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## Commercial aspects of non-thermal processes in dairy industry

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For decades, various technologies have been used to preserve the quality and microbial safety of foods. Traditional preservation methods involve the use of heat, preservatives (antimicrobials), and changes in the microorganism's environment, such as pH (fermentation), water availability (dehydration, concentration), or temperature (cooling and freezing). Heat is by far the most widely utilized technology to inactivate microbes in foods. The use of thermal energy is still a most popular and common practice of the dairy industries in order to microbial inactivation of milk and milk products. Thermal approaches such as ultra high temperature (UHT) sterilization, high temperature short time (HTST), and higher heat short time (HHST) pasteurization are widely used in the dairy industry presently. In traditional thermal processing, heat is transferred to food by conduction or convection mode. This energy not only inactivates microorganisms by disrupting the chemical bonds of cellular components such as nucleic acids, structural proteins, and enzymes but also affects desirable food components that are responsible for flavor, aroma, texture, and appearance.

Due to increasing consumer's awareness and changes in lifestyle, the demand for fresher and more natural foods is increasing which triggers the search for new food preservation technologies that are capable of inactivating food borne pathogens while minimizing deterioration in food quality, from both nutritional and sensory points of view. Most new technologies are considered non thermal, as their action does not imply food temperature increases and use more efficient heat transfer modes than traditional thermal techniques, thus allowing shorter heating times and minimizing food quality deterioration. There is a huge potential of novel non thermal techniques for a wide range of applications in dairy industry like, to improve processing effectiveness; differentiation of ingredients and products for 'tailored' functionality; to preserve heat-labile bioactives; for modulation of enzyme activity; to improved microstructure through component interactions; and hypoallergenic products.

Non thermal approaches to milk processing, such as pulsed electric fields, high pressure, among others, may also be valuable alternatives to thermal processing, because they have the ability to inactivate microorganisms at near-ambient temperatures, avoiding the undesirable effects of heat on the organoleptic properties of foods.

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