

Large scale dielectrophoretic construction of biofilms using textile technology

Abstract

Arrays of microelectrodes for AC electrokinetic experiments were fabricated by weaving together stainless steel wires (weft) and flexible polyester yarn (warp) in a plain weave pattern. The cloth produced can be used to collect cells in low conductivity media by dielectrophoresis (DEP). The construction of model biofilms consisting of a yeast layer on top of a layer of *M. luteus* is demonstrated, using polyethylenimine (PEI) as the flocculating agent. This technique offers an alternative to the formation of biofilms at microelectrodes made by photolithography, and would allow the construction of biofilms with defined internal architectures by DEP at much larger scales than was possible previously. Furthermore, the flexibility of the cloth would also allow it to be distorted or folded into various shapes.

Keyword: Dielectrophoresis; Biofilm; Consortia; Textiles; Weaving