

## Mango Peel Extract Mediated Synthesis of Silver Nanoparticles and Its Application on Biosensor Current Response Enhancement

YomkippurPerez<sup>a\*</sup>, Lawrence Trinidad<sup>a\*\*</sup>, Erika Mae Espejo<sup>a</sup>, Riza Gabriela Bonifacio<sup>a</sup>, JojoGarcia<sup>a</sup>, Maria MyrelleQuaimbao<sup>a</sup>, Arianne Aquino<sup>a</sup>, and Hilbert Magpantay<sup>a</sup>

<sup>a</sup> University of the Philippines-Diliman, Quezon City, Philippines

\*E-mail: yoki\_perez@yahoo.com

\*\*E-mail: ljprinidad@gmail.com

### ABSTRACT

#### Background:

Silver nanoparticles have acquired widespread application in catalysis, bio-sensing, nanodevice fabrication and in medicine. Although chemical and physical methods have successfully produced well-defined silver nanoparticles, these processes are usually costly and involve the use of toxic chemicals. Because of this, bio-inspired synthesis of silver nanoparticles has become significant in recent years. In the study, silver nanoparticles were synthesized using ripe and unripe mango peel extracts and its application in a polyphenol oxidase-based biosensor was investigated.

#### Methods:

Silver nanoparticles were produced from aqueous silver nitrate using ripe and unripe mango peel extract. The nanoparticles were characterized by UV-visible spectroscopy, Spectrofluorometry and Zeta-sizer. Synthesized silver nanoparticles were added to a sol-gel processed electrode and were analysed using Cyclic voltammetry.

#### Results:

The synthesized silver nanoparticles exhibited a distinct surface plasmon absorbance in its UV-Vis spectrum and a strong fluorescence emission at 340nm. The nanoparticles were generally found to have sizes ranging from 80-90nm. The electrode with silver nanoparticles was found to exhibit a higher current response than that of without the silver nanoparticles.

#### Conclusion:

These findings suggest that ripe and unripe mango peel extract may be used for the synthesis of silver nanoparticles. Synthesized silver nanoparticles may also be used as a current response enhancer. This study was able to combine concepts on nanoparticles, sol-gel enzyme immobilization and biosensor.

**KEYWORDS:** silver nanoparticles; biosynthesis; bio-sensing; mango peels