

## ABSTRAK

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Judul : *Green Synthesis* CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> nanokomposit menggunakan ekstrak daun *moringa oleifera* untuk fotodegradasi limbah *methylene blue*.

Aktivitas fotokatalis nanopartikel magnetik CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> dalam mendegradasi zat pewarna *methylene blue* (MB) telah berhasil dilakukan. Material nanokomposit CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> disintesis menggunakan metode kopresipitasi. Uji aktivitas fotokatalis dilakukan dengan beberapa variasi massa nanokomposit CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub>. Hasil dikarakterisasi menggunakan X-Ray Diffraction (XRD), Fourier Transform Infra Red (FTIR), dan spektrofotometer UV-VIS. Hasil karakterisasi menggunakan XRD menunjukkan ukuran kristalit dari CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> sebesar  $11,3 \pm 0,1$  nm. Hasil karakterisasi menggunakan FTIR menghasilkan serapan pada bilangan gelombang khas CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub>. Karakterisasi aktivitas fotokatalis yang dilakukan menggunakan spektrofotometer UV-Vis menunjukkan adanya peningkatan persentase degradasi. Variasi massa katalis mempengaruhi proses degradasi, dengan massa sebesar 0,06 gram merupakan massa yang efektif dalam mendegradasi MB. Nanopartikel masih dapat digunakan untuk mendegradasi MB kembali dengan nilai persentase degradasi yang tidak jauh berbeda.

Kata Kunci : Fotokatalis, *methylene blue*, nanokomposit CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub>, kopresipitasi, karakterisasi

## ABSTRACT

*Name: Yumna Haura Zahra*

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*Title: Green Synthesis CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> nanocomposite using moringa oleifera leaf extract for photodegradation of methylene blue waste.*

*Photocatalyst activity of CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> magnetic nanoparticles in degrading methylene blue (MB) dye has been successfully carried out. CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> nanocomposite materials were synthesized using the coprecipitation method. The photocatalyst activity test was carried out with several variations of the mass of the CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> nanocomposite. The results were characterized using X-Ray Diffraction (XRD), Fourier Transform Infra Red (FTIR), and a UV-VIS spectrophotometer. The results of the characterization using XRD showed that the crystallite size of CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> was  $11.3 \pm 0.1$  nm. The results of characterization using FTIR produce absorption at typical CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> wavenumbers. Characterization of photocatalyst activity using a UV-Vis spectrophotometer showed an increase in the percentage of degradation. Variations in the mass of the catalyst affect the degradation process, with a mass of 0.06 gram being the effective mass in degrading MB. Nanoparticles can still be used to degrade MB again with degradation percentage values that are not much different.*

*Keywords : Photocatalyst, methylene blue, CoFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub> nanocomposite, coprecipitation, characterization*