



A Novel Electrochemical Paper Strip for Detection of Tramadol in Real Sample

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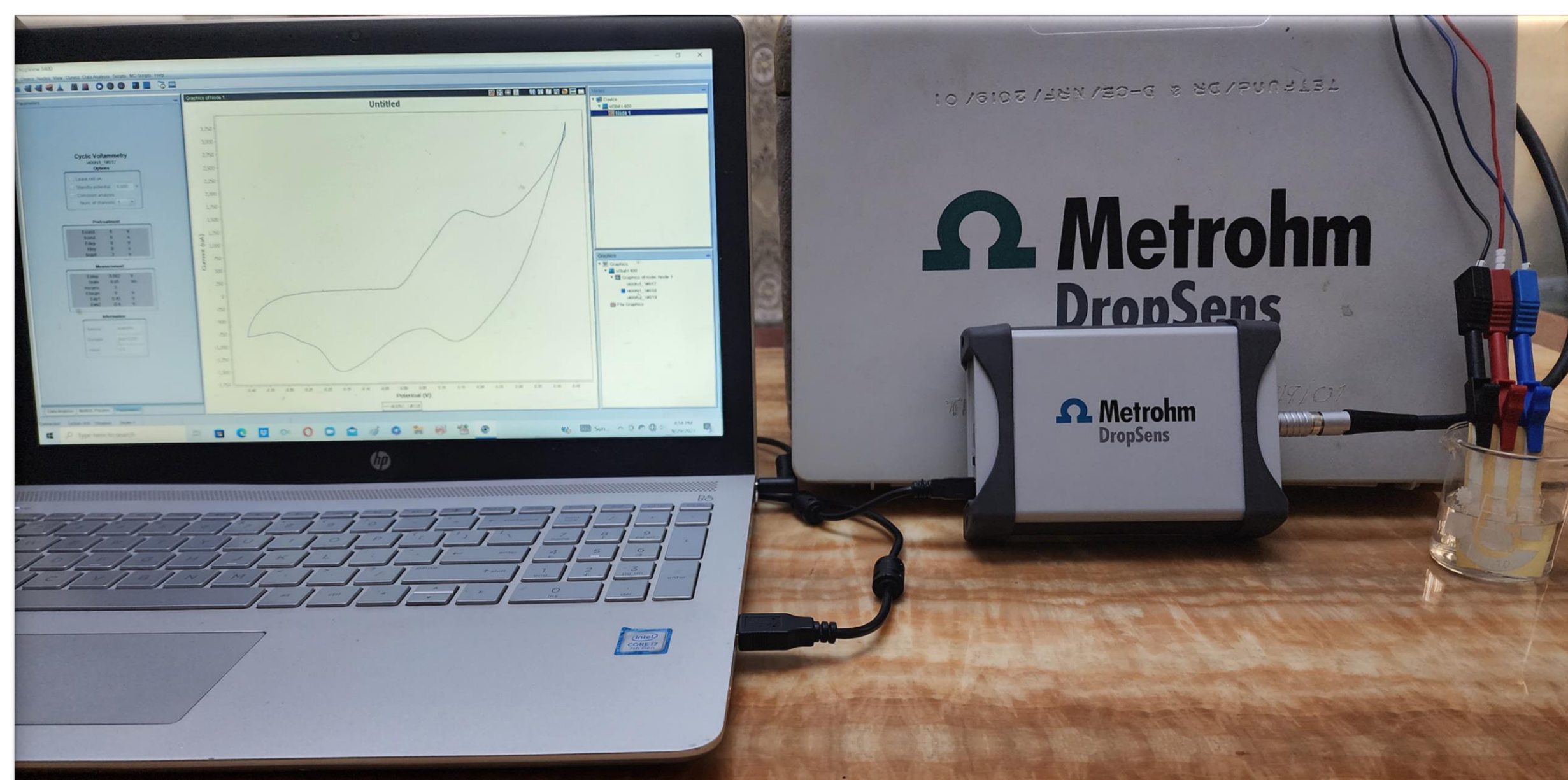
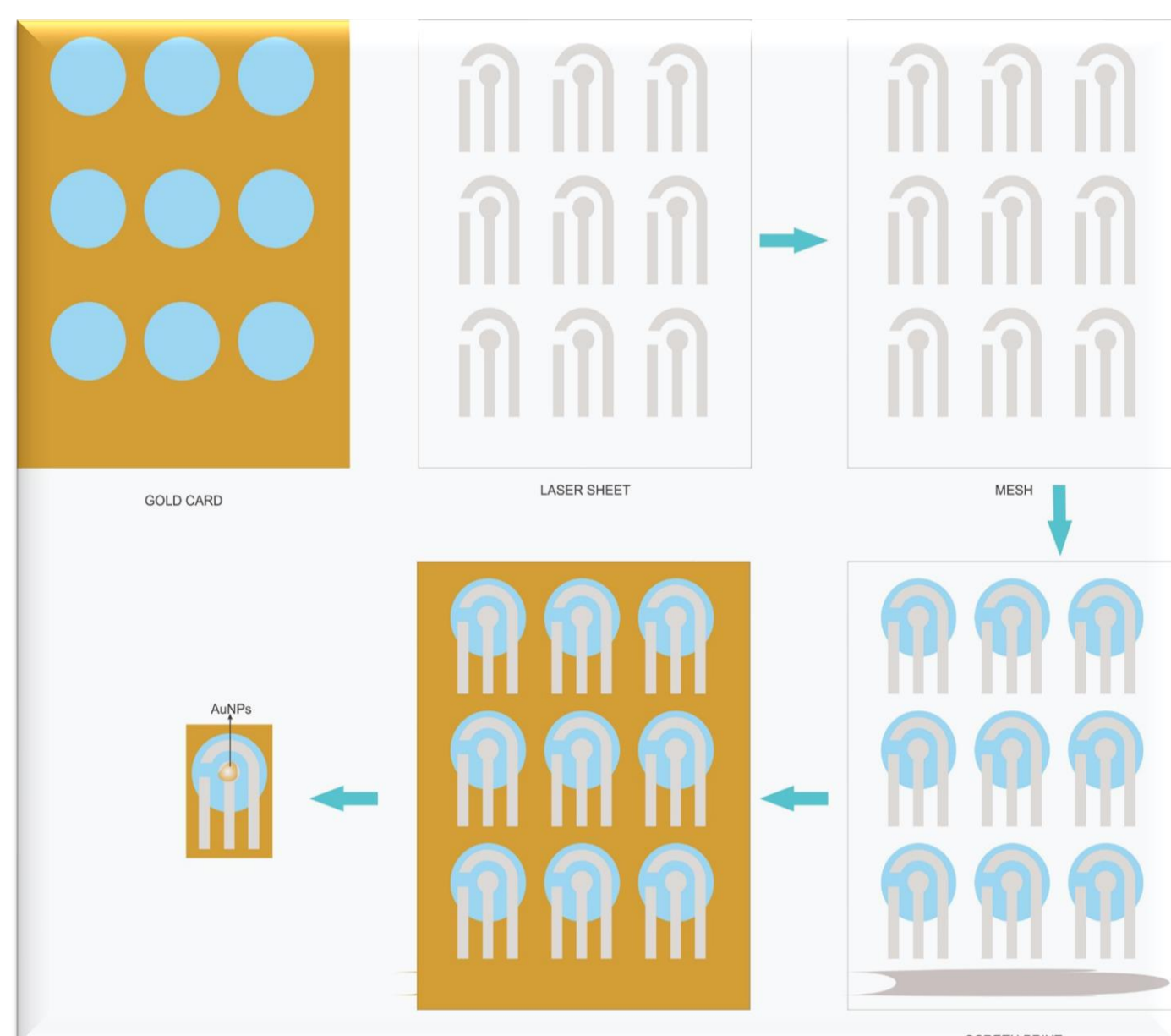
Ensure healthy
lives and promote
well-being for
all at all ages

