

Title Combined pulsed electric field and osmotic dehydration of food products
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Abstract

Purpose of review: Increasing consumer demand for new products with very high organoleptic and nutritional qualities has led to research for new alternatives to process foods. Combining pulsed electric field (PEF) with osmotic dehydration treatment is expected to reduce processing time as well as preserve nutrition. This review focuses on the potential benefits and limitations of combined PEF and osmotic dehydration of various fruit and vegetable products.

Main findings: PEF treatment has been reported to increase the permeability of plant cells thereby accelerating the rate of osmotic dehydration. Studies revealed that optimum membrane permeabilisation in plant foods of between 1.5 and 3.0 kV/cm could be achieved with 15–30 pulses. The fractional membrane pore area was reported to be increased with field strength up to a certain extent, which was also supported by microstructures. The combined PEF and osmotic dehydration technique is indicated as an alternative processing method to conventional osmotic dehydration and has been shown to preserve the quality of foods.

Direction for future research: PEF technology has the potential for economic and efficient energy use, as well as providing consumers with microbiologically safe, minimally processed, nutritious, and fresh-like foods. Currently, only a small number of equipment vendors can offer commercial-scale equipment. Additional field trials are needed in a commercial setting on a variety of products to demonstrate commercial viability of the technology. The evaluation of the microstructural changes resulting from PEF treatments may provide useful information in PEF application. Kinetics of nutrients degradation, rehydration studies and optimisation of process conditions for a wide variety of fruits and vegetables may be essential.