G modules achieve filtered juice yields of 98-99%, producing more juice per

bushel and higher profits per gallon. Available in a variety of configurations, SUPER-COR and SUPER-G modules provide high flux and high recovery for all juices and production requirements and have a robust construction that supports the extended processing requirements of modern juice processing plants.

Each SUPER-COR and SUPER-G system permits easy installation and comes complete with pump, motor, controls, piping, valves and instrumentation to control a 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, 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

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