



RETAINING FRESH TASTE, COLOUR AND AROMA WITH EXTENDED SHELF LIFE AND IMPROVED EXTRACTION

Pulsed Electric Field processing for juice and smoothies



PEF is the real alternative to both thermal and HPP processing.
Providing reliable, low temperature, continuous 24-hour, cost-efficient inactivation of fruit and vegetable juices and smoothies.



1

Produce premium quality juice with extended shelf-life

PEF enables safe inactivation of the raw product at low temperatures, retaining more of the freshness and nutritional value lost to traditional pasteurisation techniques.

2

Easy installation, continuous processing & scalable to your requirements

PEF enables safe inactivation of the raw product at low temperatures, retaining more of the freshness and nutritional value lost to traditional pasteurisation techniques.

3

Low running and maintenance costs

PEF processing costs of 0,01 – 0,02 € per litre of product, substantially lower than any other low thermal technology suitable for juices or smoothies.

4

Use any packaging material

PEF is applied prior to filling and independent of the type of bottling material. PET or glass bottles, pouches or other consumer packaging can be used. B2B solutions such as sterile tanks are also suitable.

5

PEF dramatically improves extraction

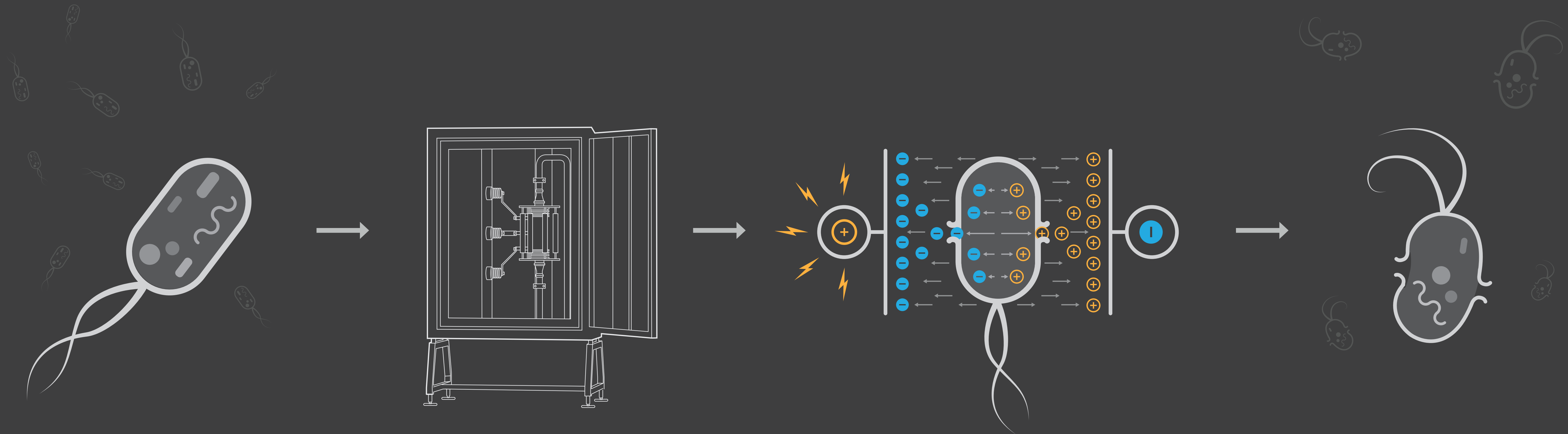
PEF causes pores to form in the plant cell which improves extraction. Yield can be increased and valuable compounds can be extracted without the need for additional enzymes.

Comparing PEF to thermal & HPP

	thermal	PEF	HPP
product quality	average	premium	premium
inactivation method	thermal	electroporation	pressure
production mode	continuous	continuous	batch
energy requirement	150 kJ/kg	110 kJ/kg	280 kJ/kg
bottling requirement	ultraclean / hotfill	ultraclean	standard
personnel required	pump	pump	2-3 people

How does Pulsed Electric Field preserve juice?

Inactivating microorganisms at low temperature, continuously 24 hours a day



Microorganism

PEF Advantage P system

The beer enters one of our Elea PEF Advantage Pipe systems. Elea produces a range of PEF systems appropriate for different scales of production.

