

ABSTRACT

Water scarcity and pollution are pressing issues globally, especially in countries such as Indonesia, where rapid urbanization and industrial growth are straining clean water resources. This study investigates the potential of nanocellulose derived from rice straw as a sustainable solution for water treatment. Using the acid hydrolysis method with varying concentrations of sulfuric acid, nanocellulose was synthesized and tested for its effectiveness in removing contaminants from water. The water sample we will test comes from Cisadane river water which has an average NTU of 38.53. The results showed that nanocellulose with 65% sulfuric acid concentration showed the highest filtration efficiency reducing the NTU to an average of 19.33 from the other concentrations of 45% sulfuric acid with an NTU of 26.38 and 55% sulfuric acid with an NTU of 21.18. Moreover, since rice straw is an abundant agricultural waste, the utilization of nanocellulose offers the dual benefits of waste reduction and water quality improvement. This research underscores the importance of innovative approaches, such as nanotechnology, in addressing water-related challenges and promoting sustainability in water management practices in Indonesia.

Keywords: Water treatment, nanocellulose, rice straw, acid hydrolysis, sulfuric acid concentration, filtration efficiency, Cisadane river, NTU, agricultural waste, sustainability, nanotechnology, Indonesia.