

Pulsed Electric Field Technology

———— The science of **Food-Physics™** ————



Food-Physics

The science behind Elea



Getting more by doing less

With **Pulsed Electric Field (PEF)** we can generate and accurately measure significant increases in yield, freshness and flavour preservation across a wide range of food types.

- Improving output
- Reducing labour costs
- Streamlining supply chain logistics
- Curtailing retail waste

Winning more with PEF

PEF works by puncturing the cell membrane, whatever the size of cell. The process is targeted, gentle and clean.

- Dramatic increases in yield, preservation of pigments, antioxidants and vitamins
- Healthy products last longer

Products that work with PEF

- Microalgae, Kelp & Seaweed
- Vegetable oil, Herbal extracts
- Flower- and Flavour extracts
- Food supplements
- Nutrient media
- Pharmaceuticals
- Process water, cooling water
- Seafood & Fish
- Dairy products
- Marinades, sauces & dressings



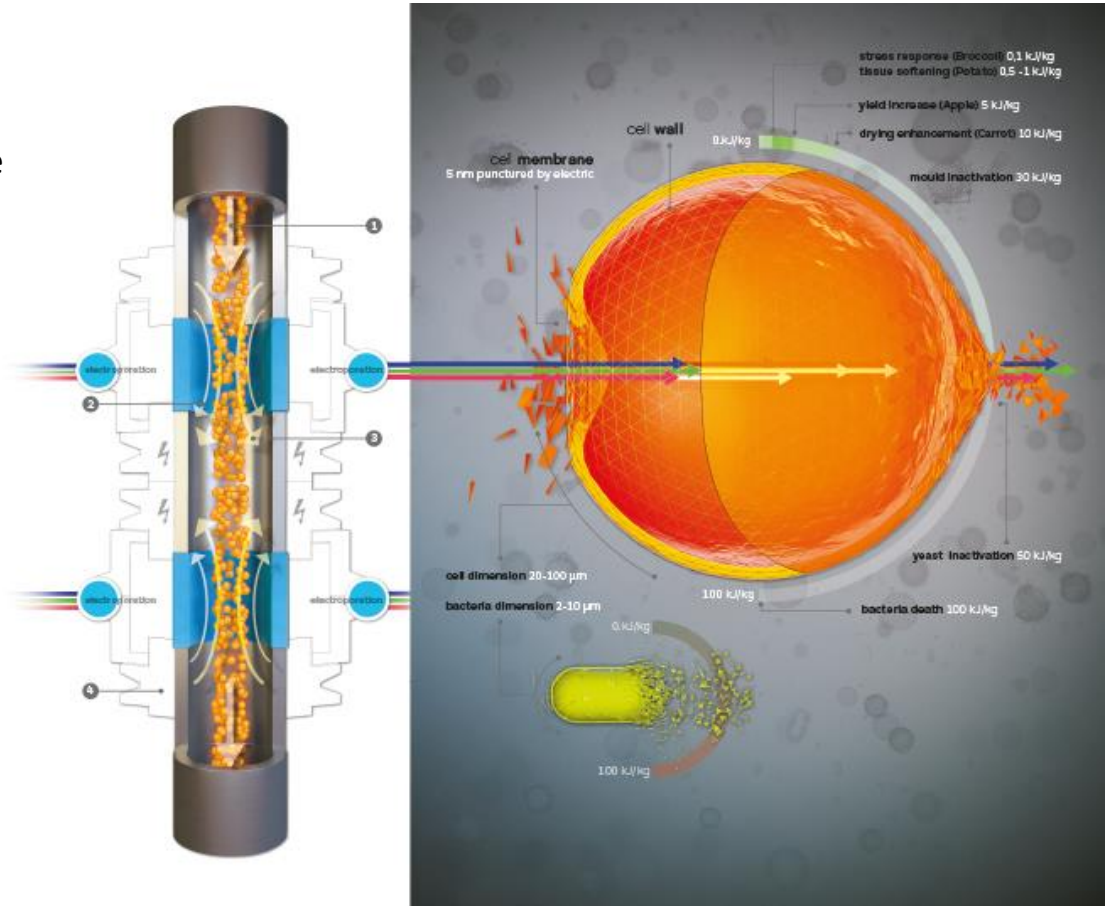
PEF science

With treatment times measured in seconds and with continuous operation and energy efficiency, PEF delivers more by doing less.

