LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Karya Ilmiah (artikel : Crystallization of struvite in a hydrothermal solution with and without calcium and carbonate ions

Nama Penulis : Athanasius P. Bayuseno, Wolfgang W. Schmahl
Jumlah Penulis : 2
Status Pengusul : Penulis pertama/penulis ke-1/Penulis korespondensi*
Identitas Jurnal Ilmiah:
a. Nama Jurnal : Chemosphere
b. Nomor ISSN : 0045-6535
c. Volume, Nomor, Bulan Tahun : 250, July 2020, 126245
d. Penerbit : Elsevier Publishers
e. DOI artikel (jika ada) ://doi.org/10.1016/j.chemosphere.2020.126245
f. Alamat web Jurnal : www.elsevier.com/locate/chemosphere
g. Terindeks di Scimagojr/Thomson Reuter ISI Knowlegde, ESCI, Gale, SCOPUS, EBSCO Host

Kategori Publikasi Jurnal Ilmiah (beri √pada kategori yang tepat)
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b. Ruang lingkup dan kedalaman pembahasan (30%)	11,75	11,5	11,625
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	11,75	11,5	11,625
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	11,75	12,00	11,875
Total = (100%)	**39,25**	**39**	**39,125**
Nilai Pengusul = (60% x 39,125) = 23,475			

Semarang, 12 Desember 2020

Reviewer 2

Prof. Dr. Moh. Djaeni, S.T., M.Eng.
NIP. 197102071995121001
Unit Kerja : Teknik Kimia FT UNDIP

Reviewer 1

Prof. Dr. Jamari, ST., MT.
NIP. 19740304 200012 1001
Unit Kerja : Teknik Mesin FT UNDIP

*Coret yang tidak perlu

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Kelengkapan unsur isi artikel (10%)	4			4
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Total = 100%	40			39,25
Nilai Pengusul	**60 % x 34,5**			**23,55**

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Semarang, 12/12/2020
Reviewer 1,

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Bidang Ilmu : Teknik Mesin

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LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
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Komponen yang dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir yang Diperoleh
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Kelengkapan unsur isi artikel (10%)	4			4,0
Ruang lingkup dan kedalaman pembahasan (30%)	12			11,5
Kecukupan dan kemutakhiran data /informasi dan metodologi (30%)	12			11,5
Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			12,0
Total = 100%	40			39,0
Nilai Pengusul	60%x39,0			23,4

1-Kelengkapan unsur isi artikel (10%)
Unsur isi artikel sangat lengkap sesuai dengan guidelines jurnal; Title, Introduction, Materials and Method, Results and Discussion, Conclusion, References serta semua grafik dan tabel yg disajikan dibahas. Semua grafik dan tabel yg disajikan dibahas. **(nilai: 4,0).**

2-Ruang lingkup dan kedalaman pembahasan (30%)
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3-Kecukupan dan kemutakhiran data /informasi dan metodologi (30%)
Artikel ini men-sitasi 66 referensi, dimana 59 diantaranya adalah terbitan 10 tahun terakhir. Novelty yg dikemukakan dalam makalah ini sangat tinggi. Metodologi disajikan secara sistimatis sehingga mudah diikuti. **(nilai: 11.5).**

4-Kelengkapan unsur dan kualitas terbitan/jurnal (30%)
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Document type
Article

Source type
Journal

ISSN
00456535

DOI
10.1016/j.chemosphere.2020.126245

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Crystallization of struvite in a hydrothermal solution with and without calcium and carbonate ions

Bayuseno A.P.[a] , Schmahl W.W.[b]

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Environmental Chemistry (including Persistent Organic Pollutants and Dioxins)

Research article ○ Abstract only

Coagulation of organo-mineral colloids and formation of low molecular weight organic and metal complexes in boreal humic river water under UV-irradiation
O.Yu. Drozdova, A.R. Aleshina, V.V. Tikhonov, S.A. Lapitskiy, O.S. Pokrovsky
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Research article ○ Abstract only

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Transfer and bioaccumulation of mercury from soil in cowpea in gold mining sites
José Marrugo-Negrete, José Durango-Hernández, Luis Díaz-Fernández, Iván Urango-Cárdenas, ... Sergi Díez
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Crystallization of struvite in a hydrothermal solution with and without calcium and carbonate ions

Athanasius P. Bayuseno, Wolfgang W. Schmahl
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Role of polyphenol in sugarcane molasses as a nutrient for hexavalent chromium bioremediation using bacteria

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Direct and residual impacts of zeolite on the remediation of harmful elements in multiple contaminated soils using cabbage in rotation with corn

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Chemosphere 250 (2020) 126245

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Crystallization of struvite in a hydrothermal solution with and without calcium and carbonate ions

Athanasius P. Bayuseno [a, *], Wolfgang W. Schmahl [b]

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[b] Department of Earth-and Environmental Sciences, Ludwig-Maximilian- University of Munich, Germany

HIGHLIGHTS

- Hydrothermal simulation of struvite with a variety of $Mg^{2+}/Ca^{2+}/HCO^{-}_{3}$ ratios.
- Biomineralization of struvite and Ca-phosphate occurs in the hydrothermal solution.
- Regulation of $Mg^{2+}/Ca^{2+}/HCO^{-}_{3}$ ratios minimize precipitation of calcium phosphate.
- The quality and quantity of struvite relates varying pH and $Mg^{2+}/Ca^{2+}/HCO^{-}_{3}$ ratios.

