Abstract

The present study covers the extraction of a glucoxylan polysaccharide-based natural coagulant from the seeds of *Mimosa pudica* used for the removal of methylene blue (MB) dye from wastewater. This study includes successful extraction of the material, analyzing its properties in detail and testing its effectiveness. Techniques like FTIR, XRD, EDX, and SEM were used to characterize the extracted mucilage. FTIR analysis identified the structure rich in hydroxyl (-OH) and carboxylate ($-COO^-$) groups. EDX analysis confirmed the purity of the mucilage and elemental composition by showing it is made primarily of carbon and oxygen with no toxic heavy metal contaminants. SEM investigation shows the mucilage is made of large, irregular, and layered flakes and the size of MP seeds mucilage particles is 3.15 μm. The XRD analysis showed that the mucilage is not a simple amorphous gel but a sophisticated, semi-crystalline bio composite. XRD data used to calculate average crystallite size and crystallinity of MP seeds mucilage and found to be 9 nm and 80.23% respectively. MB adsorption by mucilage was found to be 43.4% by UV-Visible analysis and mucilage adsorption efficiency will increase with the passage of time.