The cell membranes of microorganisms, plant or animal tissue can be made permeable by using Elea PEF technology.

This process of electroporation is suitable for use in broad range of food and bio-process using low levels of energy.

Diffusion processes, like water removal from plant or animal tissue or the absorption of marinades, spices and auxiliary substances are accelerated thereby saving valuable time in the production process.



Working with Elea



Elea and our partner DIL are driven by world leading food technologists.

With cutting edge Food-Physics, chemistry and microbiology laboratories alongside unrivalled pilot hall facilities, Elea offers a new opportunity to create new process, products and to measure value.

Our scientists are able to research and develop highly efficient process solutions using Food-Physics and our designers and engineers can put it into practice.



Elea PEF engineering



Elea designs and manufactures machines of outstanding quality for your production line. Our focus is on physical processes to enhance food quality and safety. Each Elea system is built with the highest quality German engineering to withstand continuous operation and deliver maximum performance and energy efficiency. Since 2009 PEF systems designed by DIL have been installed successfully into production lines worldwide.



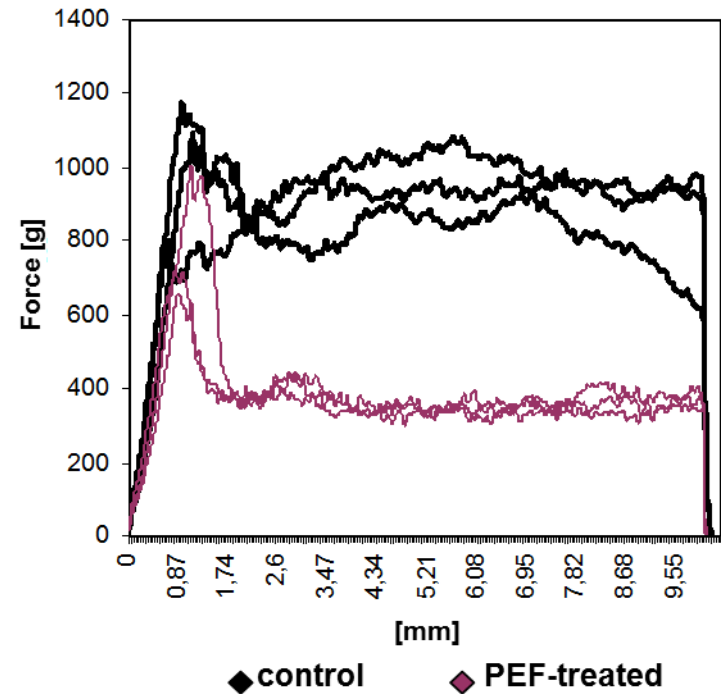
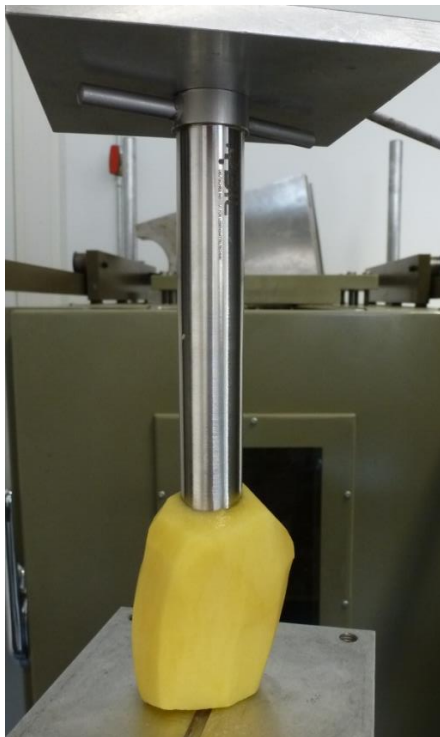
Our global reach

Elea is able to supply and support PEF systems globally. We offer a world wide service with highly skilled and trained engineers, ready to help with installation and maintenance.



