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Applications of nanoclays in diagnostic microbiology

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With the development of nanotechnology new materials based on the transformation, modification, or combinations of natural clays have been obtained for different applications in microbiology. Most of these applications are directed to inhibit the growth of bacteria and fungi combining them with solver and other inhibiting substances. Nevertheless, nanotechnology opens new possibilities to detect and identify microorganisms with high accuracy and in few minutes. Different technologies were developed based on the fabrication of nanocomposites with nanoceramics, monoclonal antibodies, DNA or RNA fragments and biomarkers. Our group has developed a technological platform for the fast and accurate detection of bacteria and fungi by combining nanoclays and nanoceramics with enzyme specific fluorogenic and chromogenic substrates. In the composition we also included different nutrients and activators of the microbial metabolism that allow reduction of the lag phase of bacterial growth and the detection of specific enzymes activity at this early stage of growth. With these new nanocomposites we have been able to identify different microorganisms within few minutes. As an example, it was possible to detect *E.coli* directly in urine sample in just 10 minutes allowing the further timely and efficient antibiotic therapy.

Biography

Claudio Rodriguez Martinez was graduated as an Engineer and completed his PhD in Applied Biotechnology at the Moscow State University in Russia. For the past 21 years, he has been the Director of Research at the National Center of Biological Products in Cuba. He is the author of more than 30 granted patents in Cuba, Europe, USA and other countries and has published several papers in international journals. He and his research team have developed more than 20 new products and technologies in the field of diagnostic microbiology.

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