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# Food & Beverages

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### Integrating new technologies in dairy operations to reduce overall water and energy consumption

With 13% of the total European Food and Drink industry turnover, the dairy industry is considered one of the most important sub-sectors as well as and one of the highest energy and water consumers, both overall and per unit production: up to 6.47MWh (5.55MWhth and 0.92 MWhel) and an average of 2m3 of water per ton processed milk. The production of milk powder and other dairy powder products in the EU has risen continually in recent years due to increased export demand, thus having a major impact on overall water and energy consumption in EU dairies. Therefore, the whole processing line of these products was analyzed and hot spots identified. Pre-heating of concentrates (45-52% solids) and/or viscous products like yogurt and quark prior spray drying remain one of the major challenges due to the formation of fouling and burn-on, which impacts on product quality and creates costs associated with downtime for cleaning and maintenance. Accordingly, microwave pre-heating technology has been identified as a promising alternative to indirect heating using plate heat-exchangers or tubular heaters. Current experiments with quark, a fresh cheese-like a micro-gel suspension, have shown no fouling formation and homogeneous product quality enabling longer processing times and substantial reduction of cleaning efforts. Additionally, rapid microwave pre-heating to a temperature inlet of 50°C increased spray dryer throughput by 11%. Presently, studies on overall energy consumption with an integrated microwave pre-heating unit are being conducted at an industrial site.

#### **Biography**

Ana Lucia Vásquez-Caicedo obtained MSc in Food Science and Technology from University of Arkansas (USA) and a PhD from University of Hohenheim (Germany). She has experience on product and process development in the fruit and vegetables, bakery, dairy and the beverage sectors. She has joined Fraunhofer IGB in 2009 and leads the group "Aseptic Technologies" focusing on process development for the stabilization of foods and manufacturing of cosmetic ingredients. Her experience includes development of innovative processes and their integration into established manufacturing processes, conducting risk analyses and evaluating the impact of introducing new technologies.

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