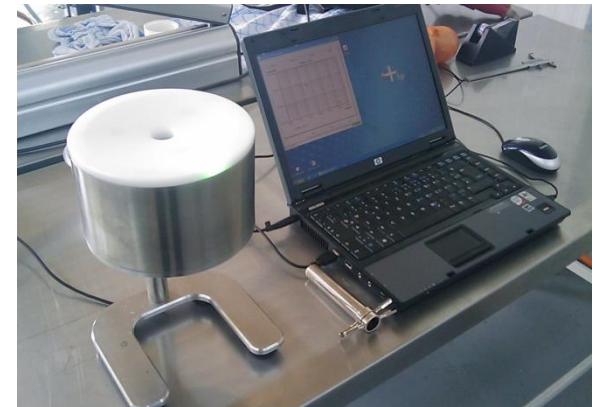
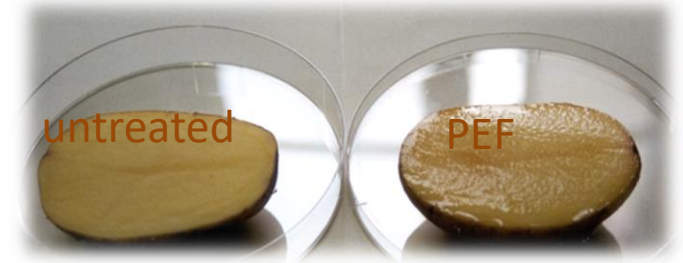
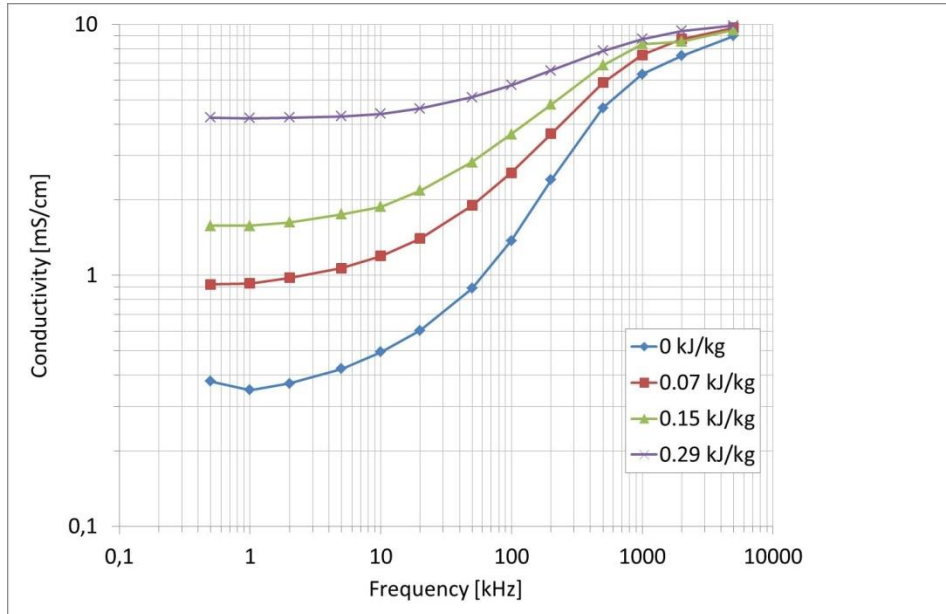
Structure modification

Influence of pulsed electric fields on hardness and cutting behaviour
 Tissue softening and significant reduction of cutting force



whole, raw potatoes (Gunda, n=6)	F [N] average
0 kJ/kg	33,75 ± 3,15
0,07 kJ/kg	29,83 ± 2,17
0,15 kJ/kg	26,65 ± 3,76

