

# ADD VALUE TO YOUR WHEY

with membrane filtration



# FROM WASTE TO VALUE

**Tetra Pak is the world's leading food processing and packaging solutions company. Working closely with our customers and suppliers, we provide safe, innovative, and environmentally sound products that each day meet the needs of hundreds of millions of people in more than 170 countries around the world. With over 25,000 employees based in over 85 countries, we believe in responsible industry leadership and a sustainable approach to business. Our motto, "PROTECTS WHAT'S GOOD™," reflects our vision to make food safe and available everywhere.**

Tetra Pak's expert centre for membrane filtration is Tetra Pak Filtration Solutions, a world-leading hub for advanced liquid separation solutions to the global food & dairy industry. We offer an unmatched range of filtration processing solutions for value-added products and optimised process economy. As an innovative company, Tetra Pak Filtration Solutions cooperates with customers, universities, and other business partners on an ongoing basis in order to develop new applications of separation technologies and constantly push performance. We are located in Silkeborg, Denmark, and Champlin, USA.

**Tetra Pak Filtration Solutions offers complete solutions and have the experience and expertise to ensure maximum processing efficiency and top quality products.**

**Contact us – and let's help you add more value to your whey.**

Whey is a significant by-product of dairy processing. Formerly used for animal feed or simply dumped as waste, it is now contributing positively to the profitability of the dairy industry.

## The nature of whey

Whey consists of 94% water and 6% dry matter, made up of proteins, vitamins, minerals, and lactose. By means of ultrafiltration, these valuable components can be separated from the water and further processed.

## Whey protein – what is it used for?

Over the last 30 years, a wide range of whey-based ingredients has been developed for different uses, above all for food functionality and nutrition, as whey proteins have great functional properties as well as a high nutritional value.

Today, dairy ingredients is one of the fastest growing businesses in the dairy industry worldwide. Membrane technology is used in the production of bulk and specialty products like WPC35, WPC80, whey protein isolate (WPI), demineralised whey, and hydrolysed whey fractions.

WPC improves the texture of yoghurts, cheese, ice cream, meat products etc. It is used as a stabiliser in desserts, sweets, and bakery products, and it extends the yield and replaces fat in a variety of products.

Infant formula is one of the businesses driving the development of new whey-based ingredients, because there is a growing demand for more human-like formula-



tions. In this process, membrane filtration is the most commonly used technology.

The ability to reduce unwanted microorganisms in product streams makes membrane technology extremely useful in the development of new ingredients as well as in food safety generally.

## Environment

Many different factors in the production can be part of environmental considerations, such as raw materials, water, cleaning chemicals, and waste. Membrane filtration has proven to be a strong technology for solving these challenges in the dairy industry.

## Water recovery

In whey processing, the 94% water content is an obvious factor to consider, water being a crucial and limited resource in the dairy industry almost everywhere.

Reverse osmosis (RO) has become widely used to remove water from whey.

The water removed can be used for cleaning or other process steps. Apart from reducing the need of drinking water for production, this considerable volume reduction of the whey stream provides an obvious cut in transportation costs and environmental load, if the product is transported to another production site.

In addition, recovery of condensate from evaporators is a well-documented application.

Dairies can reduce the intake of well water by running condensate through an RO system.

## Whey concentration

Cross-flow ultrafiltration (UF) is the filtration technology most commonly used for processing of whey into high value whey protein concentrates (WPC). The idea is to separate lactose and minerals from the protein, at the same time concentrating the protein by selecting a membrane which is permeable for lactose and which rejects protein. The more the whey is concentrated the higher the ratio of protein to dry matter (WPC) will be.

