

## Magnetite nanoparticles on paper: A platform for the diagnosis of dengue fever by magnetic-ELISA

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Enzyme-linked immunosorbent assays (ELISAs) are the most widely used methods to detect antibodies. However, they have some drawbacks. As a result, in recent years magnetic nanoparticles or beads (e.g. magnetites) have been combined with ELISAs to improve their analytical performance. On the other hand, despite paper-based ELISA are less sensitive than conventional ELISA, they emerge as suitable platforms to develop disposable devices for point-of-care diagnostic. A novel “magnetic-ELISA”, based on core-shell magnetite@polydopamine nanoparticles supported on Whatman paper was developed to detect IgM-dengue antibodies. An affordable procedure to deposit magnetite nanoparticles on paper surfaces (Whatman thype-1 and Whatman thype-ss903) and, to conjugate such nanoparticles with Anti human-IgM antibodies using polydopamine as linker, is reported. Structural features, magnetic behavior, coating homogeneity, as well as, the nanoparticles/linked antibodies ratio were determined. The analytical performance of “magnetic-ELISA” supported on paper surface was 100 times more sensitive with a 700 times lower limit of detection than traditional ELISA or using magnetic beads without depositing on paper to detect IgM-dengue antibodies. Additionally, the new system showed low background, acceptable reproducibility, low-cost, easy manufacturing and effortless and easy handling which are very important, considering the large number of biological samples to be processed by a laboratory in case of dengue epidemics..

### Biography

Greter Amelia Ortega Rodríguez has completed her Bachelor of Science in Chemistry (*Summa cum Laude*) and her Master of Science in Chemistry at University of Havana, Cuba in 2012 and 2015, respectively. At present, she is a graduate teaching assistant at the Department of Inorganic Chemistry, Faculty of Chemistry, University of Havana and a PhD student at Center for Applied Science and Advanced Technology of IPN, Legaria Unit, Mexico. She has participated in 10 international scientific meetings held in Cuba and has done research on synthesis, functionalization and the use of the novel properties of metal and magnetic nanoparticles to design nanostructured biosensors.

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