

# Non enzymatic detection of Glycine in synthetic human saliva

Vasquez Jesus<sup>1</sup>, Noe T. Alvarez<sup>1</sup>

<sup>1</sup>Department of Chemistry, University of Cincinnati

## Abstract

Glycine, the smallest amino acid (AA), has emerged as a promising biomarker due to its diverse biological function and involvement in several metabolic pathways. This research focuses on the non-enzymatic detection of glycine using iron oxide nanoparticles ( $\text{Fe}_3\text{O}_4$ ) as catalysts in glycine's oxidation reaction. Detection of glycine has gained significant interest as a biomarker for real-time sensing due to evidence linking to obesity and Nonketotic Hyperglycinemia (Glycine Encephalopathy). Iron oxide nanoparticles exhibit excellent catalytic properties for oxidation reactions. Their high surface area-to-volume ratio allows for efficient contact with reactant molecules, enhancing the catalytic activity. The presence of iron in multiple oxidation states, particularly Fe (II) and Fe (III), enables redox reactions facilitating the transfer of electrons during oxidation processes. Additionally, the synthesis of iron oxide nanoparticles is inexpensive and relatively simple. The electrocatalytic properties of iron oxide nanoparticles enable the oxidation of non-electroactive glycine, offering a potential avenue for the development of glycine sensors. The combination of large surface area of reactive nanoparticles and their assembly into monolayers is an approach that offers a valuable platform for studying advanced catalytic systems with improved performance and selectivity for glycine sensing.

## Biography of Presenter

Jesus is a dedicated chemical engineer pursuing a Ph.D. in Chemistry with a research focus on amino acid sensing using nano catalysts. With a diverse background in the oil industry, volunteer work, and roles as a research and teaching assistant, they have gained practical insights and valuable knowledge in natural gas pipeline construction and design. Fluent in English, German, and Spanish, their passion for community service is evident through their volunteer work, while their contributions as a research and teaching assistant showcase their dedication to their field and education. With a well-rounded skill set and commitment to excellence, Jesus is poised to make significant contributions nanoscience and beyond.

