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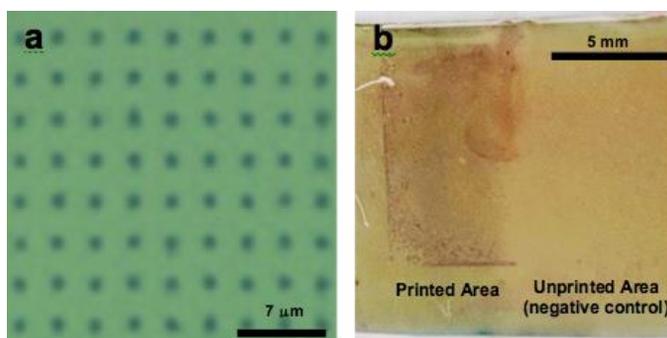


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## RESEARCH HIGHLIGHTS

### 1. Nanotechnology Derived Chip

The oil palm, *Elaeis guineensis* has been a significant contributor to Malaysia's economy in agricultural sector. However, the greatest current threat to the production of palm oil is the basal stem rot (BSR) diseases caused by *Ganoderma boninense*. Since there is no effective treatment for BSR disease, early detection is a proactive measure to avoid it. Collaborative work with researchers from University of Manchester and MARDI focused on the development of nanotechnology derived chip-based DNA/RNA detection platform that is applicable to be used in Malaysian agricultural setting. The research activities involved the development of nanoparticle assay with local biological materials and fabrication of arrays by using polymer pen lithography.



Optical image for immobilisation experiments on arrays with capture DNA-AuNPs and genomic DNA extracted from *G. boninense* mycelia. b) Photographic image of glass slide post hybridisation (10 pM of target ssDNA). Reprinted from Polymer Pen Lithography-Fabricated DNA Arrays for Highly Sensitive and Selective Detection of Unamplified *Ganoderma Boninense* DNA, by Ekta Rani et al. *Polymers* 2019, 11, 561.

### 2. Modification of Quantum Dots

Quantum dots (QDs), typical sizes ranges from 1 to 20 nm, are among the most interesting nanocrystals and have attracted more attention due to their special characteristics such as broad absorption spectra coverage, narrower and symmetric emission spectra and capability of tuning the optical properties by controlling the size of particles and surface functionalization. To enhance the performance of nanomaterials in particular applications, the surface of quantum dots require modification. Our recent work reported the modification of PbS QDs with antibody as a label for the quantitative detection of HER2 breast cancer biomarker and generated adsorbent for the removal of organic dye removal from waste water.