Treatment dose and analytical tools



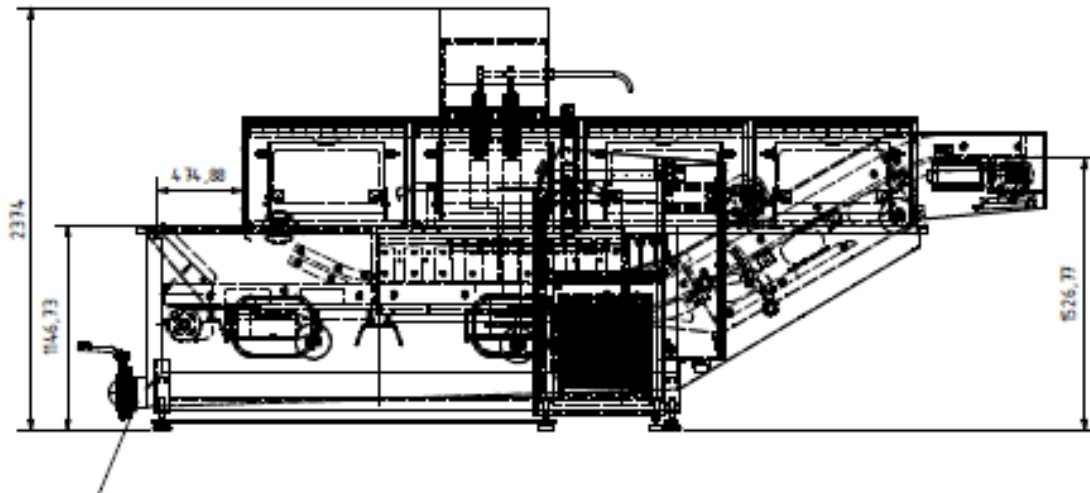
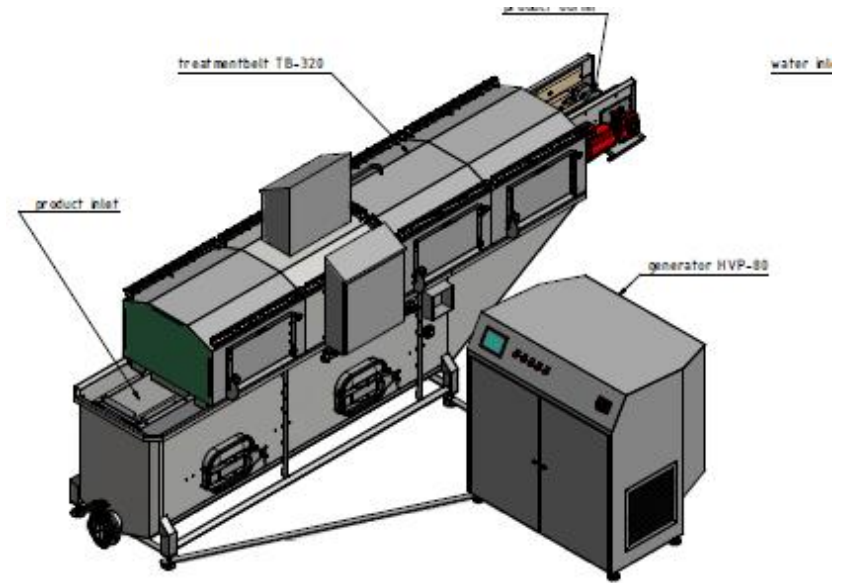
ELEA PEF allows a targeted structure modification. The desired level of cell disintegration can be selected with specific energy input as a main treatment dose parameter

Possibilities to measure the cell disintegration:

