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Effect of Planar Electrode Shapes on Paramecium Cell Lysis Performance in Microfluidic Systems

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Electrical cell lysis is an important technique in obtaining intracellular components for further analysis. In this research, three different array of shapes; comb, triangle, rectangle; of indium tin oxide (ITO) were fabricated for cell lysis in microfluidic systems. *Paramecium sp.* cells were used in visualizing cell disruption due to the application of 12 $V_{p\text{-}p}$ AC voltage between electrodes. From the observation, Paramecium cell membrane disruptions were more pronounced in triangle and rectangle electrodes. Electric field distribution inside microfluidic systems for three electrode shapes were simulated to confirm Paramecium's transmembrane potential. Simulation results agree with the experiments that triangle and rectangle shape produce high transmembrane potential when Paramecium cells are placed between electrodes.

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