



# New Interferometric Label-Free Biosensing System for Food Allergy Diagnostics in Biophotonic Sensing Cells

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## ABSTRACT:

In this scientific work we developed a high-performance *in vitro* detection system for food allergy in a multiplex serologic IgE format which improves the specificity and selectivity of our biosensors, reducing the cross-reactivity and the matrix-effect in real serum assays. We demonstrated the effectivity of the system for one molecular allergen, with promising results to become a real alternative to existing CRD diagnostic tests based on specific IgE detection.

We accomplished a novel assay framework inspired by the chemical and optical properties of SiO<sub>2</sub> NPs and by the flexibility of the interferometric Fabry-Perot transducer used which helped us to solve the unspecific adsorption problem in diagnostic test based on specific IgE detection by separating the objective molecule, IgE, from the rest of the serum out of the sensor.

The novelty of the methodology lies on the use of a given size of SiO<sub>2</sub> NPs as filtering and signal amplification system to separate IgE from IgG and to improve the interferometric optical signal, respectively

**Keywords:** food allergy, IgE, optical biosensors, interferometer, SiO<sub>2</sub> Nanoparticles.



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