Novel technology for optimised food processing

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Food processing technologies have come a long way in terms of time and energy savings, extended retail shelf life and ready-to-use products. However, the implementation of such technologies in industrial food production is still rather limited.

There are several roadblocks to implementing food processing technologies. The main ones are low consumer acceptance or rejection, non-open market access, and lack of knowledge and information among food producers on how to integrate such technologies. Furthermore, an applicable validation system is missing that will integrate these technologies one by one based on a generalised approach.

Achieving optimum process control for sustainable food processing

Taking risks and investing in the improvement of the technologies' processing lines is a major hurdle for the industry, especially food processing SMEs. There's neither the time nor the available resources needed to implement new non-standard processes. Thanks to EU funding, the i3-Food project "identified barriers and designed a plan to help in a wider implementation of food processing technologies," says coordinator Dr. Claudia Siemer.

The i3-Food team implemented three innovative food processing technologies under real industrial conditions to ensure rapid and maximum market uptake. Pulsed electric field preservation (PEF-P) of liquid food products, high pressure thermal sterilisation (HPTS) for ready-to-eat-meals and low shear extrusion (LS-extrusion) of cold food products have been taken to a new stage in their industrial application.

PEF-P uses short electric pulses to achieve microbial inactivation in food products while preserving freshness. HPTS employs high pressure to reduce the thermal impact on products compared to other thermal sterilisation procedures. LS-extrusion improves sensory qualities in products like ice cream. The three technologies were selected because of their similar technology readiness levels.

Food control is needed over the food processing method for all three technologies, and the appropriate sensors are required for the right process. Knowledge is also needed on how to implement the process. "We had to look into the lack of continuous process control in the three technologies," explains Dr. Siemer. "This is very important when you consider that a small difference in temperature can lead to big energy savings, or a safer and/or better product." This issue was addressed by developing validated sensors to control the process online.

Project partners devised a hazard analysis and critical control points concept for each technology. Users like food companies now have a systematic, preventive approach to food safety from biological, chemical and physical hazards in production processes. Also at their disposal are design measurements to reduce these risks to a safe level.

Overcoming market barriers and ensuring maximum uptake

Team members analysed the innovation environment and identified opportunities for fast and easy market penetration. Their efforts fed into three roadmaps that present the market potential, drivers and possible hurdles, and further application areas for each technology. In all, 30 experts and market participants from 11 countries and 25 institutions joined efforts to produce the roadmaps.

Dr. Siemer emphasised the innovative aspect of i3-Food. Open information workshops in Germany, Spain and the Netherlands were organised to showcase the three technologies. The workshops were attended by 48 European and foreign institutions. First-time users were given the opportunity to confidentially apply the technologies to their products. Three EU patents have been filed.

"The European food and drink industry and the manufacturing sector will benefit from i3-Food because of a wider and faster deployment of the developed food processing technologies, lower production costs and higher product quality," concludes Dr. Siemer."

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