

Removal of Basic Dyes from Aqueous Medium Using Novel Poly(MAA)-Cross Linked Pregelled Starch Graft Copolymer

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ABSTRACT: Wastewater from textile industries may contain a variety of dyes that have to be removed before their discharge into waterways. For this purpose, pregelled starch (PG) as one of the most abundant biodegradable carbohydrate polymer was first cross linked with epichlorohydrin to obtain insoluble cross-linked pregelled starch (CPS). The latter was graft copolymerized with different amounts of methacrylic acid (MAA) using potassium persulphate as initiator. This was done to obtain six levels of poly(MAA)-cross linked pregelled starch graft copolymers (PMCPs) having different graft yields (expressed as meq COOH/100 g starch) with increasing order and designated as (PMCPs 1 to PMCPs 6). The latter copolymers were used to remove basic dyes namely (safranin T, methylene blue, crystal violet) from their solution and filtered to form polymer—dyes complex. Major factors affecting the

dyes removal such as dye concentration, pH, polymer dose, treatment time, agitation speed, and extent of grafting were studied in detail. It was found from the obtained results that; the % dye removal increased by (a) increasing the dye concentration and pH within the range studied; (b) increasing the agitation speed until ≥ 40 rpm then leveled off thereafter; (c) increasing the polymer dosage from 0.25 to 3.0 g/L then leveled off thereafter; (d) increasing the time of the reaction up to 60 minute then leveled off after that; and (e) increasing the extent of grafting of PMCPs i.e., from PMCPs 1 to PMCPs 6. © 2010 Wiley Periodicals, Inc. *J Appl Polym Sci* 118: 2728–2735, 2010

Key words: pregelled starch; epichlorohydrin; cross-linking; methacrylic acid; grafted starch; activated carbon; dyes removal