- Microscopic
- Texture analysis
- Frequency dependent conductivity

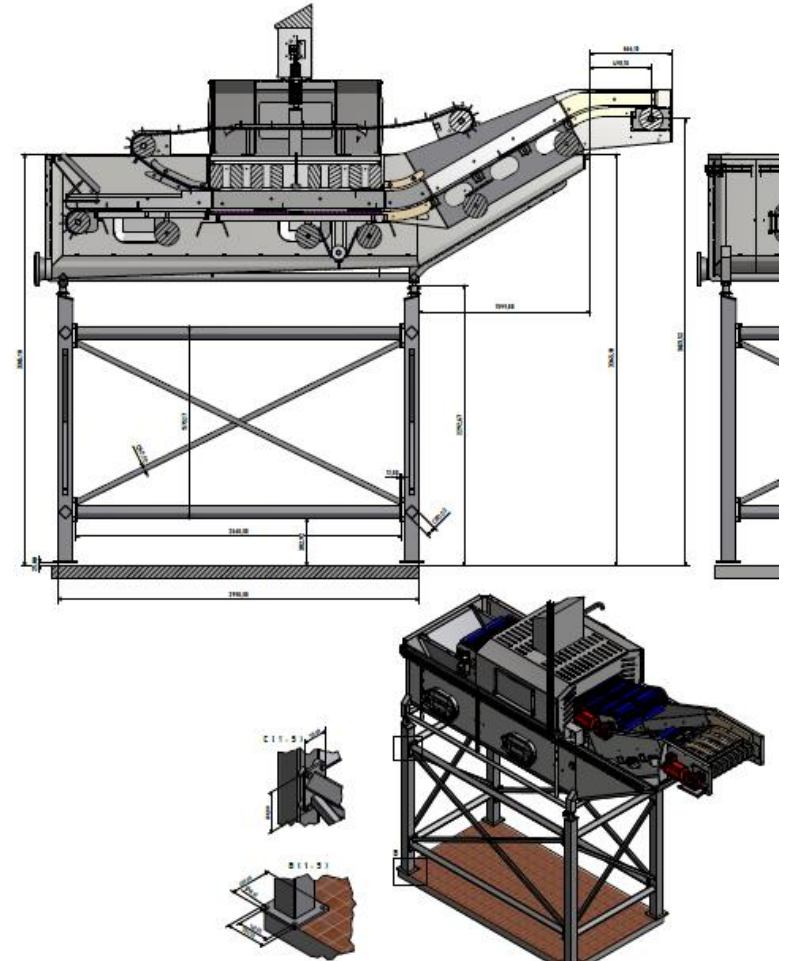
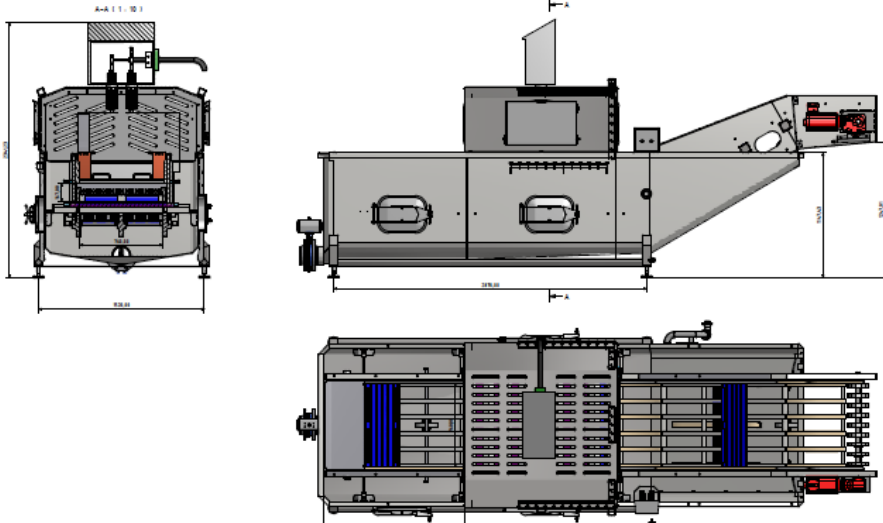
Equipment

Versatile 340 mm top and bottom belt system for treatment of sinking and floating products
Capacity range 5 – 10 t/h