Introduction

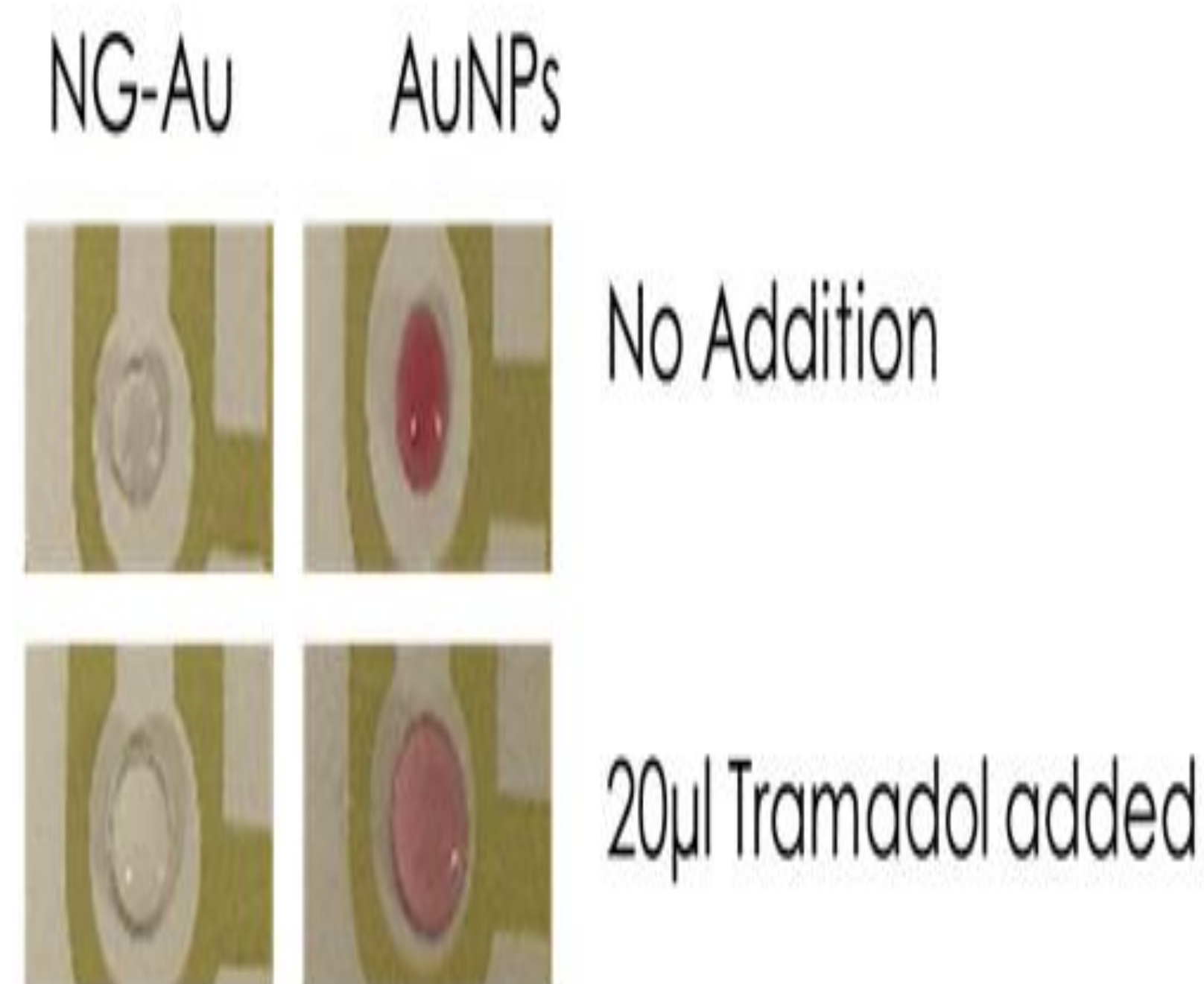
Drug abuse is the misuse and addiction to medicinal opioid products. It is associated with countless number of medical, social, and legal problems. Tramadol is an opioid pain medication that causes seizures, decreased alertness at high doses. Its overdose is toxic in nature and may cause dizziness, nausea and vomiting. A novel electrochemical paper strip was fabricated by screen printing silver ink on a gold card to form a screen printed paper electrode. The electrochemical paper strip was applied in the colorimetric and electrochemical detection of tramadol.