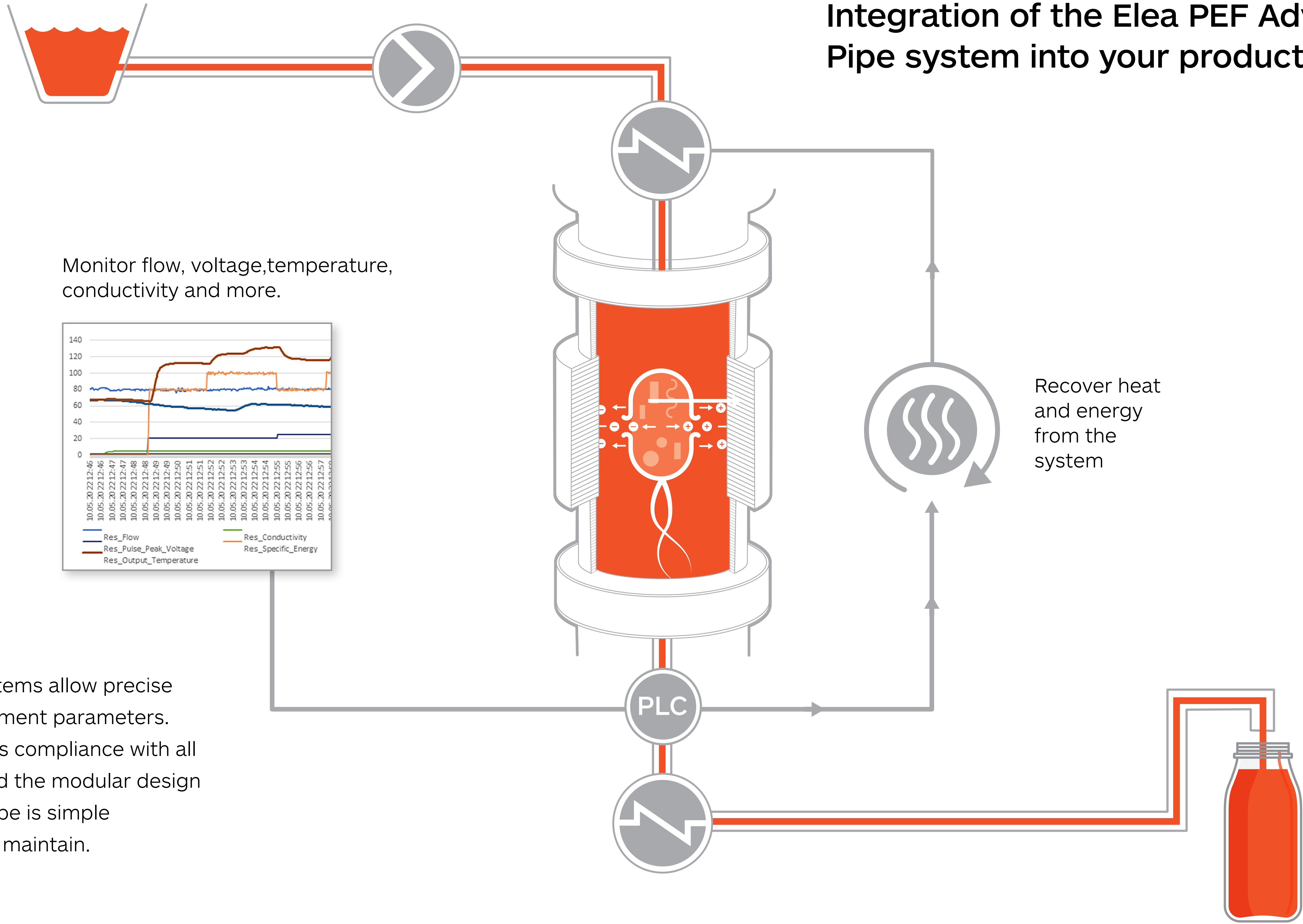
Inside the PEF treatment chamber

Positively and negatively charged particles are attracted to their respective electrodes. When the field strength exceeds the transmembrane potential, pore formation starts, forcing the cell membranes to open.

