Starch-Based Adsorbents for Environmental Applications

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The textile industry effluents containing various types of synthetic dyes is one of the significant cause of water contamination and pose a serious threat to the natural ecosystem. More than one hundred different types of dyes are commercially available that are used in the annual production of over 80 million tons of textile fabrics globally, and the annual cumulative consumption of dyes exceeds 7×10^5 tonnes[1]. Dyes are also widely applied in other industries like printing, pharmaceuticals, paper, and rubber products. It is reported that around 10–15 % of total dyes produced are discharged into water bodies and become toxic due to their mutagenic and carcinogenic nature[2].

The adsorption technique has numerous advantages over the other methods of dyes removal such as low operational cost, ease of operation, high efficiency, environment friendliness, wide adaptability, lower generation of secondary pollutants, etc. Due to their biodegradable and non-toxic nature, various starch-based adsorbents have been developed and have shown remarkable success in heavy metals and dyes removal from wastewater.

The aim of this study was to applied polymeric microspheres based on modified starch, dimethacrylate ethylene glycol, and vinyl acetate for basic dye removal from dyeing baths. The impacts of phase contact time, adsorbate initial concentration, and auxiliaries presence (electrolytes and surfactants) were evaluated on dye sorption effectiveness on starch based adsorbents. Kinetic and equilibrium parameters, as well as desorption and reuse possibility were also discussed.

Keywords: dyes removal, starch-based adsorbent, textile wastewaters

References

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