



Food and Beverage

## More Value from Milk

With Pall comprehensive fractionation assortment

*Filtration. Separation. Solution.<sup>SM</sup>*

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# More value from milk with Pall comprehensive fractionation assortment

**Pall® crossflow membranes and chromatography sorbents equip process separation systems with new options for purifying milk proteins and peptides for higher yields and faster profits.**

Dairy manufacturers will benefit from extracting higher profit proteins and peptides from milk. Fractionation techniques have evolved dramatically in recent years. Techniques previously restricted to specialized laboratories, can now be performed at an industrial level. Chromatography technology is the ideal complement for the separation of pure milk into whey proteins, peptides, enzymes and growth factors.

Pall, the world's leading filtration, separation, and purification company, has acquired Biosepra. The Biosepra® product line provides qualified chromatography sorbents to food ingredients production. With this acquisition, Pall's product portfolio comprises a unique offering of preparative chromatography solutions.

## **Pall comprehensive fractionation assortment**

### **Consistency**

With total revenue of \$2 billion and more than 30 years serving the Food and Beverage industry, our reputation depends on consistency of performance - in products, in documentation, and in service and customer support systems. This principle is embedded in our culture.

### **Innovation**

In the development of dairy fractionation systems, it is necessary to think large and act small. Being a large company allows substantial knowledge and resources to be applied for product development. It also enables timely investment in the necessary validation and manufacturing programs to bring new products to market consistently and reliably. Pall knows the value of small teams, working with customers and other innovators to bring new ideas to fruition. The large product portfolio and the number of highly skilled teams result in numerous solutions - recognizing that each milk fractionation process is unique and makes specific demands.

### **Service**

With facilities and dedicated personnel in every global region, whether it is at the start of a project or after installation, a quick response is delivered in every case. Pall specialists are experienced and trained to reply to any questions on process development and operation, including general purification and filtration, instrumentation and documentation, as well as chromatography sorbents and crossflow membranes. Additionally, unique and valuable technology services exclusive to Pall, such as purification development using protein chips arrays, and column packing diagnostics, help deliver further advantages in speed and effectiveness of service.

# Membralox<sup>®</sup> ceramic membranes and modules

**Membralox** ceramic membranes are asymmetric membranes composed of porous support and filtering layers. Membrane materials (alumina, zirconia, titania) provide a high resistance to a wide range of pH, chemicals, temperature and pressure. High compactness of the multi-channel membrane combined with high permeability allow treatment of large volumes with high throughput.

The **Membralox** GP membranes have a longitudinal permeability gradient which allows for homogeneous and calibrated permeation along the flow channel resulting in marked improvement of utilization of membrane surface within a stable microfiltration regime.

## Applications

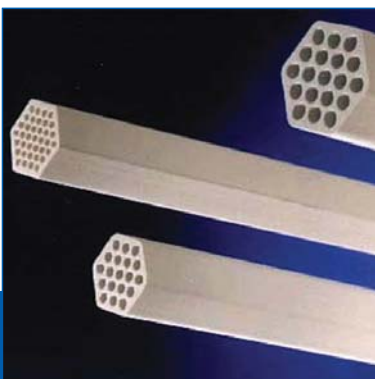
- Microbial removal from milk and whey
- Defatting of milk and whey
- Casein separation from whey proteins
- Protein standardization

## Features

- High flux
- High controlled selectivity
- Proven long operational life
- Wide chemical and pH (0-14) compatibility
- Excellent thermal stability
- Sanitizable and sterilizable
- 100% bubble point integrity testing
- Hydrodynamically optimized GP membranes
- Customized membrane configurations can also be proposed for the most demanding applications

## What does it mean for you? More productivity

- Significant increase in protein yields
- Selective separations between casein and soluble proteins
- Selective fractionation of high value milk components
- Longer service life, longer processing times
- Shorter and simpler cleaning cycles
- Typical 6 Log reduction of bacteria



Membralox membranes



Membralox modules



Membralox modules

# Pall Biosepra® chromatography sorbents

The dairy dedicated line of **Pall Biosepra** products comprises of different sorbents which are used to capture and purify proteins such as alphas-lactalbumin, beta-lactoglobulin, lactoferrin, and lactoperoxidase from milk and whey.

