

Manida Kaewphetsuwan 2014: Preparation and Characterization of Tapioca starch-Graft-Poly(*2-methacryloxyethyl trimethyl ammonium chloride*) as Environmentally Friendly Dual Functional Flocculants. Master of Engineering (Advanced and Sustainable Environmental Engineering), Major Field: Advanced and Sustainable Environmental Engineering, Faculty of Engineering. Thesis Advisor: Miss Chalida Niamnuy, D.Eng. 98 pages.

Water pollution arising from industrial processes is a matter of great concern. The effluents contain high level of suspended solid, turbidity, acidity or alkalinity and contaminants including dyes and heavy metal ions. These effluents will cause considerable damage to the environment and human health if discharged. Flocculation is an efficient and cost-effective method for wastewater treatment process. Natural flocculants become more attractive with their tailor-made, high flocculation ability and environmentally friendly. Tapioca starch is much highlighted to modify via conventional free-radical graft copolymerization with strongly positively charged monomer (*2-methacryloxyethyl trimethyl ammonium chloride*) (DMC) to enhance the flocculation ability. To optimize the graft copolymerization condition, the Box-Behken design (BBD) from Response surface methodology was applied. The successful of modified starch by grafting was confirmed by physiochemical characterization. CHN elemental analysis and the FTIR spectra revealed the presence of N-content and characteristic peak of PDMC. Jar test is a conventional and popular method to find the approximately pH and flocculants dosage for the each flocculation system. It could be implied that the highly positively charged polymer was grafted to tapioca starch backbone enhanced their flocculation ability and their performance was equal to the commercial flocculants (PDADMAC) in any pH conditions. Hexavalent chromium ions (Cr(VI)) and Congo red dye could be accomplished by this innovate modified starch grafted copolymer.

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