



## Guar-Graft (Vinylacetate-Co-Ethylacrylate-Co-Acrylamide): A Potential Hg(II) Adsorbent

Angela Singh and Vandana Singh\*

Department of Chemistry, University of Allahabad, Allahabad-211002, **INDIA**

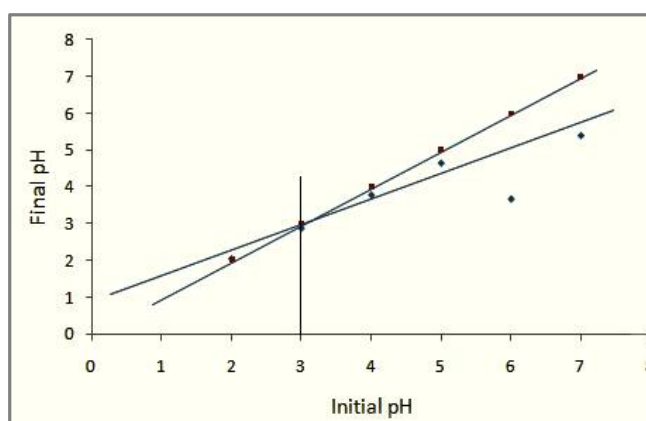
Email: [vschemau@gmail.com](mailto:vschemau@gmail.com)

Accepted on 7<sup>th</sup> February, 2019

### ABSTRACT

With the aim to explore new efficient, low-cost and environment-friendly adsorbent for water purification, a ternary graft copolymer (GG-g-poly-(VAC-co-EA-co-AAm)) has been synthesized. Vinyl acetate and ethyl acrylate (VAC+EA) with comonomer acrylamide (AAm) were grafted onto guar gum using potassium persulfate/ascorbic acid (KPS/AA) redox initiator. The concentration of acrylamide was varied (from 0.08 to 0.2 M) at the pre-optimized conditions for binary grafting (vinyl acetate = 0.46 M, ethylacrylate = 0.38 M, potassium persulfate =  $1.0 \times 10^{-2}$  M, ascorbic acid =  $2.3 \times 10^{-2}$  M, grafting time = 1 h) at 35 °C. The optimum ternary grafting percentage was obtained when the molar ratio of vinyl acetate, ethyl acrylate, and acrylamide was for 0.46: 0.38: 0.12. The synergistic effect of the ternary monomers (VAC+EA+AAm) were advantageous for achieving better % G (106%) as compared to % G for the unitary (VAC) and binary (VAC+EA) vinyl monomer/s. The graft copolymers were characterized by Fourier transform infrared spectroscopy (FTIR), Thermo gravimetric analysis (TGA) and Scanning electron microscopy (SEM). The ternary copolymer (GG-g-poly-(VAC-co-EA-co-AAm)) was found efficient in Hg(II) uptake.

### Graphical Abstract



Determination of zero-point charge of the TC<sub>3</sub>

**Keywords:** Guar gum, Vinylacetate, Ethylacrylate, Acrylamide, Grafting, Hg(II) removal.