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THE USE NONTHERMAL TECHNOLOGIES IN COMBINATION WITH BIOPRESERVATION TO ENSURE FOOD SAFETY

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In recent years consumer interest is intensified on natural, fresh, functional, safe, and easy to handle foods with extended shelf life. Therefore, novel food preservation techniques have been developed to overcome drawbacks of conventional food processing methods to meet consumers' expectations. Amongst them, high hydrostatic pressure, pulsed electrical field, oscillating magnetic field, modified atmosphere packaging, irradiation, intense light pulses, ultrasound and biopreservation can be classified as non-thermal alternative technologies while ohmic heating and microwave exert thermal activity. Nonthermal technologies are advantageous as they can be applied at different temperatures (refrigerated, ambient, hot) to improve food safety and extend the shelf without major losses in organoleptic quality. High hydrostatic pressure (HHP) and pulsed electric field (PEF), biopreservation are the most investigated alternative approaches to provide and maintain food safety. The effects of these techniques on foodborne pathogens differ, depending on the methods and their application details. Despite of their efficiency in eliminating certain types of pathogens, spore forming bacteria is a challenging issue for nonthermal processes. Inactivation of spore forms and some other pathogens requires combination of different processes defined as hurdle concept / hurdle technology. Hurdle technology is the use of selected processing techniques in combination to provide food safety and extend the shelf life. The principal traditional hurdles comprise reducing water activity, increasing acidity, mild heat treatment, using preservatives, preservation at low temperatures and changing the atmospheric conditions. This presentation covers basic principles, benefits and limitations of HHP, PEF, and biopreservation, and current seeks on their combinational applications in the context of hurdle approach.

Key words: Biopreservation, nonthermal technology, ohmic heating, microwave, food safety