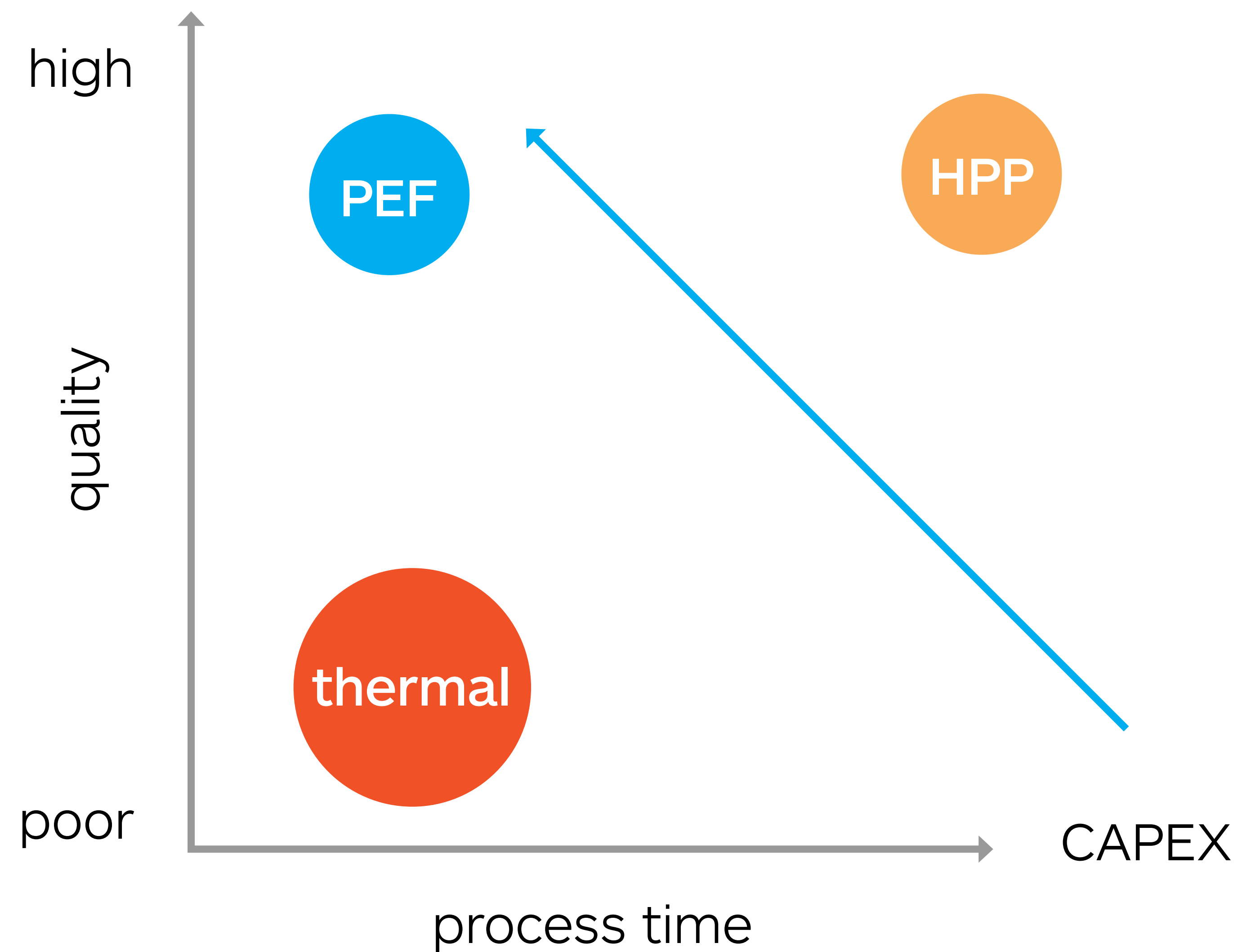
Dead microorganism

The bacteria is now inactivated (dead).

Integration of the Elea PEF Advantage Pipe system into your production line



Elea PEF Advantage systems allow precise optimisation of the treatment parameters. Close monitoring ensures compliance with all HACCP requirements and the modular design of the PEF Advantage Pipe is simple to configure and easy to maintain.

