short cleaning intervals. The techniques applicability and technical requirements will be presented along with a discussion of commercial experiences.

Invited Talk SYMP 1.7 We 17:30 A 001

Effects of Microsecond- and Nanosecond-Pulsed-Electric-Fields on Plant Cells — •Thomas Berghöfer[1], Bianca Flickinger[1], Christian Eing[1], Martin Sack[1], Petra Hohenberger[2], Peter Nick[2], Michael Pacher[3], Holger Puchta[3], and Wolfgang Frey[1] — [1]Institute for Pulsed Power and Microwave Technology, Karlsruhe Institute of Technology, 76344 Eggenstein-Leopoldshafen — [2]Botanical Institute I, Karlsruhe Institute of Technology, 76131 Karlsruhe — [3]Botanical Institute II, Karlsruhe Institute of Technology, 76131 Karlsruhe

Cellular responses on pulsed electric field exposure roughly can be divided into two groups. For pulse durations in the microsecond range and rise-times in the order of several 100 ns, predominantly the plasma membrane is targeted. It is commonly accepted, that due to an increase of transmembrane voltage hydrophilic pores are created which allow an exchange of liquids and ions through the membrane and simultaneously affect the charging process of the membrane. At the IHM this effect predominantly is applied for the extraction of cellular ingredients, e.g. from wine grapes or sugar beets, and the conditioning of green biomass. For a second type of field induced cell response, the pulses have to exhibit a rise time considerably shorter than the charging time of the plasma membrane. In this case the electric field penetrates into the cell interior and affects intracellular components. Recent experiments have shown that structures of the cytoskeleton of plant cells are affected by 10 ns pulses of 30 kV/cm and that the growth behaviour of plants and fungi can be influenced by nanosecond pulse treatment.

Invited Talk SYMP 1.8 We 18:00 A 001

Electrochemotherapy - An efficient electroporation based tumor treatment — •Damijan Miklavcic — University of Ljubljana

When cells are exposed to a sufficient high electric field, permeability of their plasma membrane is increased. This allows molecules, that otherwise can not penetrate through the membrane, to enter the cell. One of the most advanced applications taking the advantage of this phenomenon is electrochemotherapy. Electrochemotherapy is currently used in daily clinical practise for treatment of superficial tumor nodules. Electrochemotherapy as a local treatment combining cancer dugs such as bleomycin or cisplatinum with short high voltage electric pulses results in approximately 80% complete responses irrespective of histological origin of the tumor.