

Chemistry - REQUIMTE

Bionanosensors

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Objectives

- Development of biosensor to detect *Phytophthora cinnamomi*, by integrating state of the art technology such as DNA probes, antibodies, gold nanoparticles and microfluidic devices;
- Low cost micrometer interdigital capacitive (IDC) immunosensors for Malaria diagnostics with 3-dimensional immobilization layers (*Master's thesis of Tiago Monteiro*);

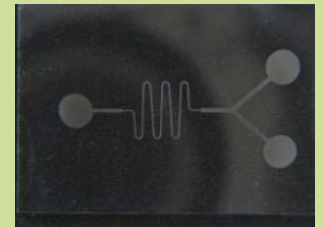
Methodology

- Microfluidic masters are fabricated in SU8 by spin-coating. Channels are molded in PDMS by Softlithography; Gold nanoparticle probes specific to certain DNA sequences or antigens related to the pathogen will be used in the microfluidic system;
- Micrometer interdigital capacitive (IDC) transducers will be coupled to 3 – dimensional matrixes (microporous or nanostructured) for the immobilization of 2E6 antibodies. Affinity binding of antigen/antibody will be measured by capacitance changes.

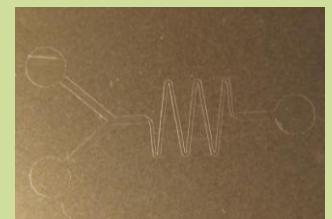
Expected Results

- Detection of *Phytophthora cinnamomi* with higher sensitivity, faster detection time, lower cost, and untrained personnel;
- Micrometer IDC's with 3D matrixes layers should exhibit higher sensitivity than sensors without them and similar sensitivity than nanometer IDC;

- SU8 microfluidic master structures



- PDMS microfluidic channels



- Gold 50µm interdigital electrodes;



- 3D nanostructured matrixes;