Methodology

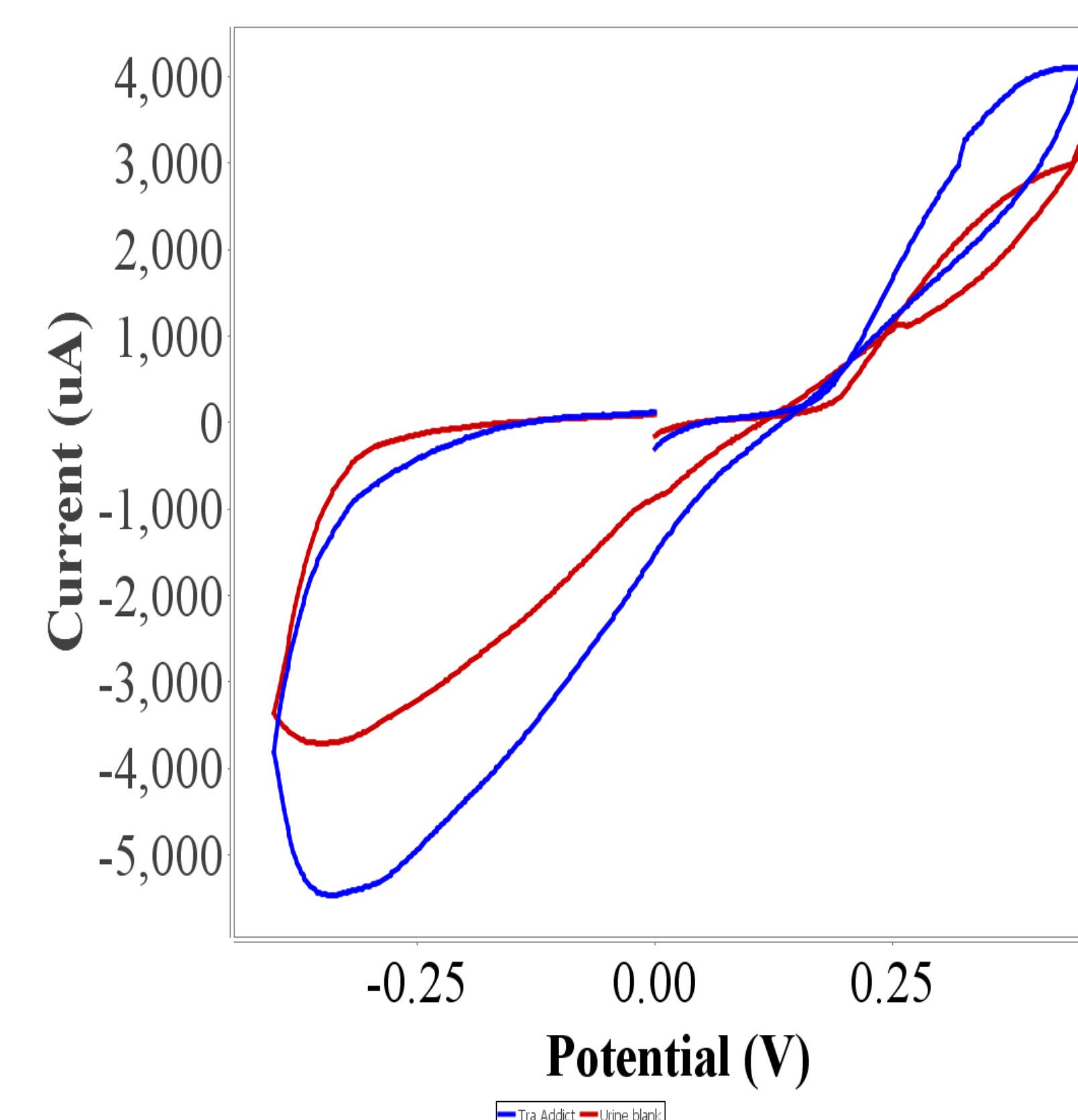
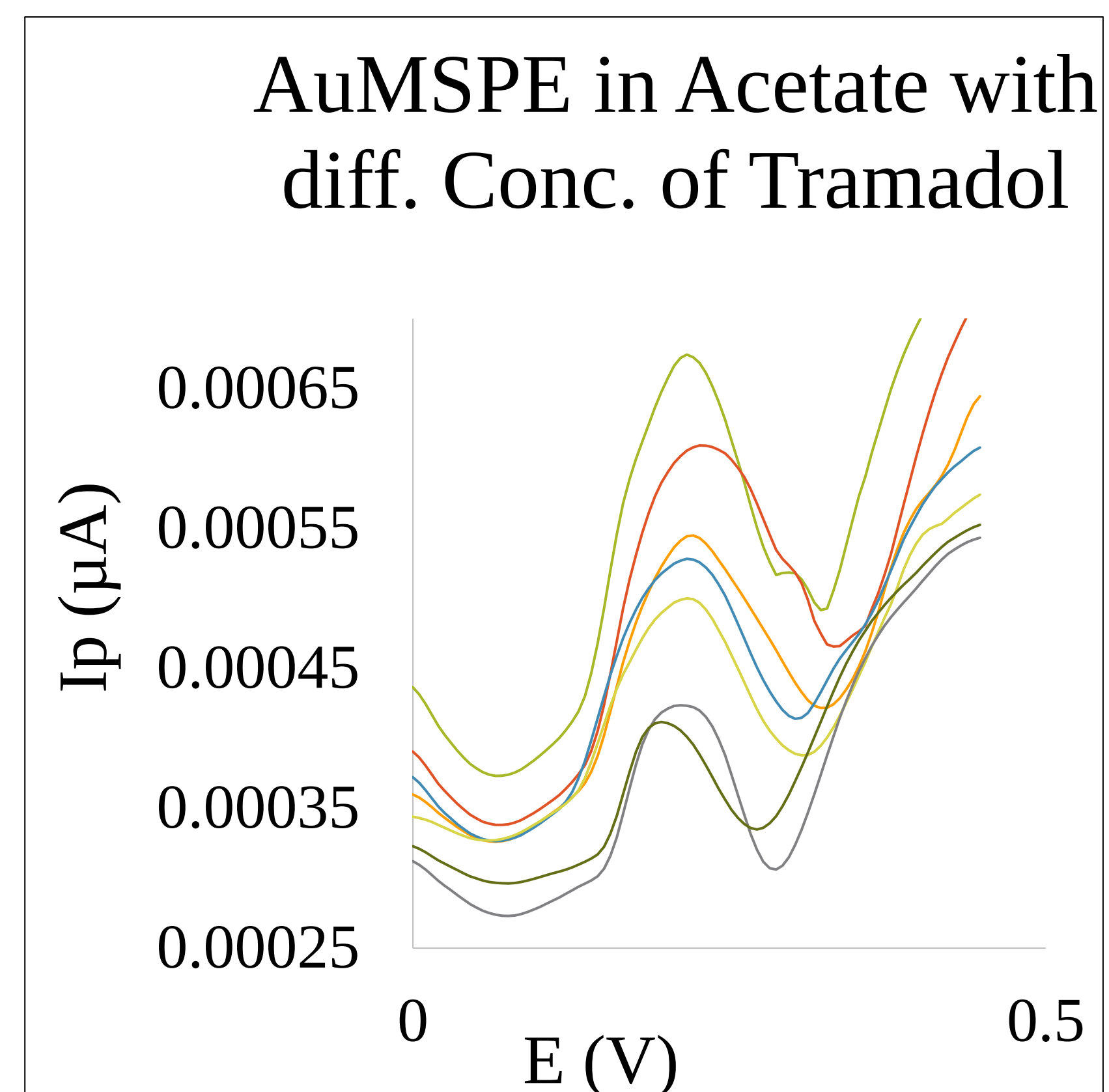
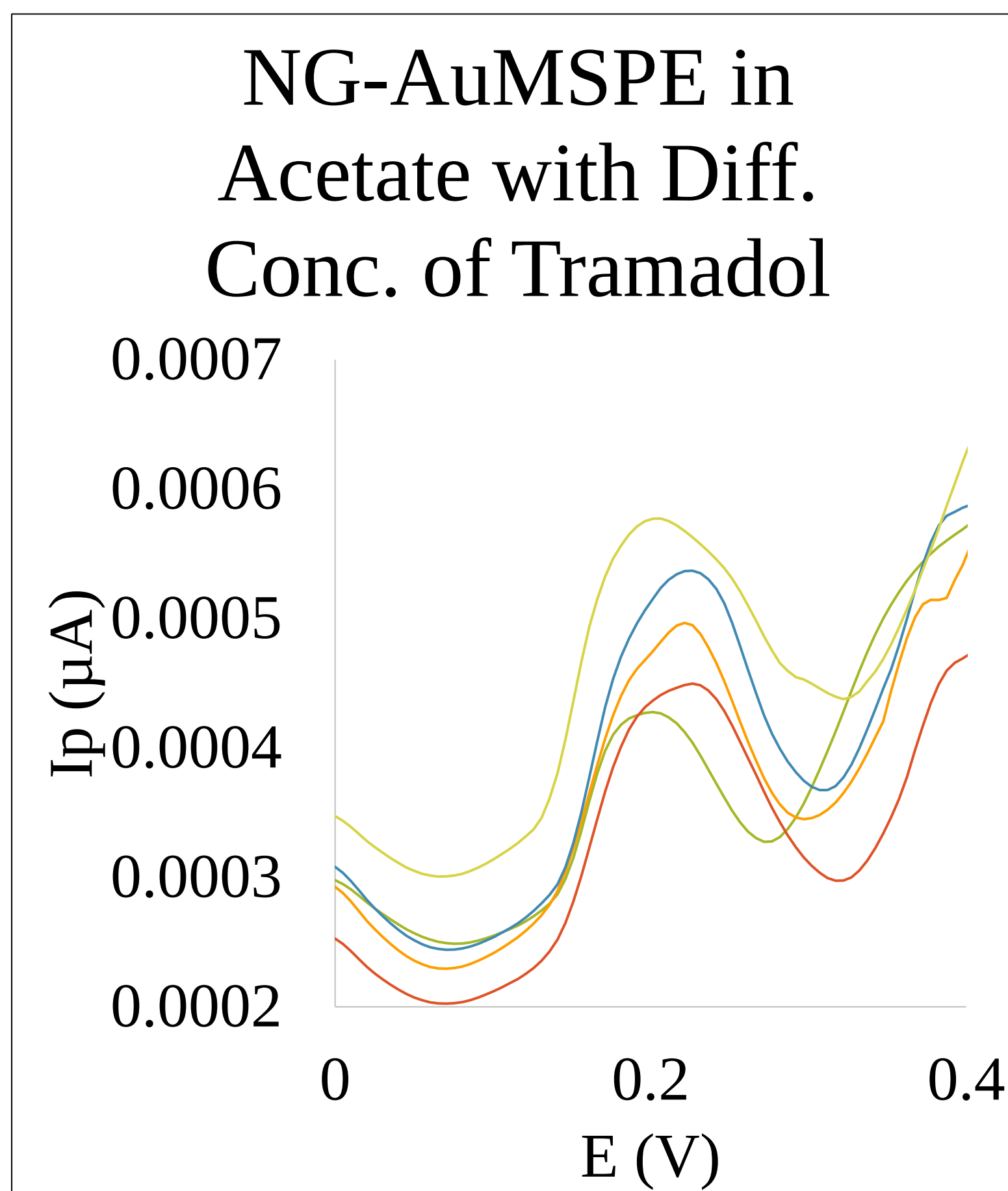
Two distinct patterns were created in Corel Draw. The first pattern, which is made up of circles with 1.6 cm in diameter, was printed using a printer on the card. The second pattern, the electrode layout, was printed on an A4 laser sheet. The electrode layout consists of the working electrode (WE), reference electrode (RE), and counter electrode (CE). The design on the laser sheet was exposed to a mesh, and the mesh was used to screen print silver ink onto the card. The working electrode was subsequently modified with synthesized gold nanoparticles (AuNPs) and gold nitrogen doped graphene (Au-NG).



Result



Colorimetric Study



Real Sample Study

Conclusion

The new electrochemical paper strip was successfully developed and applied in the colorimetric and electrochemical detection of tramadol. Tramadol was detected in human urine sample, showing positive response. The strip can be further developed for on field analysis (such as on the road, airport, rehabilitation facilities etc.)

Reference

- 1.Diouf, A., Aghoutane, Y., Burhan, H., Sen, F., Bouchikhi, B., & El, N. (2021). Tramadol sensing in non-invasive biological fluids using a voltammetric electronic tongue and an electrochemical sensor based on biomimetic recognition. International Journal of Pharmaceutics, 593(November 2020), 120114. <https://doi.org/10.1016/j.ijpharm.2020.120114>.
- 2.Mohseni, N., Bahram, M., &Baheri, T. (2017). Chemical nose for discrimination of opioids based on unmodified gold nanoparticles. Sensors and Actuators, B: Chemical, 250, 509–517. <https://doi.org/10.1016/j.snb.2017.04.145>.

