

## Effective removal of cationic dyes from aqueous solution using gumghatti-based biodegradable hydrogel

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### Abstract

Biodegradable hydrogels of gum ghatti (Gg) with a co-polymer mixture of acrylamide (AAM) and methacrylic acid (MAA) (termed as Gg-cl-P(AAm-co-MAA)) were synthesised by microwave-assisted free radical graft co-polymerisation technique. The hydrogel polymer was characterized by FTIR, SEM, and Brunauer–Emmett–Teller techniques. The Gg-cl-P(AAm-co-MAA) hydrogel was studied as an adsorbent for the removal of methylene blue (MB) and methyl violet (MV) from aqueous solutions. Adsorption of both the dyes followed pseudo-second-order kinetics and Langmuir adsorption isotherm models. The hydrogel polymer adsorbed 98% of MB and 95% of MV from aqueous solution. The Gg-cl-P(AAm-co-MAA) maintained its original sorption capacity for three cycles of adsorption-desorption. Furthermore, the hydrogel polymer degraded fully within 50 days in soil compost. In summary, the Gg-cl-P(AAm-co-MAA) hydrogel could be a potential adsorbent for the remediation of dyes from industrial wastewater.