

Review

# Metallic and Metal Oxides Nanoparticles for Sensing Food Pathogens—An Overview of Recent Findings and Future Prospects

Camelia Ungureanu <sup>1</sup>, Gratiela Teodora Tihan <sup>1,\*</sup>, Roxana Gabriela Zgărian <sup>1,\*</sup>, Irina Fierascu <sup>2,3</sup>,  
 Anda Maria Baroi <sup>2,3</sup>, Silviu Răileanu <sup>4</sup> and Radu Claudiu Fierăscu <sup>2,5,\*</sup>

<sup>1</sup> Department of General Chemistry, University “Politehnica” of Bucharest, 011061 Bucharest, Romania

<sup>2</sup> National Institute for Research & Development in Chemistry and Petrochemistry ICECHIM, 060021 Bucharest, Romania

<sup>3</sup> Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 011464 Bucharest, Romania

<sup>4</sup> Department of Automation and Industrial Informatics, University “Politehnica” of Bucharest, 011061 Bucharest, Romania

<sup>5</sup> Department of Science and Engineering of Oxide Materials and Nanomaterials, University “Politehnica” of Bucharest, 011061 Bucharest, Romania

\* Correspondence: gratiela.tihan@upb.ro (G.T.T.); roxana.zgarian@upb.ro (R.G.Z.); fierascu.radu@icechim.ro (R.C.F.)



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**Abstract:** Nowadays, special importance is given to quality control and food safety. Food quality currently creates significant problems for the industry and implicitly for consumers and society. The effects materialize in economic losses, alterations of the quality and organoleptic properties of the commercial products, and, last but not least, they constitute risk factors for the consumer’s health. In this context, the development of analytical systems for the rapid determination of the sanitary quality of food products by detecting possible pathogenic microorganisms (such as *Escherichia coli* or *Salmonella* due to the important digestive disorders that they can cause in many consumers) is of major importance. Using efficient and environmentally friendly detection systems for identification of various pathogens that modify food matrices and turn them into food waste faster will also improve agri-food quality throughout the food chain. This paper reviews the use of metal nanoparticles used to obtain bio nanosensors for the purpose mentioned above. Metallic nanoparticles (Au, Ag, etc.) and their oxides can be synthesized by several methods, such as chemical, physical, physico-chemical, and biological, each bringing advantages and disadvantages in their use for developing nanosensors. In the “green chemistry” approach, a particular importance is given to the metal nanoparticles obtained by phytosynthesis. This method can lead to the development of good quality nanoparticles, at the same time being able to use secondary metabolites from vegetal wastes, as such providing a circular economy character. Considering these aspects, the use of phytosynthesized nanoparticles in other biosensing applications is also presented as a glimpse of their potential, which should be further explored.

**Keywords:** metallic nanoparticles; metallic oxides; biosensors; food-borne pathogens; nanotechnology; rapid detection

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