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TREATMENT TECHNIQUES OF INDUSTRIAL WASTEWATER AND ITS REUSE APPLICATION – A REVIEW

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Abstract

Industrial wastewater treatment, recycling, and reuse have become essential strategies for sustainable water management in various industries. In an effort to reduce pollution and their water footprint, industries are rapidly implementing sophisticated wastewater treatment technologies as environmental rules tighten and the world's water supply becomes more limited. The effectiveness, advantages, and difficulties of the many techniques used for recycling and reusing industrial wastewater are discussed in this study. Conventional treatment techniques, including sedimentation, filtration, and chemical coagulation, are essential in primary and secondary treatment processes. Nonetheless, new technologies such as membrane filtration, reverse osmosis (RO), electrocoagulation, and biological treatments have markedly enhanced the efficacy of industrial wastewater recycling. These procedures eliminate impurities, heavy metals, and organic pollutants, rendering the treated water appropriate for reuse in industrial applications such as cooling, boiler feed, and irrigation. Industries are investigating zero liquid discharge (ZLD) technologies, which optimise water recovery and eradicate wastewater discharge, thus ensuring adherence to rigorous environmental standards. Reusing cleaned industrial wastewater has several benefits, such as less need for freshwater resources, financial savings, and a smaller environmental effect. However, issues like elevated operational expenses, energy utilisation, and the necessity for ongoing surveillance and upkeep must be resolved to guarantee the sustainability of these approaches. This research seeks to elucidate recent advancements in industrial wastewater recycling and reuse, presenting a comparative review of various treatment methodologies.

Key words: Effluents; treatment methods; pollution; zero liquid discharge; membrane filtration.

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