The **Pall** ceramic HyperD® range of sorbents are rigid porous beads, which are coated and permeated with a functionalized cation and anion exchange hydrogels. This gives the beads outstanding rigidity and flow performance as well as exceptional mass transfer and dynamic properties.

The SPEC 70 SLS sorbent is a spherical semi-rigid microbead of acrylic copolymers that generate low back-pressures at typical low pressure liquid chromatography process flow rates. The strongly-bound cation exchange groups, which are an integral part of the polymer structure, are found within its three dimensional structure. Each sub-unit of the polymer possesses hydrophilic groups which ensure biocompatibility and prevent non-specific adsorption.

## Applications

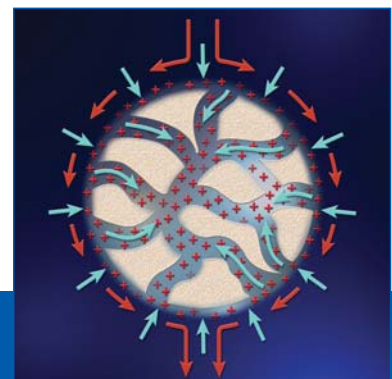
- Dairy protein capture and purification
- Dairy polypeptide and peptide purification

## Features

- High dynamic binding capacity at high flow rates
- Easy, simple cleaning with sodium hydroxide
- Allow large volume processing
- Not sensitive to fouling/clogging in viscous and/or lipidic solutions
- Highly resistant to microorganisms

## What does it mean for you? Cost effectiveness and high resolution

- High productivity, large throughput (up to 50000L/h of milk or whey)
- High molecule purity (> 85%)
- Easy and cost effective regeneration
- Long service life (typical 2 to 7 years)
- Short and simple cleaning cycles



Sorbent



# Microza\* PES hollow fiber ultrafiltration modules for dairy applications

Microza hollow fiber ultrafiltration modules comprise a unique double-skinned proprietary polysulfone membrane with dense internal layer. Currently available in 4000, 6000 and 10000 molecular weight cut-off, the modules are used in a range of applications including pyrogen removal from water, chromatography buffer solutions and protein concentration.

## Application

Concentration of protein downstream chromatography elution

## Features

- Double skin provides assurance of removal rating
- Combination of high strength and high flow due to unique membrane construction
- High strength fibres allow reverse filtration to reduce fouling
- Can be hot water sanitized up to 95°C (203°F)
- Compatible with a wide range of cleaning agents, up to 5000 ppm sodium hypochlorite or 4% sodium hydroxide

## What does it mean for you?

### Ease of use and productivity

- No recontamination of the concentrated protein
- High protein concentration and purification yields
- Long running time, low sensitivity to fouling
- Short and easy cleaning cycles



Microza module



Microza hollow fiber transversal cut



Microza hollow fiber



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## Pall Biosepra Chromatography Services

Supporting its global network of processing specialists, Pall also has additional customized services.

## On Protein Chip Purification Development and Identification

Available in Pall laboratories around the world, Protein Chip technology, used with arrays of sorbent chemistry provides a very fast method to assess samples for binding and elution of molecules under different conditions. This process development tool saves valuable time and generates more valuable information than conventional operation of small scouting columns alone. Samples may be assessed in our own laboratories and we can also work with customers to develop in-house capability. In addition to its use in purification development, this service can be used for expression monitoring and product analysis of protein.

## Packing Studies

The consistency in performance of a chromatography column is highly dependent upon the effectiveness of the packing method. Pall offers the ability to run trials, to optimize packing methods and confirm bed stability on repeated cycles.

## Process Optimization

By using some of these tools in tandem with all conventional methods we are ready to offer specific guidance where our own customer's resources may be stretched or where additional data is required quickly. In the most demanding critical situations we can often make the difference.

## Training

Based on a broad process expertise, Pall has developed training modules for many aspects of purification and separation technology including filtration and chromatography. They are both advanced scientific and at basic operator training levels. These services can be tailored to specific customer needs.

## Food Use Compliance

Please contact Pall for further information on regulatory food use compliance.

## What does it mean for you?

**A perfect match of your process needs with a comprehensive support and an optimized products assortment**



Pall Corporation

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