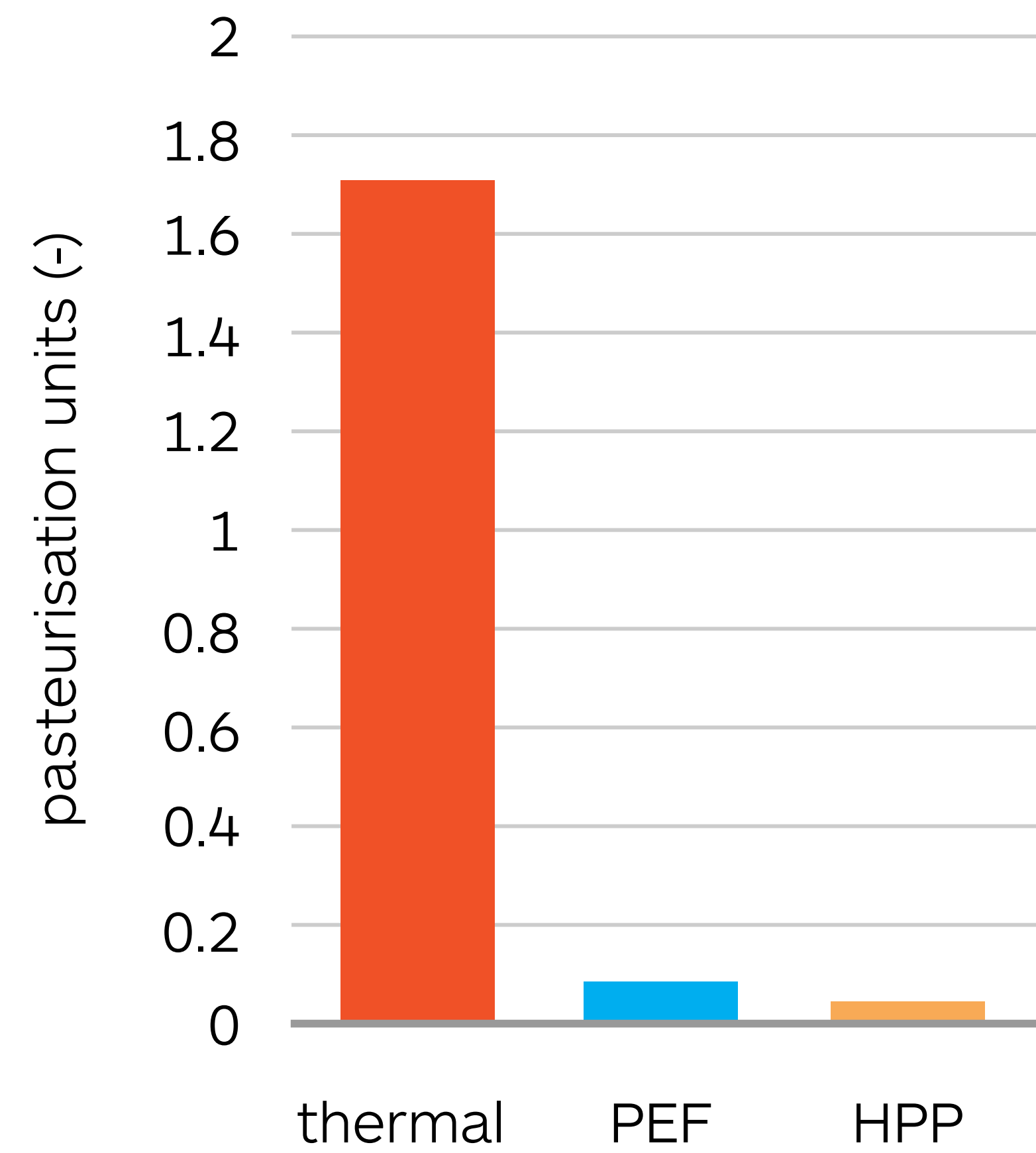


Process time vs quality

PEF results in lower energy costs, long shelf life and high quality. PEF preserves valuable compounds, juices and smoothies retain their natural nutritional value, including vitamins, antioxidants and pigments, to produce a healthier, fresher, more appetising, long lasting final product.

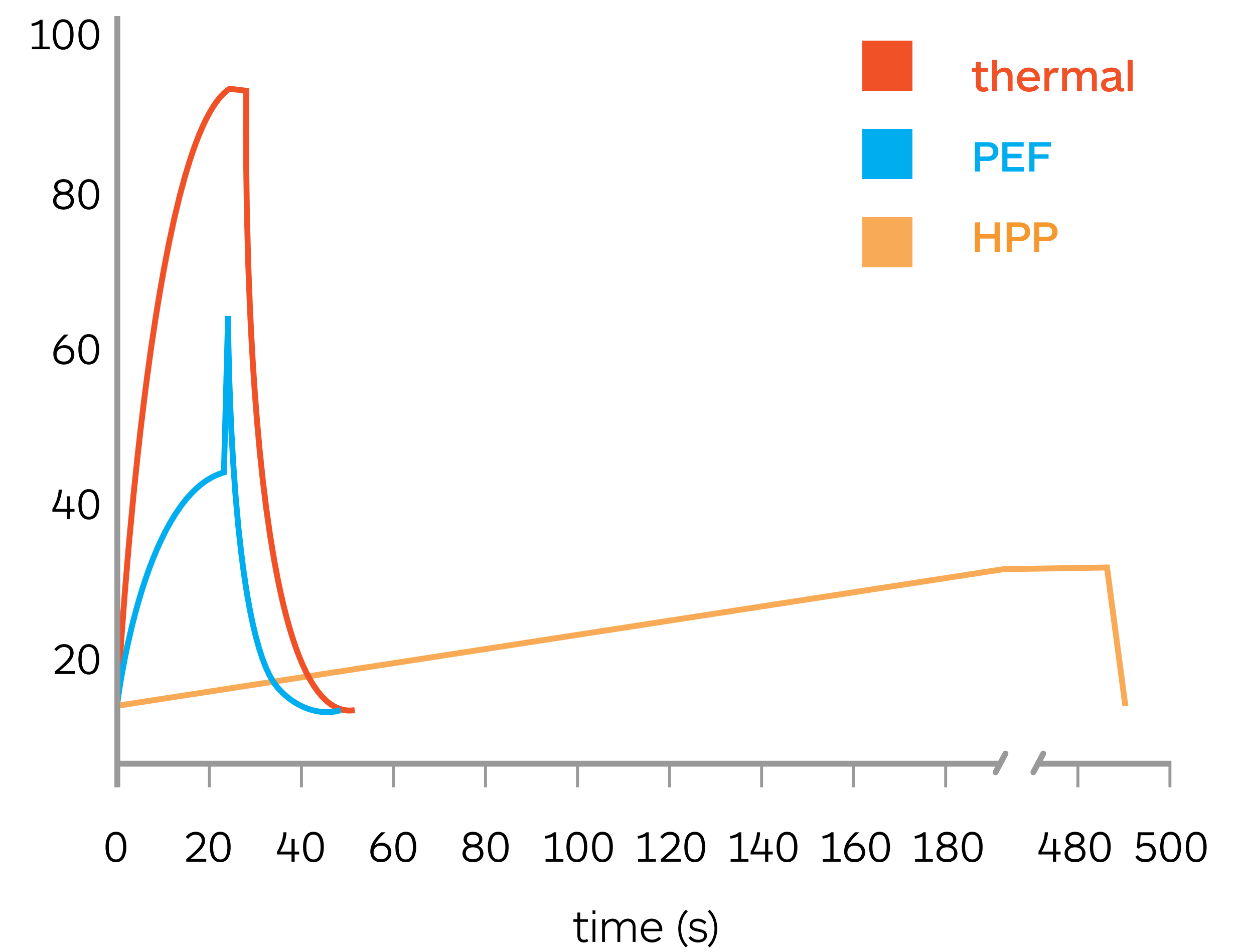
HACCP / FDA dossier data for pathogenic and spoilage organisms are available on request.

