

Mild preservation

Novel technologies for enhancing shelf life and quality



FOOD & BIOBASED RESEARCH
WAGENINGEN UR



Nowadays there is a clear consumer demand for minimally processed products that are similar to fresh products in terms of vitamins and taste but have a longer shelf life. Food & Biobased Research develops and researches novel preservation methods that result in pasteurisation or sterilisation with less heat impact and yield a better quality compared to conventional conservation methods.

Novel technologies

High pressure processing: Pressures up to 700 MPa can be applied for food preservation and preparation. High pressure is used in industry for pasteurisation of food products at room temperature and is also potentially interesting for sterilisation.

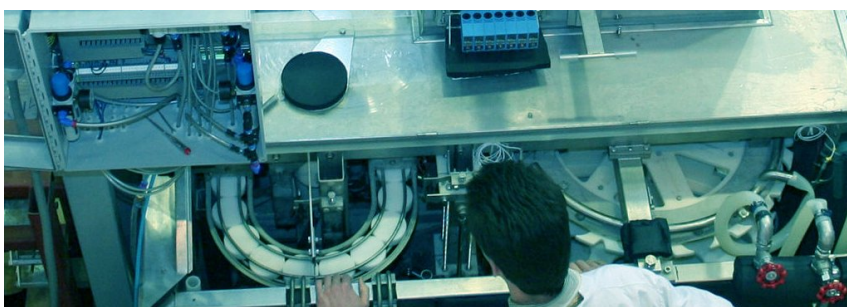
Pulsed electric field processing: Preservation of bulk products by electrical impulses can be applied homogeneously through the product for pasteurisation of liquid foods at reduced temperatures.

Cold plasma treatment: Cold plasma gas is suitable for decontamination of surfaces without affecting the quality of the product or packaging. Produced by electric discharges in inert gases that carry excited molecules, cold plasma gas offers the potential to inactivate micro-organisms on surfaces at temperatures below 40 °C.

Radio frequency heating: water immersed radio frequency heating is used for fast and homogeneous heating of packed products to achieve pasteurisation or sterilisation with improved quality compared to conventional processing.

Food & Biobased Research & mild preservation

Food & Biobased Research has more than 15 years of experience in novel processing, including microbiology, product quality, process impact, technology development, implementation and consumer acceptance. This resulted in scientific publications, cooperation in many (international) projects and industrial cooperation for specific applications.



Benefits

- Mild preservation at low temperatures
- Improved shelf life and quality

Technology takeaways

- Technologies in different stages of development
- Microbiology, process homogeneity and product research is crucial

Our expertise & facilities

- Labscale and pilotscale equipment
- Expertise on product-process interaction
- Pathogen research
- Track record in implementation

Information

Ariette Matser
T +31 (0)317 48 01 21
E ariette.matser@wur.nl

Bornse Weiland 9
6708 WG Wageningen
The Netherlands
www.wageningenUR.nl/fbr

Overview of novel processing technologies

	HP pasteurisation	HP sterilisation	PEF	Plasma	Radio Frequency
Description	Batch process in which a packaged product is put under high pressure (600 MPa)	Batch process in which pre-heated packaged product is put under high pressure (700 MPa)	Low thermal pasteurisation using short electric pulses to electroporate membranes of bacteria	Surface processing by gas at 40°C to inactivate micro organisms	Homogeneous heating with electro magnetic energy with long wavelength
Phase	Commercially in use	Technology proven	Industrially in use for juices (1500 l/h)	Test facilities available	Test facilities available
Estimated costs (€/kg)	0.10-0.20	0.20-0.50	0.02-0.04	-	-
Shelf life	4-6 weeks cooled	1 year ambient	2-3 weeks cooled	-	-
Taste like	Fresh (texture maybe altered)	Freshly cooked	Fresh	Fresh	Freshly cooked

Cooperation on mild preservation

In addition to the various bilateral projects with companies for specific applications of mild preservation technologies, Food & Biobased Research joins partners interested in mild preservation in larger platforms focussing on knowledge bottlenecks and implementation of mild preservation technologies.

An example is the European project NovelQ where 37 partners worked together on the development of novel technologies, including high pressure, pulsed electric field processing, cold plasma and advanced heating technologies. Food & Biobased Research coordinated this project. Results are described in the final report of the project and over 150 scientific publications.

Currently, the Dutch PPS mild preservation combines the strategic research focussing on novel preservation technologies. Partners interested in participation can contact Food & Biobased Research to discuss the possibilities.



References

Timmermans, R.A.H., Mastwijk, H.C., Knol, J.J., Quataert, M.C.J., Vervoort, L., Plancken van der, I., Hendrickx, M.E., Matser, A.M. Comparing equivalent thermal, high pressure and pulsed electric field processes for mild preservation of orange juice. Part I: Impact on overall quality attributes. *IFSET*, 2011(12), 235-245

Mols, M., Mastwijk H.C., Nierop Groot M.N., Abee, T. Physiological and transcriptional response of *Bacillus cereus* treated with low-temperature nitrogen gas plasma. *Journal of Applied Microbiology*, 2013, 115:689-702