Equipment

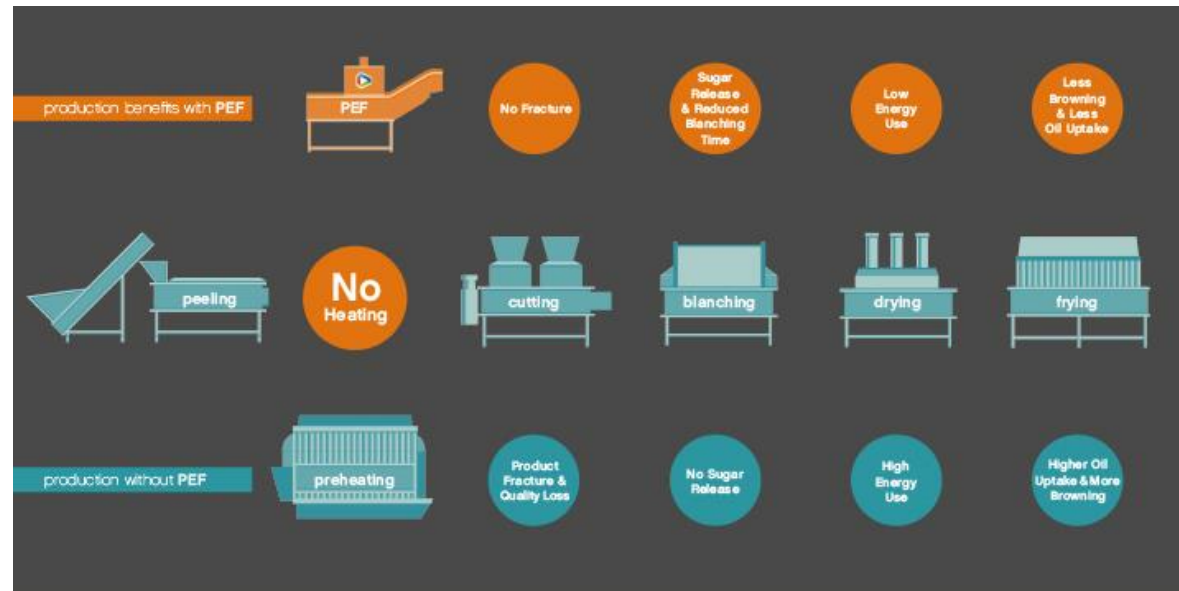
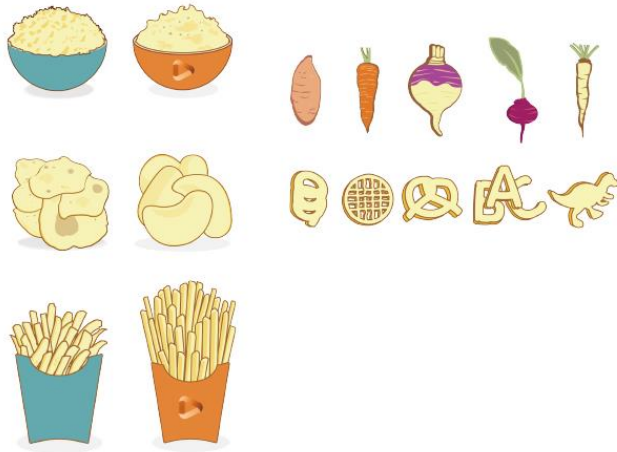
Versatile 800 mm belt system for large scale processing
Capacity range 30 – 50 t/h
Systems for sinking and floating products available



Equipment



Benefits



- **Replacing thermal pretreatment**
- **Texture softening and cutting improvement**
- **Controlled release of moisture, sugar and starch dependent on pore size**
- **Continuous, minimum energy consumption**
- **Less shatter, less breakage during handling**
- **Lower cutter water pollution**
- **Reduced oil uptake**



Elea Vertriebs- und Vermarktungsgesellschaft mbH

Professor-von-Klitzing-Str. 7

49610 Quakenbrueck / Germany

www.elea-technology.com

+49 (0)5431 183 442