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Detection of Yeast Cells; Microfluidic Impedance Sensor[1]
KELSEY HULEA, Youngstown State Universtiy, NICHOLAS MATUNE, BENJAMIN MABBOTT, YOGENDRA PANTA, Youngstown State University — A microelectromechanical system (MEMS) based biosensor was proposed for the rapid detection of pathogenic bacteria and contaminants that pose a threat to public health. In this study, experimental tests followed by finite element computer simulations were performed to selectively detect the quantity of yeast cells in a sample solution then was compared to a solution with no yeast cells. The impedance based biosensor detects the change in impedance caused by the presence of yeast cells between the electrodes integrated into microchannel walls that contain the target cells in a suspension medium. Microfluidic devices were fabricated by using two methods: traditional micromachining and photolithography for experimental purposes. An impedance analyzer was experimentally used for the measurement of the electrical impedance signals. Computer models based in COMSOL Multiphysics consisted of a long microchannel with two electrodes placed on opposite sides of the channel. Experimental data, simulation results and published data were compared and similar trends were found.

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