"*Structural, Photocatalytic and Antibacterial activity of low cost and biogenic Zinc oxide Nanoparticles (ZnONPs)*"

Ms Siti Huzaimah Binti Ribut
Dr. Che Azurahanim Che Abdullah
Dr. Mohd Zaki Bin Mohd Yusoff
Faculty of Science
Universiti Putra Malaysia

The use of plant extract in the synthesis of nanoparticles can minimize the use of chemicals, cost-effective and environmental friendly approach. The current work was carried out to obtain the biogenic zinc oxide nanoparticles (ZnONPs) via green synthesis method using *Citrus hystrix* (*C. hystrix*) plant. The effect of various concentration of precursor on structural, optical, antibacterial and photocatalytic activity was explored. X-ray diffraction (XRD) analysis proved the crystalline nature of the ZnO with wurtzite structure having average crystallite size of 22 nm to 27 nm which was supported by FESEM and HRTEM analysis. The morphology study indicates the nanoparticles is in spherical shape and the formation of biogenic ZnONPs was confirmed by EDX. The existence of chemical bonding and the functional groups are corroborated by FTIR spectra.

For the optical properties, the energy band gap was decreased from 3.36 eV to 3.35 eV with the increasing of the particles size. Photoluminescence analysis exposed that all the emission peak observed in green band of the visible spectrum with a maximum intensity of 487 nm. The antibacterial activity of biogenic ZnONPs against *Escherichia coli (E. coli)* bacteria decreased with the increasing concentration of samples. The photocatalytic activity of biogenic ZnONPs revealed the reduction of methylene orange concentration. The results showed that the biogenic ZnONPs have potential in biological application like wastewater treatment.

Presented at the MTSF Grant Research Symposium held on 26 November 2019.