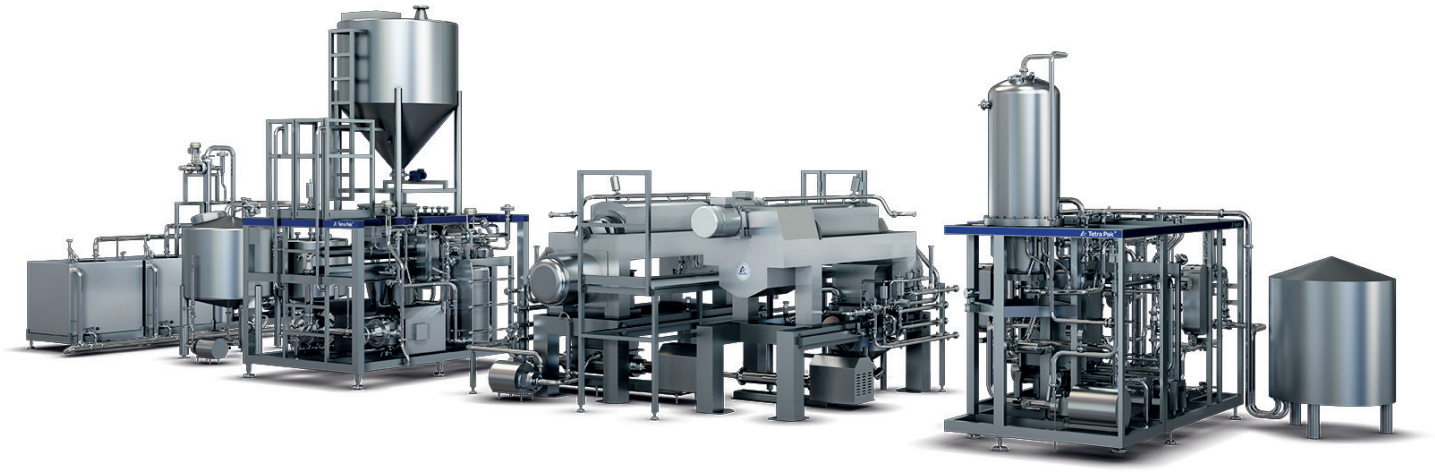
Tetra Pak® Extraction Unit for plant-based products

One solution. Numerous possibilities.



Application

A flexible production system for continuous extraction of plant-based ingredients, including grains, beans, nuts and more.

Highlights

- Flexibility to extract a wider range of plant-based ingredients
- Lower ingredient cost thanks to high extraction yield
- Full control to achieve desired product characteristics
- Quick conversion from ingredient to product
- Low water consumption*
- Reduced product loss
- Easy to clean with cleaning-in-place (CIP)
- High production-to-footprint ratio
- Consistent quality
- Easy operation, with reduced risk of human error

Working principle

Extraction begins with a grinding section, where whole or semi-processed plant-based ingredients are first fed in a silo tank. No prior soaking or blanching is required. A dosing valve transfers the ingredients into a hopper, at which point hot water is added via a control valve. A positive pump then transfers the combined ingredients and water to two mills, where they are ground into a slurry. Parameters such as grinding temperature can be controlled to adjust taste and other product characteristics. For pre-powdered ingredients such as oat flour, no grinding step is required.

The ground slurry is transferred to the fibre separation section, where decanters remove insoluble fibres through high-speed centrifugal force. For starch-rich ingredients like oats, a hydrolysation process with enzymes must be included prior to separation to break down the starch. Soya beans and similar ingredients can be sent directly to separation without the addition of enzymes.

* Compared to plant-based extraction processes that require water for soaking or blanching

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After separation, an enzyme deactivation section involving direct steam injection is used to heat treat the ingredient base in a holding cell. For soya, this deactivates the trypsin inhibitor that otherwise limits the human body's ability to absorb the protein. For ingredients such as oats, heat treatment deactivates the enzyme that was added prior to separation. For nuts, no enzyme deactivation is required, and this step can be skipped.

A vacuum vessel flash-cools the ingredient base before further cooling in a plate heat exchanger. After cooling, the base is transferred to downstream equipment for further processing (e.g., mixing, UHT-treatment and packaging).

Basic unit

Prior to delivery and on-site installation, the Tetra Pak® Extraction unit is pre-assembled in three main sections:

Grinding section

- Silo tank
- Dosing valve
- Positive pump for ingredient/water feed
- Two mills
- Plate heat exchanger

Fibre separation section

- Decanters
- Valve cluster for CIP/product flow selection
- CIP Station for CIP of decanters

Enzyme deactivation section

- Balance tank for ingredient base/water feed
- Direct steam injector
- Holding cell
- Flash/vacuum vessel
- Plate heat exchanger

Automation system

- Automatic control using Allen Bradley PLC or Siemens PLC as standard

Options

- Sodium bicarbonate preparation and dosing tanks for the grinding sections
- Okara discharge pump (for soya)
- Third mill for reducing okara molecule size (for soya)

Capacities

- 4,000 kg/hr with single or double decanter
- 7,000 kg/hr with single or double decanter
- Other capacities from 500 kg/hr and up are available upon request

Layout and space requirements

Tetra Pak® Extraction Unit – 4,000 kg/h capacity

Module	Length (mm)	Width (mm)	Height (mm)
Sodium bicarbonate	5,100	1,400	2,400
Grinding	3,000	2,000	4,600
Fibre separation (1)	4,500	2,600	2,600
Fibre separation (2)	4,500	1,600	2,600
Enzyme deactivation	3,400	2,000	3,600
Spiral holding cell in ED section: 1200 OD x 1700 H			
CIP unit	4,400	1,800	2,000
Total*	**16,000**	**8,000**	**4,600**

Tetra Pak® Extraction Unit – 7,000 kg/h capacity

Module	Length (mm)	Width (mm)	Height (mm)
Sodium bicarbonate	5,100	1,400	2,400
Grinding	3,800	3,500	4,400
Fibre separation (1)	5,100	3,400	3,200
Fibre separation (2)	5,100	1,800	3,200
Enzyme deactivation	3,600	2,700	4,000
Spiral holding cell in ED section: 1200 OD x 1700 H			
CIP unit	4,600	2,000	3,000
Total*	**20,000**	**8,000**	**4,600**

**Recommended total line space incl. sodium bicarbonate option.*

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