ARTICLE INFO

Article history:
Received 6 November 2019
Received in revised form
15 February 2020
Accepted 15 February 2020
Available online 17 February 2020

Handling Editor: Yongmei Li

Keywords:
MAP solution
Hydrothermal method
Phosphate recovery
Struvite: hydroxyapatite

ABSTRACT

Hydrothermal experiments with magnesium, ammonium, and phosphate (MAP) solution at a temperature of 120 ^{O}C for 24 h and pH (9 and 10), whilst effects of varying $Mg^{2+}/Ca^{2+}/HCO^{-}_{3}$ ratios on struvite crystallization were examined. The study was performed to investigate their effects on the quality and quantity of crystals using the XRPD Rietveld refinement and SEM method. Obviously, the struvite crystallization was inhibited through the forming of calcite, dolomite, hydroxyapatite, sylvite, and Mg-whitlockite under different pH conditions. In the absence of Ca^{2+} and HCO^{-}_{3} ions, struvite and dittmarite were formed at pH solutions (9 and 10). Struvite proportion reduced with pH (9 and 10) under $Mg^{2+}/Ca^{2+}/HCO^{-}_{3}$ ratios (1:1:1 and 2:1:1), and depleted under the $Mg^{2+}/Ca^{2+}/HCO^{-}_{3}$ ratio of 1:2:2. An obvious change in morphologies of crystals into nanosized particles was observed. Results of the low proportion of struvite for experiments with $Mg^{2+}/Ca^{2+}/HCO^{-}_{3}$ molar ratios may be a drawback for phosphate recovery.

1. Introduction

Recovery of valuable compounds such as ammonium and phosphate from wastewater can be implemented through “simple to use” hydrothermal method. Recently, the hydrothermal system is widely known to be simple, cost-effective and easy to set up (Jesse and Davidson, 2019; Xue et al., 2015). Moreover, the system is suitable for use of wastewater treatment because of their low energy consumption (low temperatures in the single-step process), reduction of environmental impact, production with the versatility of struvite in any form and size. Correspondingly the hydrothermal method is a realistic option for ammonium and phosphorus recoveries from wastewater in struvite. However, the treatment stage benefit of wastewater by the hydrothermal method is slightly offset by generating a new waste residue containing chlorides, water-soluble sulfate and alkali ions (Jesse and Davidson, 2019). Hence, a degree of compromise may be required in the selection of hydrothermal treatment due to the competition between the quality benefits of struvite for a slow-release fertilizer and producing other pollutants (Li et al., 2019). Nevertheless, it is envisaged that the large good-quality crystals and quantity of struvite can be achieved by the hydrothermal treatment (Zhu et al., 2019).

Hydrothermal treatment of wastewater through struvite ($MgNH_4PO_4{\cdot}6H_2O$) precipitation with magnesium addition has been proposed for recovering nutrient source from wastewater (Li et al., 2019). Accordingly hydrothermal synthesis of struvite has become a promising technology for wastewater treatments (e.g. municipal sewage, industrial wastewater, liquid manure) to recover

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https://doi.org/10.1016/j.chemosphere.2020.126245
0045-6535/

Chemosphere 250 (2020) 126216

Contents lists available at ScienceDirect

Chemosphere

journal homepage: www.elsevier.com/locate/chemosphere

Coagulation of organo-mineral colloids and formation of low molecular weight organic and metal complexes in boreal humic river water under UV-irradiation

O.Yu. Drozdova [a, *], A.R. Aleshina [a, b], V.V. Tikhonov [c], S.A. Lapitskiy [a], O.S. Pokrovsky [d, e, f]

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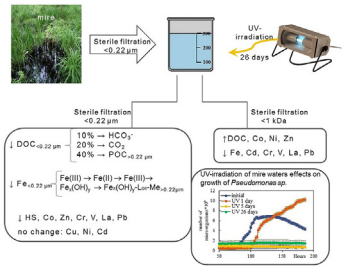
HIGHLIGHTS

- The UV-irradiation of humic mire water removed up to 80% of initial DOM.
- Pb, Cr, Co, V, La and Zn were removed via coprecipitation with Fe hydroxide.
- UV-irradiation increased the concentration of Ni, Co and Zn in the <1 kDa fraction.
- Short-term (1 day) UV-irradiation of mire water stimulated growth of *Pseudomonas* sp.

