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Mathematical Model for concentrations of 4-aminobenzoic acid in water [1]

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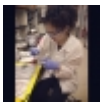 [2]

Research en la Isla del Encanto!

Detecting bioactive agents in water has become a matter of great importance and I am grateful to have been given the opportunity to be a part of this REU program where I have been able to work in a project whose' goal is to advance technology for this matter. I was assigned to work with Dr. Marco De Jesus in the chemistry department of University of Puerto Rico Mayaguez, or as known as "El Colegio". My project was to design a mathematical model that could describe concentrations of bioactive agents in water in the range of zero to saturation point. One of our main tools for this project was using Surface Enhanced Raman Spectroscopy to first detect bioactive agents in water. I was fortunate to work with helpful mentors Dr. De Jesus and his PhD student Hector Areizaga who have guided me through the process from developing a thesis to arriving to a conclusion after performing experiments and optimizing my mathematical model until it converged with experimental data.

Surface Enhanced Raman Spectroscopy (SERS) is an emerging detection technique that enables the rapid detection of pathogens, antimicrobials and other emerging pollutants in water. Metalized elastomers such as polydimethylsiloxane (PDMS) are soft-materials that serve as suitable substrates for SERS. Our work aims to add micro scale features to augment area and plasmonic properties of these soft materials for quantitative applications. This work improves the SERS performance of polidimethylsiloxane (PDMS) by casting it on a microgrit shaped stamp that allows higher signals in SERS of a possible water contaminant.

I came to Puerto Rico having a background in general chemistry only; this research program has helped me understand how math can be applied in this field and I am now more knowledgeable regarding chemistry. I am considering applying math to this subject for my future career now. I consider myself lucky to have had this opportunity and it makes me sad to say good bye to this beautiful island. See you later PR!

Tags:

- UPR-Mayagüez REU RMSM Blog [3]

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