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Editorial Note on Azo Dyes

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Editorial Note

Fast and relatively unregulated population growth, as well as industrial, agricultural and technological advances, have adversely affected the environment and human health over the last several decades. Toxic organic compounds are found in industrial processing wastewater effluents in particular. Dyes are a well-known source of contamination in the world, so their removal from waste water is gaining momentum. They are typically immune to light, water, oxidising agents and many chemicals and are thus difficult to degrade after they are introduced into aquatic environments.

The most important and most versatile class of organic dye-stuffs is Azo dyes. These comprise one or more azo bonds (-N=N-) in connection with aromatic structures containing functional groups such as-OH and-SO3H as a chromophore community. Azo dyes' complex aromatic structures make them more durable and harder to extract from the effluents discharged into the bodies of water. A number of physical, chemical and biological techniques had been reported for the treatment of all types of dyes with limited success.

Traditional physical techniques (adsorption on activated charcoal, ultrafiltration, reverse osmosis, coagulation by chemical agents, natural method on synthetic adsorbent resins, etc.) may typically be effectively used for the removal of dye contaminants. They are, however, nondestructive since they actually move organic compounds from one phase to another, resulting in secondary emissions. Consequently, regeneration of the adsorbent materials and post-treatment of solid-wastes, which are expensive operations are needed.

Traditional biological treatment methods (microbiological or enzymatic decomposition and biodegradation) are ineffective for decolorization and/or degradation due to the large amount of aromatics present in dye molecules and the durability of modern dyes. In addition, on the sludge, the bulk of dyes is merely adsorbed and not degraded. Chlorination and ozonation are now being used to extract such dyes, but at a slower pace due to their high operating costs. These are the reasons why advanced oxidation processes (AOPs), which can deal with the problem of dye destruction in aqueous systems, have been developed in the last decade.

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