



A journal article co-authored by **Joseph Irudayaraj**, Associate Professor in *Agricultural and Biological Engineering and Bindley Bioscience Center*, has been designated during the period of April 1-June 30, 2006 as the #1 most-accessed article by readers of *Analytical Chemistry*, the professional journal of the American Chemical Society.

The publication, [**Magnetic and Gold-Coated Magnetic Nanoparticles as a DNA Sensor**](#), describes a study conducted by Dr. Irudayaraj of Purdue University and Gilles K. Kouassi of Penn State University in which the chemical synthesis and functionalization of magnetic and gold-coated magnetic nanoparticles and the immobilization of single-stranded biotinylated oligonucleotides onto these particles is reported.

In their study, selected sequences specific to the BRCA1 gene were used as a test platform for the binding of oligonucleotides to these particles. The study found that the rate of hybridization increased concomitantly with the concentration of the probe and the target in the reaction medium. Furthermore, exposure of probe and target oligonucleotide to a combination of target and noncomplementary DNA strand reduced the rate of hybridization, possibly because of steric crowding in the reaction medium and cross-linking between reacting oligonucleotides and the noncomplementary strands. The study was undertaken to open several possibilities in therapy and drug delivery via bioconjugation strategies of iron and iron nanocomposite structures for controlled manipulation and handling using magnetic fields.

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[**Magnetic and Gold-Coated Magnetic Nanoparticles as a DNA Sensor**](#)

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