

Mobility of As, Cr and Cu in a contaminated grassland soil in response to diverse organic amendments; a sequential column leaching experiment

Kerry Mitchell, Lukas Trakal, Hana Sillerova, Francisco Javier Avelar-González, Alma Lilian Guerrero-Barrera, Rupert Hough, Luke Beesley



PII: S0883-2927(17)30091-4

DOI: [10.1016/j.apgeochem.2017.05.020](https://doi.org/10.1016/j.apgeochem.2017.05.020)

Reference: AG 3895

To appear in: *Applied Geochemistry*

Received Date: 30 January 2017

Revised Date: 12 April 2017

Accepted Date: 23 May 2017

Please cite this article as: Mitchell, K., Trakal, L., Sillerova, H., Avelar-González, F.J., Guerrero-Barrera, A.L., Hough, R., Beesley, L., Mobility of As, Cr and Cu in a contaminated grassland soil in response to diverse organic amendments; a sequential column leaching experiment, *Applied Geochemistry* (2017), doi: 10.1016/j.apgeochem.2017.05.020.

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.

Mobility of As, Cr and Cu in a contaminated grassland soil in response to diverse organic amendments; a sequential column leaching experiment

Kerry Mitchell^{a1}, Lukas Trakal^a, Hana Sillerova^a, Francisco Javier Avelar-González^b, Alma Lilian Guerrero-Barrera^b, Rupert Hough^c, Luke Beesley^{c2}

^a*Department of Environmental Geosciences, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 129, 16521 Praha 6 Suchbát, Czech Republic*

^b*Universidad Autónoma de Aguascalientes, Avenida Universidad #940, Aguascalientes, 20231 Aguascalientes, México*

^c*The James Hutton Institute, Craigiebuckler, Aberdeen AB15 8QH, UK*

Abstract

In this study, sequential column leaching coupled with batch sequential extraction assays were used to assess the fate of arsenic, chromium and copper in a wood ash contaminated alkaline grassland soil amended with biochar and its non-pyrolysed origin source material. Application of both amendments resulted in a general reduction of copper and arsenic mobility. Chromium, confirmed to be highly mobile under the high pH conditions of the experimental soil, was also stabilised with both amendments, though its mobility was more significantly reduced in soils amended with the source material. This was attributable in part to lower pH in the source material amended soils when compared to the biochar amended soils which facilitated the reduction of the more mobile chromium (VI) to less mobile chromium (III), as confirmed by ion exchange chromium speciation. In this study, the use of biochar vs source material was beneficial only for select metals, thus highlighting the importance of considering the specific physico-chemical conditions and metal(loid) properties in contaminated soils during the evaluation of remediation strategies.

Keywords *arsenic, chromium, copper, biochar, leaching, ash, speciation, CCA*

¹ Present Address:

*St. George's University,
P.O. Box 7, True Blue, St. George's, Grenada, W.I.*

² Corresponding Author:

Email: luke.beesley@hutton.ac.uk

Download English Version:

<https://daneshyari.com/en/article/8863254>

Download Persian Version:

<https://daneshyari.com/article/8863254>

[Daneshyari.com](https://daneshyari.com)