catalysts

Ms. Ref. No.: catalysts-1584262

Title: Bio-stimulated adsorption of Cr(VI) from aqueous solution by Groundnut Shell Activated Carbon@Al embedded material

Response to Reviewer-3 Comments

We appreciate the efforts of the reviewers for their detailed and insightful comments, which have helped us to improve the quality of our manuscript. A point-by-point response to the reviewer-3 comments is appended below for your convenience.

The manuscript entitled 'Bio-stimulated adsorption of Cr(VI) from aqueous solution by Groundnut Shell Activated Carbon@Al embedded material' by Rao et al focuses on the synthesis of bioadsorbent aluminum metal blended with groundnut shell activated carbon material (Al-GNSC) and it practical application for Cr(VI) adsorption from waste aqueous solutions. Very interesting and well-carried study. The experimental approach is sound. The manuscript is well-organized, all the conclusions are supported by the presented data.

The paper mainly presents two key contributions:

1. Synthesis of bioadsorbent and evaluation of its structure using SEM and FT-IR spectroscopy.
2. Examination of prepared adsorbents for Cr(VI) ions removal.

There are some points which must be edited or clarified by providing additional information or comments:

Comment 1: The authors should write the complete terms of all abbreviations (including the instruments) before the first use in the abstract and main manuscript i.e. FT-IR and SEM in abstract section et al.

Response: We acknowledge the reviewer's opinion. According to the reviewer suggestion, the complete terms of all abbreviations are mentioned before the first use in the revised manuscript. Thank you for your valuable suggestion.

Comment 2: The authors should clearly explain the innovation and importance of their work on the introduction of the manuscript. They should justify the value of the work and compare their work with previously similar published papers.

Response: We acknowledge the reviewer's opinion. As suggested, the novelty of the research work is explained in the introduction part of the revised manuscript, and the

obtained results are compared with the recent literature. Thank you for your valuable suggestion.

Comment 3: Fig. 1 - for a more effective visual comparison, authors recommended to provide SEM images of the same scale. In such form is rather difficult to make adequate comparison.

Response: We acknowledge the reviewer's opinion. According to the reviewer suggestion, the SEM images with same scale are provided in the revised manuscript. Thank you for your valuable suggestion.

Comment 4: EDX analysis (Fig 3) - a very conditional (not specific) type of analysis of the chemical composition of the surface. Often, spectra with different atomic abundances of elements can be obtained even from the same sample. First of all, authors have to attach a EDX mapping images before/after sorption of chromium ions. And the authors are strongly recommended to add XPS spectra to this section of revised manuscript. The XPS method is much more sensitive and more accurately determines changes in the chemical composition of samples.

Response: We acknowledge the reviewer's opinion. However, we regret that we were not able to investigate the XPS analysis due to pandemic situation, which could definitely give us additional information about the elemental confirmation. We hope the reviewer understand the experimental deficiencies at the stage of the present experiments. We deeply appreciate the comment raised by the reviewer. Thank you very much.

Comment 5: Why authors did not use XRD technique for sample characterization?

Response: We acknowledge the reviewer's opinion. According to the reviewer suggestion, XRD study has been performed and incorporated in the revised manuscript. Thank you for your valuable suggestion.

Comment 6: The adsorption capacities of Al-GNSC adsorbents at different contact times have been provided. Which kinetics are right? Please add missing information about appropriate kinetic model in revised manuscript.

Response: We acknowledge the reviewer's opinion. According to the reviewer suggestion, kinetic study has been performed and incorporated in the revised manuscript. Thank you for your valuable suggestion.

Comment 7: It is rather difficult to make an adequate comparison of certain properties (catalysts or sorbents) with the already available results, since the concentration of the pollutant and the mass of the loaded sorbent vary in each experiment. Therefore, the authors are recommended to add the missing information (i.e. conditions for testing sorbents of Cr(VI) ions) to Table 3.

Response: We acknowledge the reviewer's opinion. According to the reviewer suggestion, the conditions for testing adsorbents of Cr(VI) is incorporated in the Table and is mentioned in the revised manuscript. Thank you for your valuable suggestion.

Adsorbent Material	Initial Cr(VI) Conc. (ppm)	pH	Contact Time (min)	Adsorbent dosage ($g\ l^{-1}$)	Maximum adsorption capability ($mg\ g^{-1}$)	References
Activated carbon (AC) prepared from coconut tree sawdust	10	3.0	180	0.2	3.46	[29]
Raw coconut fiber	250	1.0	270	10	18.60	[30]
Sugarcane bagasse	100	2.0	90	10	1.76	[31]
Canadian peat Coconut fiber	50	2.0	4320	25	4.61 4.71	[32]
peanut shell (P. Shell), sawdust (S. Dust) and *Cassia fistula* leaves (C.F. Leaves).	40	2.0	360	5	4.32 3.66 & 4.48	[33]
Al-GNSC	100	4.0	60	8	13.458	Present Work

Comment 8: In order to confirm proposed mechanism of Cr(VI) adsorption (illustrated on the fig 6) Authors should provide data on adsorption capacity of pristine groundnut shell activated carbon (not modified with Al).

Response: We acknowledge the reviewer's opinion. According to the reviewer suggestion the adsorption capacity of groundnut shell activated carbon (Q_e= 7.4 mg/g) is mentioned in the revised manuscript. Thank you for your valuable suggestion.

Comment 9: The conclusion section should be elaborated and improved. The author should bring specific conclusions in accordance with obtained results.

Response: We acknowledge the reviewer's opinion. According to the reviewer suggestion the conclusion section is elaborated with specific conclusions in the revised manuscript. Thank you for your valuable suggestion.

Comment 10: Moderate English changes required

Response: We acknowledge the reviewer's opinion. As suggested by the reviewer, we checked the manuscript carefully and enlisted a professional English language service to eliminate the spelling mistakes and grammatical errors. Thank you for your valuable suggestion for strengthening the quality of the manuscript.

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Editing Certificate

This document certifies that the manuscript listed below has been edited to ensure language and grammar accuracy and is error free in these aspects. The edit was performed by professional editors at Editage, a division of Cactus Communications. The author's core research ideas were not altered in any way during the editing process. The quality of the edit has been guaranteed, with the assumption that our suggested changes have been accepted and the text has not been further altered without the knowledge of our editors.

MANUSCRIPT TITLE
Biosorption of Cr(VI) Using Aluminum Metal Embedded with Groundnut Shell Activated Carbon

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Chief Operating Officer - Editage

The authors are very thankful to the Reviewer for their valuable suggestions for the improvement of the manuscript.

All the modifications are shown in yellow color in the revised manuscript.

With regards

Ravindranadh Koutavarapu, Ph.D.