

## **Ultrasound assisted extraction of nano calcium from waste eggshell: a preliminary study on crystal violet dye removal**

### **ABSTRACT**

Extraction of bio-based calcium carbonate ( $\text{CaCO}_3$ ) nanoparticles from eggshell waste materials assisted by horn-type ultrasonic generator was studied. Chicken eggshells (CS) and duck eggshells (DS) were cleaned and ground using pestle and mortar, and further treated with acetone and dichloromethane (DCM) to remove impurities. The treated eggshells were then ultrasonic irradiated for 5 to 20 min, before sending to Dynamic Light Scattering (DLS) for particle size distribution measurement. Results shown that, nano calcium with approximately 300 nm was being recovered successfully. The recovered nano calcium is later subjected to Crystal Violet (CV) dye removal testing and has recorded a high removal efficiency of up to 87.90 % and 83.06 % for DS and CS, respectively. The high removal efficiency is basically due to the large surface area on calcium nanoparticles created by ultrasonic cavitation, as confirmed by Scanning Electron Microscopy (SEM) analysis.