

### *Cucumis maderaspatanus*-Mediated Synthesis of ZnO/NiO Nanocomposites

Technology Domain: Environmental Technology

Patent Application Number: 202441062387

Status (Patent/TRL): Patent Pending / TRL 3

#### Technology Summary:

This invention details an innovative and eco-friendly process for synthesizing Cm-ZnO/NiO nanocomposites using *Cucumis maderaspatanus* L. (CmL.) leaf extract as a sustainable stabilizing agent, thereby significantly reducing the use of hazardous chemicals in nanoparticle synthesis.

The method involves preparing a concentrated CmL leaf extract, combining it with zinc and nickel precursor solutions, followed by controlled heating, purification, and calcination to optimize the nanocomposite's properties. This novel nanocomposite demonstrates exceptional photocatalytic efficiency in degrading toxic textile dyes like Basic Blue 41 and Reactive Orange M2R under visible light, achieving high removal rates and notably reducing the ecotoxicity of the degraded products. Furthermore, the material exhibits excellent recyclability and stability, presenting a comprehensive, sustainable, and cost-effective solution for industrial wastewater treatment and broader environmental remediation applications.