Thermal energy load



temperature (°C)

Temperature-time profile



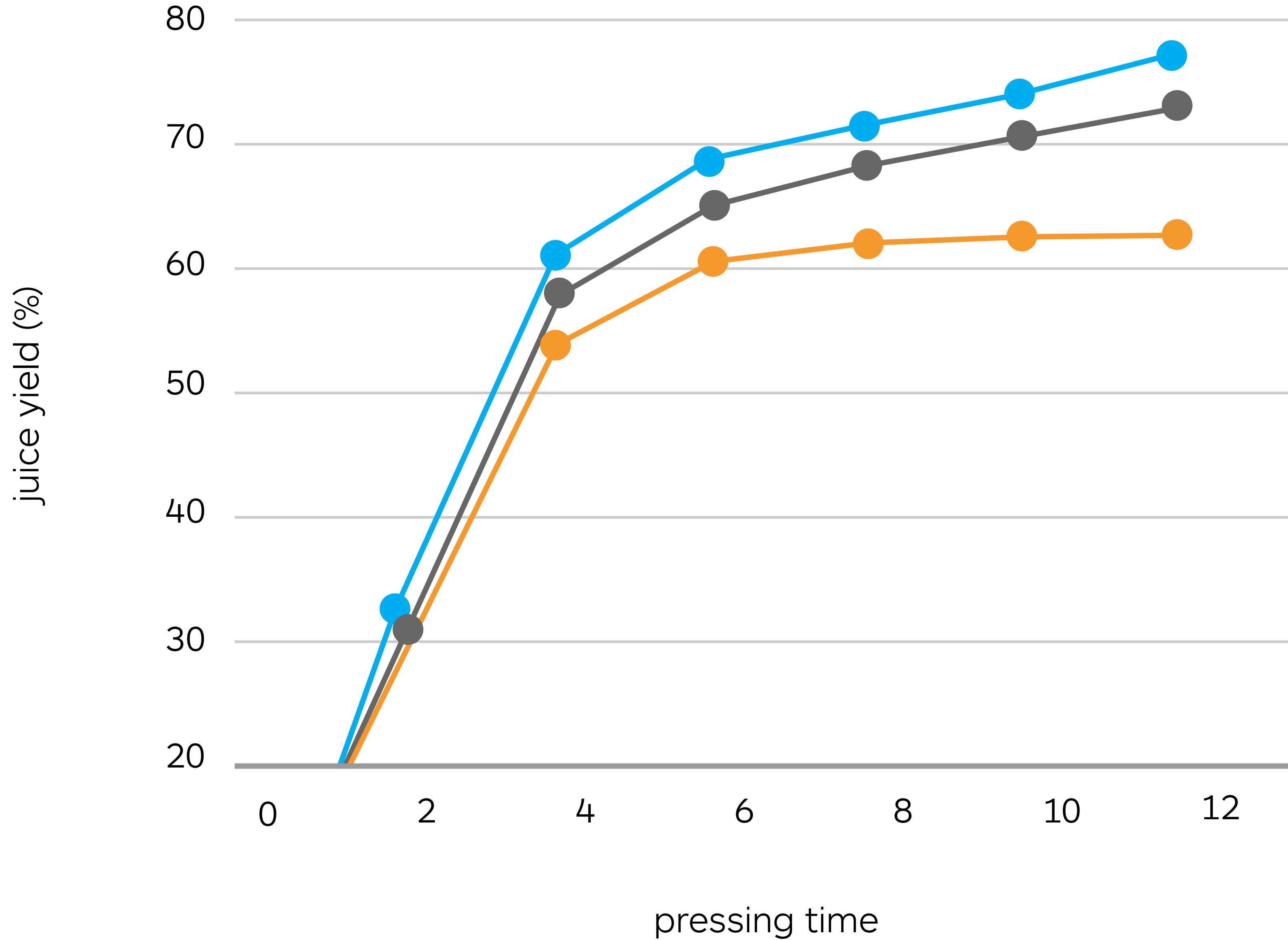
Improving extraction with Elea PEF Advantage P systems

