

ABSTRACT

The synthesis of TiO_2 using the sol-gel method with the aid of kabau fruit peel extract produced a good catalyst material for degrading paracetamol solutions. However, the characteristics of the resulting material showed a low degree of crystallinity and a small surface area, resulting in suboptimal photocatalytic activity. Modification using biochar as a dispersing agent aims to produce a modified TiO_2 material with better characteristics and photocatalytic activity than pure TiO_2 . This study used biochar pyrolyzed from kabau fruit peel (*A. bubalinum*) samples as a TiO_2 particle dispersant for the degradation of paracetamol solutions. The optimal pyrolysis temperature for the kabau fruit peel sample was 700 °C. The results showed that biochar-modified TiO_2 had better surface area characteristics and superior photocatalytic activity. BET analysis showed a high surface area of 461.88 m²/g and a pore volume of 0.716 cc/g. The crystallinity tested based on XRD results reached 94.76%. The average size of nano-sized particles (<100 nm) was 14.68 nm. FTIR analysis showed the presence of Ti–O–Ti stretching at a distance of 400–600 cm⁻¹. And the band gap energy was obtained at 3.29 eV. Optimal photocatalytic activity occurred at pH 5, with a paracetamol solution concentration of 5 ppm, and a catalyst mass of 50 mg. During 120 minutes of copying under UV light, a degradation result of 99.18% was obtained.

Keywords: photocatalyst, biochar, paracetamol