# Accepted Manuscript

Title: Borax cross-linked guar gum hydrogels as potential adsorbents for water purification

Authors: Nandkishore Thombare, Usha Jha, Sumit Mishra,

M.Z. Siddiqui

PII: S0144-8617(17)30350-8

DOI: http://dx.doi.org/doi:10.1016/j.carbpol.2017.03.086

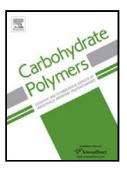
Reference: CARP 12175

To appear in:

Received date: 19-2-2017 Revised date: 15-3-2017 Accepted date: 27-3-2017

Please cite this article as: Thombare, Nandkishore., Jha, Usha., Mishra, Sumit., & Siddiqui, M.Z., Borax cross-linked guar gum hydrogels as potential adsorbents for water purification. *Carbohydrate Polymers* http://dx.doi.org/10.1016/j.carbpol.2017.03.086

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# ACCEPTED MANUSCRIPT

### Borax cross-linked guar gum hydrogels as potential adsorbents for water purification

Nandkishore Thombare\*<sup>1</sup>, Usha Jha<sup>2</sup>, Sumit Mishra<sup>2</sup> and M. Z. Siddiqui<sup>1</sup>

- 1. Processing and Product Development Division, ICAR-Indian Institute of Natural Resins and Gums, Namkum, Ranchi-834010, India
  - 2. Department of Chemistry, Birla Institute of Technology, Mesra, Ranchi-835215, India
  - \*Correspondence: nandkishore.icar@gmail.com; Phone: +91-6512261152; Fax: +91-6512260202

## **Highlights**

- Synthesis of borax cross-linked guar gum hydrogels and its optimization
- Characterization with FTIR, surface morphology, thermal and water absorption studies
- Evaluation of flocculation efficiency at different pH, cross checked with floc size
- Comparison with commercial coagulant alum and evaluation of Al & K residues by ICP-OES
- Evaluation of (aniline blue) dye removal efficiency

#### Abstract

With the aim to explore new adsorbents for water purification, guar gum based hydrogels were synthesized by cross-linking with borax at different percentage. The cross-linking was confirmed through characterization by FTIR spectroscopy, SEM morphology, thermal studies and water absorption capacity. To examine the adsorption / absorption performance of different grades of hydrogels, their flocculation efficiency was studied in kaolin suspension at different pH by standard jar test procedure. The flocculation efficiency of the test materials was compared with the commercially used coagulant, alum and also residues of Al and K left in the treated water were comparatively studied. The synthesized hydrogels were also tested for their efficiency of removing Aniline Blue dye by UV–Vis spectrophotometer study. The best grade hydrogel outperformed alum, at extremely low concentration and also showed dye removing efficiency up to 94%. The single step synthesized green products thus exhibited great potential as water purifying agents.

**Keywords:** Natural gum, borate, flocculation, dye removal, adsorption

#### 1. Introduction

Development of eco-friendly and effective polymers for water treatment and pollution remediation is need of the hour. Inorganic coagulants such as alum, polyaluminium chloride, ferric chloride, ferrous

## Download English Version:

# https://daneshyari.com/en/article/5157119

Download Persian Version:

https://daneshyari.com/article/5157119

<u>Daneshyari.com</u>