Apple juice extraction

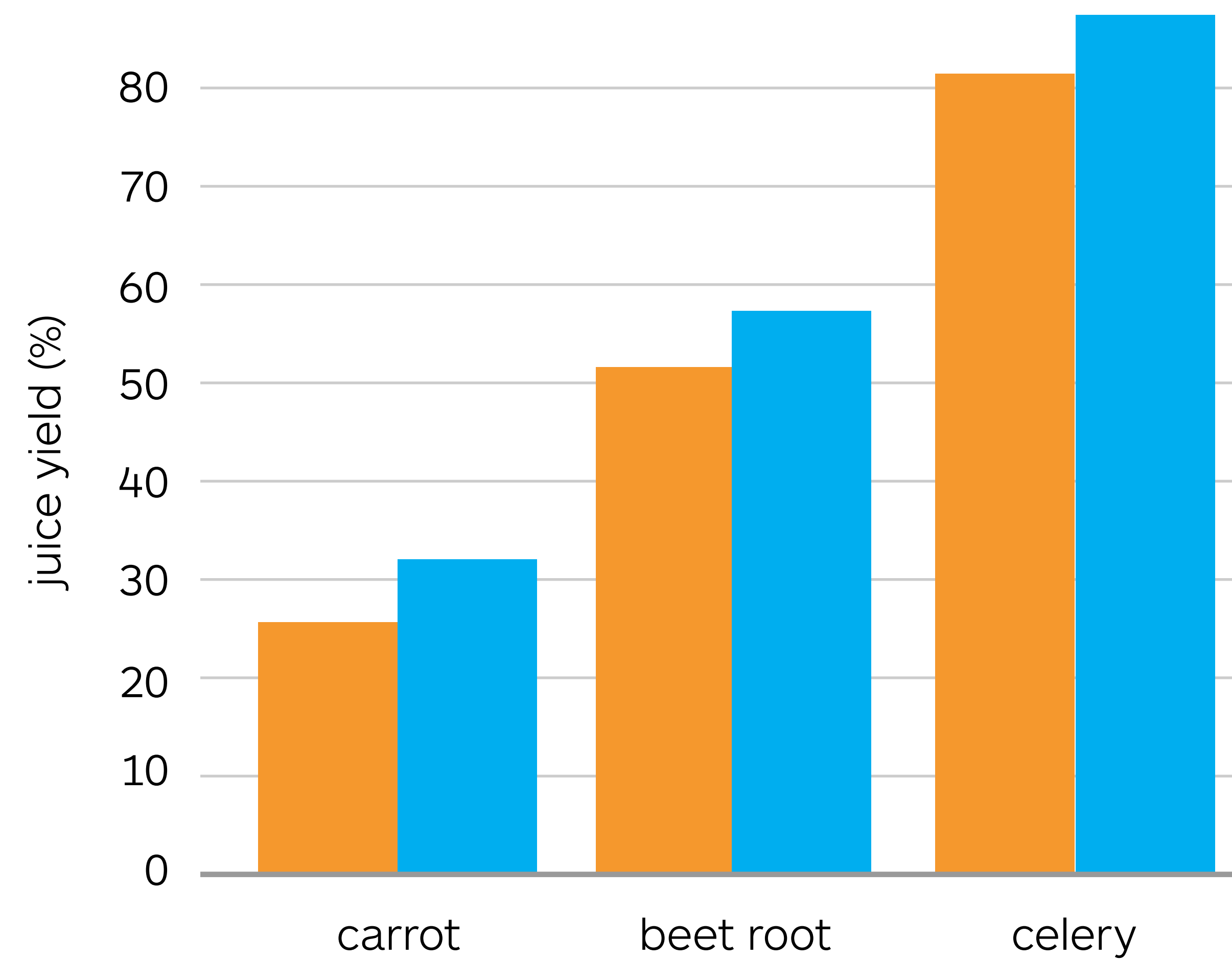
up to 15% increase

Method: Mash treatment,
wrapped cloth press.
Pressure was increased
from 0 to 20 bar
in increments of 4 bar.

