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Hydrogels for removal of recalcitrant organic dyes: A Conceptual Overview

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Abstract

The contamination of water by dyes is a very serious environmental problem and as such vast amount of efforts are invested to prioritise the synthesis of the novel adsorbent systems with high sorption capacity and at the same time achieving a major goal to alleviate their non-biodegradable and toxic nature. Removal process of recalcitrant organic dyes has been done in many ways, however adsorption methods are usually best suitable due to their ease of operation and economical value. Various adsorption techniques have been adapted like sawdust and other wood type materials, rice husk, petroleum wastes, fertilizer wastes, fly ash, sugar industry wastes blast furnace slag, chitosan and seafood processing wastes, seaweed and algae, peat moss, clays, red mud, zeolites, sediment and soil, ore minerals etc. However hydrogels with high sorption capacity, high functionality and hydrophilicity pave a probable way for decolourisation of organic dye pollution, as being cost effective, high on demand, biodegradable and their ease of preparation. Moreover, certain modifications in synthesis of hydrogels help to customize them to respond to different external stimuli like temperature, pH and ionic strength with an added advantage in water treatment. The present review is an attempt to provide recent progress in the synthesis of the hydrogels for dye removal from waste waters and insight into increase in their mechanical strength, selectivity, efficiency and their recovery.

Keywords: hydrogels; adsorption; recalcitrant organic dyes; decolourise