PHOTODEGRADATION OF PARACETAMOL USING ACTIVATED CARBON-TiO_2 UNDER LOW UV LIGHT

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ABSTRACT

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The presence of drug residues in environmental matrices, particularly water, poses significant challenges to community health and safety. Photocatalysis has emerged as a promising water treatment method due to its high efficiency, accuracy, and precision. Titanium dioxide (TiO_2) serves as a semiconductor photocatalyst owing to its stability, affordability, and low toxicity. However, challenges such as rapid electron recombination. In this study, activated carbon (AC) is integrated with TiO_2 to enhance photocatalytic performance against paracetamol under low UV-light irradiation. Various ratios of AC-TiO_2 photocatalysts are evaluated, and the resulting photocatalysts are characterized using SEM-EDX and FTIR analyses. The investigation focuses on activated carbon, and its effects on developing high-performance photocatalysts, encompassing surface morphological, structural, and optical properties, as well as photoinduced electron-hole separation efficiency. The results of photocatalyst performance reveals that the AC-TiO_2 (B) composite exhibits the most effective photocatalytic performance against paracetamol under low UV light intensity, achieving an efficiency of 89.9%. Conversely, AC-TiO_2 (A) and AC-TiO_2 (C) demonstrate lower efficiencies of 86.32% and 78.24%, respectively.

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