- PEF
- enzyme
- untreated



Increase in juice yield

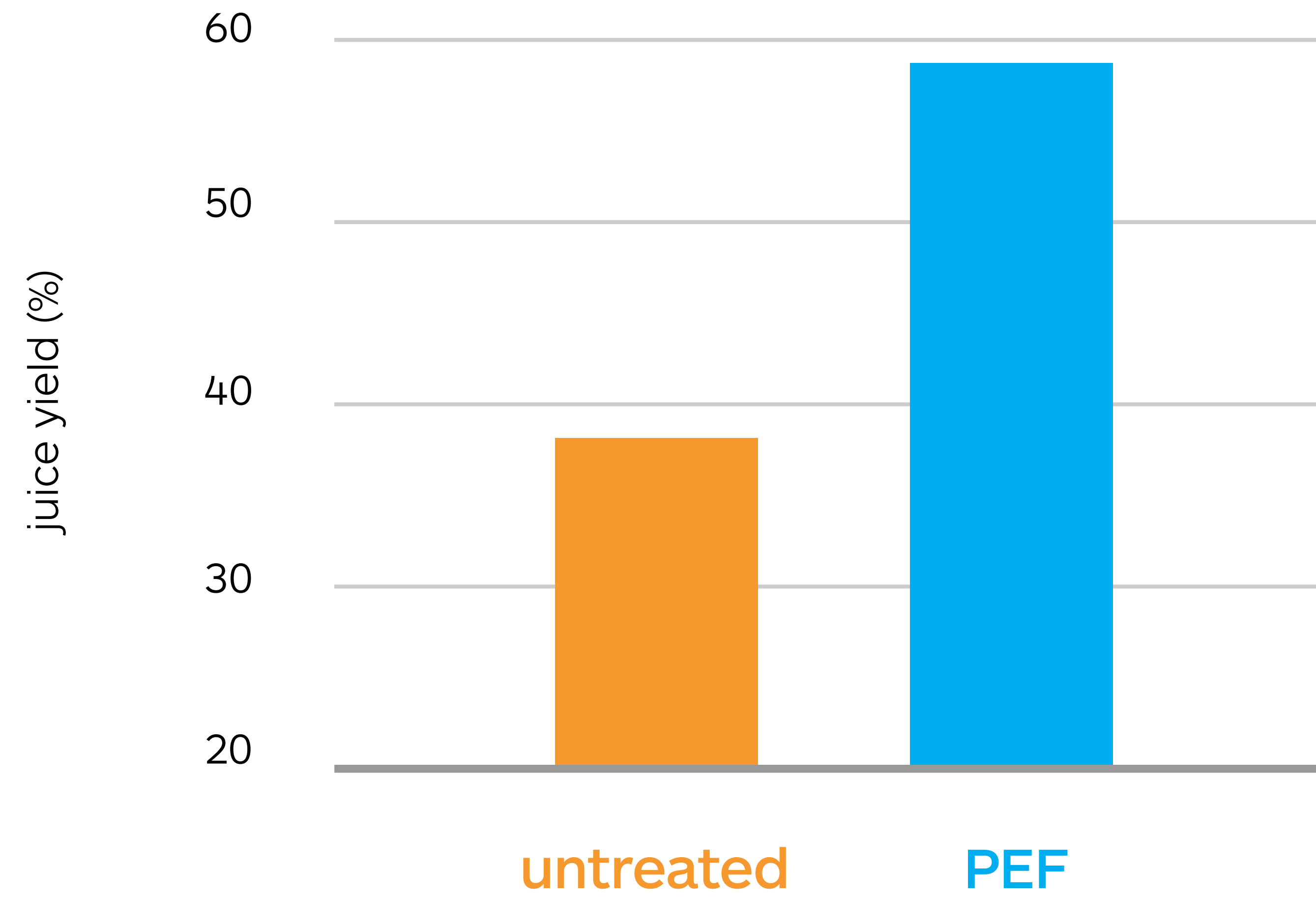


up to 6% increase

Method: Pre-treatment
of whole vegetable, JBT
Paddle Finisher

PEF
untreated

Carrot juice extraction



up to 31% increase

Method: Mash treatment.
Pressure was increased
from 0 to 300 bar in
increments of 10 bar.



The Elea PEF Advantage P 1, 10, 100 & 1000 e & i system range suitable for extraction and inactivation