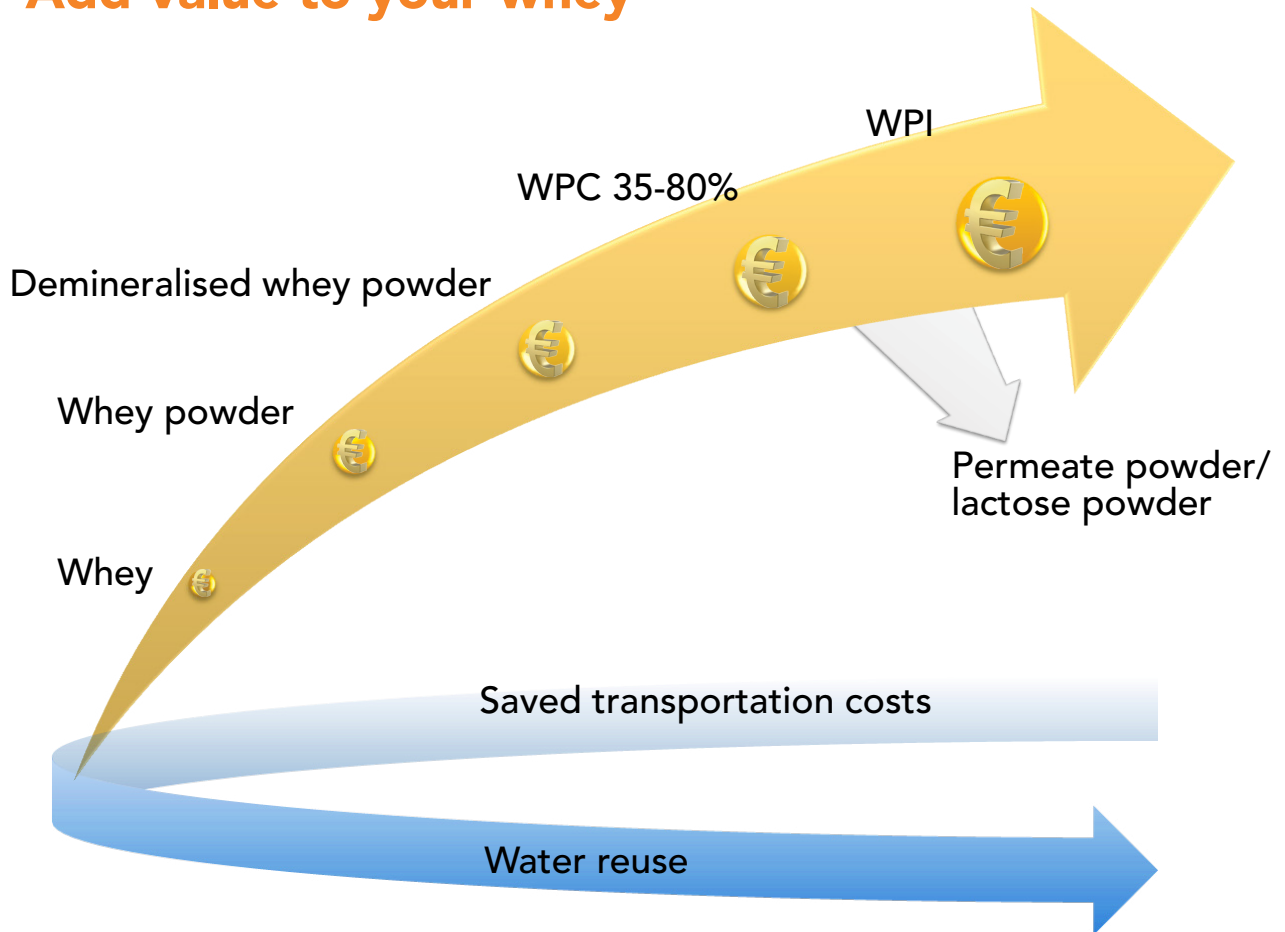
The highest grade WPC achievable by concentration is approx. WPC80-85, meaning 80-85% protein in dry matter. If higher-grade WPC is required, special techniques such as diafiltration are needed to wash the protein, removing more lactose and minerals.

Fat and cheese fines are a natural part of whey; their presence sets a limit to the grade of WPC achievable. In order to produce a pure and almost fat-free WPC, the whey must be processed by microfiltration (MF). The purpose of MF is to separate native proteins, lactose, and minerals from fat and very small particles (cheese fines).

By means of the MF step, the whey is separated into a low-fat/high-quality whey fraction, which can be processed by UF to produce high-quality WPC, WPI, and a fat fraction.

The fat fraction also contains protein, which – together with the lactose – should be handled as a product in order to maximise the value of the whey.

# Add value to your whey



**Tetra Pak**  
Tetra Pak Filtration Solutions

Bergsøesvej 17  
8600 Silkeborg  
Denmark  
Email: [filtration.info@tetrapak.com](mailto:filtration.info@tetrapak.com)  
Phone: +45 8720 0840

12255 Ensign Ave North  
Champlin, Minnesota 55316  
U.S.A.  
Email: [info.fe@tetrapak.com](mailto:info.fe@tetrapak.com)  
Phone: +1 763 421-2721

Tetra Pak, , and PROTECTS WHAT'S GOOD are trademarks belonging to the Tetra Pak Group  
[www.tetrapak.com/membrane-filtration](http://www.tetrapak.com/membrane-filtration)

 **Tetra Pak**<sup>®</sup>