

Micropollutant Carbamazepine: Its Occurrences, Toxicological Effects, and Possible Degradation Methods (Review)

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Abstract : Because of its persistence in conventional treatment plants and broad prevalence in water bodies, the pharmaceutical chemical carbamazepine (CBZ) has been suggested as an anthropogenic marker to evaluate water quality. This study provides a thorough examination of the origins and occurrences of CBZ in water bodies, as well as the drug's toxicological effects and laws. Given CBZ's well-documented negative consequences on the human body when used medicinally, cautious monitoring in water is advised. CBZ residues in drinking water may enter embryos and newborns via intrauterine exposure or breast-feeding, causing congenital abnormalities and/or neurodevelopmental issues over time. The insufficiency of solo solutions was shown after an in-depth technical study of traditional and sophisticated treatment technologies. Nanofiltration and reverse osmosis membranes are more successful at removing CBZ than traditional activated sludge and membrane bioreactor techniques. Recent research has shown that severe chemical cleaning, which is essential to prevent membrane fouling, may lower long-term removal efficiency. Furthermore, despite the efficacy of activated carbon adsorption and advanced oxidation processes, a few issues such as chemical cost and activated carbon renewal must be carefully examined. Individual technology constraints lead to the benefits of combined and hybrid systems, namely the heterogeneous advanced oxidation process.

Keywords : carbamazepine, occurrence, toxicity, conventical treatment, advanced oxidation process (AOPs)

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