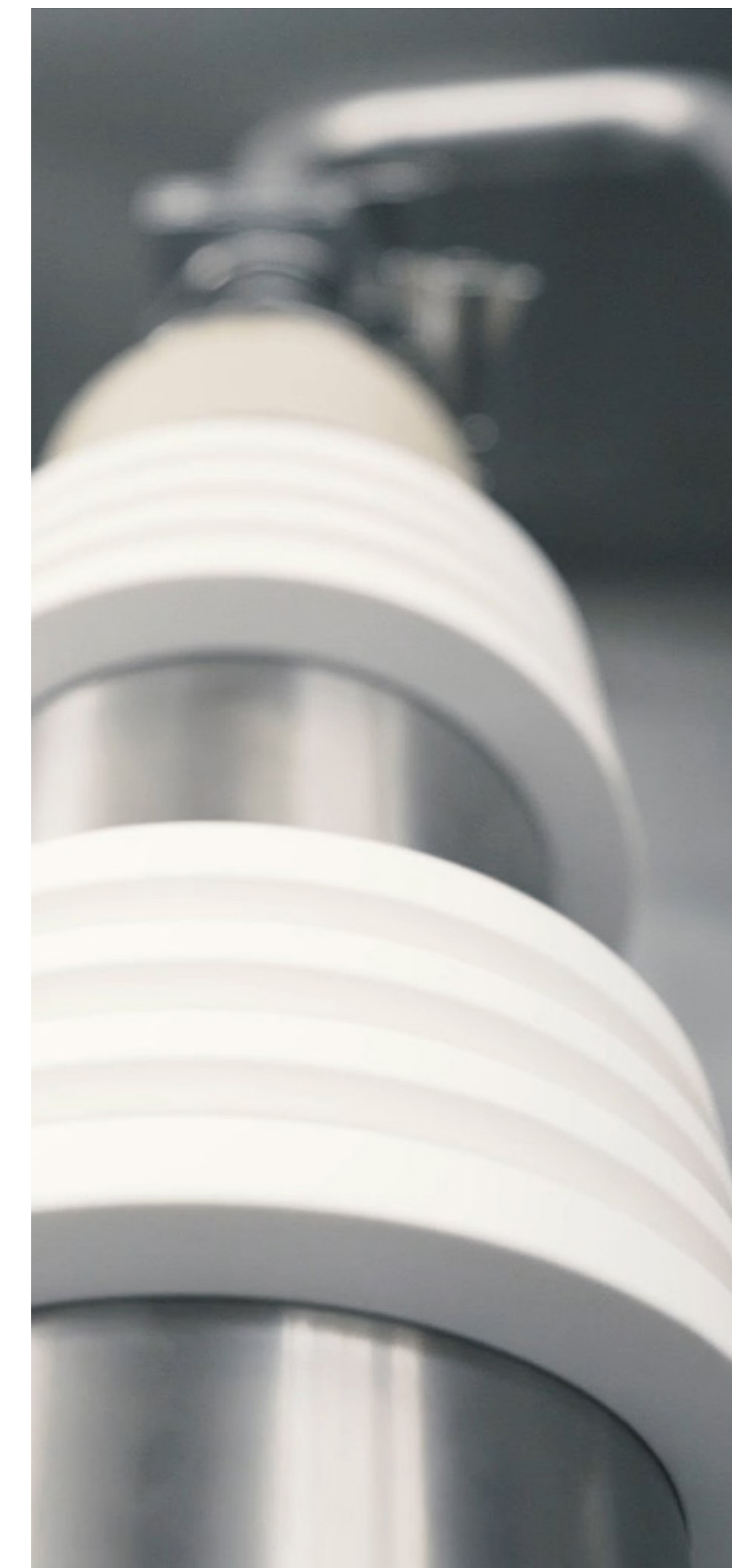
We offer a range of different sized Elea PEF Advantage Pipe systems suitable for processing juices with varying line capacity.

In addition, we provide a design and build service to customise Elea PEF technology to your specific requirements. All of our systems share the same 24/7 production capability and are designed to operate under extreme conditions.

The range can fulfil capacities between 7 t/h and 30 t/h for extraction and 500 litre/h and 5000 litre/h for inactivation. Each system has a hygienic integrated design that is CIP and SIP ready.

Designed to be easily and fully integrated into your existing production line with minimal disruption.

Elea systems put control in the hands of the operator and offer customisation of the process parameters. Close monitoring ensures compliance with all HACCP requirements, and the modular design of the Advantage Pipe is simple to configure and easy to maintain.



Our Elea PEF systems are designed and built by us at our specialist facility in Germany.

PEF Advantage P features	
control system	Touch screen, measurement of peak voltage and current, connectors for oscilloscope, safety interlock, emergency off.
cooling	Air or oil cooled depending on system.
Continuous Treatment Chambers	
capacity	Between 500 litre/h and 5000 litre/h subject to load ratio and process requirements.
electrodes	Titanium.
Services Required	
power supply	400/415 V, 50 Hz (3Phase/Ground), 100 A. Other options available.
cooling	Air or water cooled depending on system.



The Elea PEF Advantage P 1000i
Up to 5000 litre/h of pumpable products, subject to process requirements.



The Elea PEF Advantage P 10 - 1000
Up to 5000 l/h of pumpable products, subject to load ratio and process requirements.



The Elea PEF Advantage P 1
Up to 500 l/h of pumpable products, subject to load ratio and process requirements.



We are the world's leading
manufacturer of Pulsed
Electric Field solutions
with more than 200 Elea
PEF Advantage systems
already installed globally

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