GRAPHICAL ABSTRACT



ARTICLE INFO

Article history:
Received 3 October 2019
Received in revised form
11 February 2020
Accepted 13 February 2020
Available online 14 February 2020

Handling Editor: Xiangru Zhang

Keywords:
Organic substances
Trace metals
Natural waters
UV radiation
Colloids
Bioavailability

ABSTRACT

Photodegradation of dissolved organic matter (DOM) is highly important in humic waters of peatland regions, yet the coupling between organic and organo-mineral colloids, trace metals and bioavailability of photodegraded products is poorly known. Here we studied photo-destruction of organo-mineral colloids induced by UV-irradiation of sterile-filtered mire water. We revealed two simultaneously occurring processes of transformation of DOM and trace elements speciation: (*i*) disintegration of high molecular weight organo-mineral colloids into lower molecular weight (<1 kDa) DOM and metal complexes and (*ii*) formation of particulate (>0.22 μm) aggregates of metals and organic matter. Over 26 days of UV-irradiation, up to 20% of dissolved organic carbon from peat waters was transformed into CO_2. In addition to transformation of organic compounds, sizeable change in speciation and size fractionation of many trace metals such as Fe, Pb, Cd, Co, Zn, Cu, V, La, Ni and Cr occurred. Although short-term (1 day) UV-irradiation of mire water stimulated growth of cultivable *Pseudomonas* sp. bacterium, the long-term exposure (26 days) of organic substrate had a negative effect on bacterial development. Therefore, while sizeable transformation of the organic and metal colloidal load of peat water may occur over first 10 days of UV-irradiation, the enhanced bioavailability of UV-treated substrate is achieved after first day of exposure. The present study demonstrates the importance of even short-term UV-irradiation on colloidal transformation and potential bioavailability of humic waters from temperate mires and highlights the

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https://doi.org/10.1016/j.chemosphere.2020.126216

Chemosphere 250 (2020) 126142

Contents lists available at ScienceDirect

Chemosphere

journal homepage: www.elsevier.com/locate/chemosphere

Transfer and bioaccumulation of mercury from soil in cowpea in gold mining sites

José Marrugo-Negrete [a, *], José Durango-Hernández [a], Luis Díaz-Fernández [a], Iván Urango-Cárdenas [a], Hermes Araméndiz-Tatis [a], Vicente Vergara-Flórez [b], Andrea G. Bravo [c], Sergi Díez [c, *]

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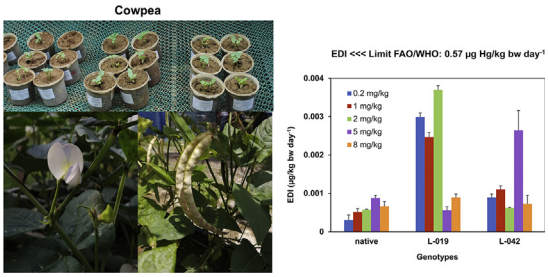
HIGHLIGHTS

- Mercury uptake in cowpea was determined in three genotypes using polluted soil.
- In all the lines, Hg levels in plant tissues followed this order root > leaf > stem.
- Native variety showed resistance to translocate Hg to the fruit vs commercial lines.
- The daily Hg intake through cowpea are far below the health risk according to WHO.
- Cowpea is a protein-rich food that can reduce the high intake of contaminated fish.

GRAPHICAL ABSTRACT



ARTICLE INFO

Article history:
Received 17 December 2019
Received in revised form
4 February 2020
Accepted 5 February 2020
Available online 8 February 2020

Handling Editor: Lena Q. Ma

Keywords:
Cowpea
Phytoextraction
Mercury
Health risk
Vigna unguiculata L. Walp
Healthy food

ABSTRACT

In this study, we evaluated the phytoremediation ability of three different genotypes of cowpea (*Vigna unguiculata L.* Walp) grown on mercury-contaminated soils from gold mining areas. In particular we compared a native genotype with two commercial lines L-019 and L-042. The plants were cultivated in soils amended at different concentrations of Hg (i.e. 0.2, 1, 2, 5 and 8 mg kg^{-1}). After three months exposure, we determined plant growth, seed production, and Hg accumulation in different plant tissues (root, leaf, seed and stem). Indices of soil-plant metal transfer such as translocation, bioconcentration and bioaccumulation factors were calculated. Results showed that the native variety presented the highest seed production (3.8 g), however the highest plant biomass (7.9 g) was observed in line L-019, both on Hg-contaminated soil of 1 mg kg^{-1}. The different plant tissues differed in terms of Hg concentration (root > leaf > stem). In the highest treated soil, the line L-042 accumulates higher Hg in both roots and leaves, while line L-019 accumulates more metal in stems. In line L-019, Hg concentrations in the fruit showed significant differences being higher in the valves than in the seeds. The transfer factors were generally lower than 1 and indicates the low accumulation of Hg by cowpeas. The estimated daily Hg intake through cowpea consumption showed values far below the threshold of 0.57 µg kg^{-1} dw day^{-1} recommended by the World Health Organization. Our results show cowpea *V. unguiculata* as a good protein-rich food substitute of Hg-contaminated fish for populations living near gold mining sites.

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https://doi.org/10.1016/j.chemosphere.2020.126142
0045-6535/