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Pulsed Electric Field Processing of Fruits and Vegetables

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Diversified Technologies, Inc. has developed a PEF (Pulsed Electric Field) system for processing fruits and vegetables by softening their tissue at the cellular level. This process, which applies short (microsecond scale), high voltage pulses to the product in a water bath / slurry, makes slicing, dicing, peeling, drying, and juicing easier, and saves substantial energy in these downstream processes. PEF processing can be applied to non-thermal pasteurization of liquids, such as juices, or tissue modification of fruits and vegetables, which lowers their processing cost by actually making more of the cell contents accessible. Utilizing microsecond 1-5 kV/cm high voltage pulses to perforate cell membranes, this system can prepare tons-per-hour of whole fruits and vegetables for downstream processing.

The PEF system consists of a switching power supply, capacitor, solid state hard switch, and controls, all packaged in a NEMA-4 enclosure for operation in a food processing plant. The PEF system operates at 15 kV, and up to 100 kW average power. DTI has built numerous PEF systems, for different applications and specifications, since 2000.

This paper will describe PEF System design, applications, and trade-offs in the specification and construction of PEF system.

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