**GREEN ADSORBENT SYNTHESIS FOR SUSTAINABLE REMOVAL OF PHENOL FROM OLIVE OIL MILL WASTEWATER**

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Olive oil mill wastewater (OMWW) poses a significant environmental challenge due to its high organic loads and phenolic compounds (PCs) content. This study introduces two novel nanoparticle synthesis approaches and their environmental remediation applications. Copper oxide (CuO) nanoparticles were synthesized using microalgal cell lysate supernatant. In contrast, *Verbena officinalis* was utilized as a green reducing agent to synthesize reduced graphene oxide (RGO). Subsequently, RGO and CuO nanoparticles were cross-linked with sodium alginate (SA) to form SA-RGO and CuO-SA beads, respectively. The characteristics of SA-RGO and CuO-SA beads were assessed through scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), Fourier-transform infrared spectroscopy (FTIR), and X-ray diffractometer (XRD). Batch and fixed-bed column adsorption experiments for phenol were conducted to evaluate the sorption capacity of SA-RGO and CuO-SA beads. The results indicated a phenol adsorption capacity of 994 mg g-1 and 314 mg g-1 for SA-RGO and CuO-SA beads, respectively; this adsorption capacity was attained for initial concentration phenol of 4000 mg L-1.

**Keywords**: Green synthesis; Adsorption; Phenol; Olive oil mill wastewater