

# GREEN SYNTHESIS AND CHARACTERIZATION OF IRON OXIDE MICROPARTICLES USING SUGARCANE (*SACCHARUM OFFICINARUM*) BAGASSE AS CAPPING AND REDUCING AGENT AND ITS APPLICATION AS NOVEL BIOSAND FILTER FOR INDUSTRIAL WASTEWATER TREATMENT

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## ABSTRACT

Wastewater is a major environmental concern of the modern time. One way to solve this problem is through filtration using microtechnology. In this study, iron oxide microparticles were synthesized using sugarcane bagasse as bioreducing and capping agent and utilized as biosand filter composite. Physical and chemical properties of the sample confirmed the presence of Iron oxide revealing the following results: greyish red, solid in powder form, insoluble in water, insoluble in alcohol and non-flammable. This was confirmed further by UV visible spectrometer and Auger Electron Spectroscopy (AES) with absorption peak at 260 nm. The particles were also irregular in shape and varied in size with an average diameter of 1.64  $\mu\text{m}$  as revealed by Field Emission Scanning Electron Microscopy (FESEM). The biosand composite with iron oxide microparticles significantly reduced the pH, turbidity, Total Suspended Solids, Total Coliform, Thermotolerant Fecal Coliform and Dissolved Oxygen of the wastewater after the filtration process and were able to pass the accepted range set for Class C water.

**Keywords:** Sugarcane bagasse; iron oxide microparticels; wastewater.