

The 24th International Biohydrometallurgy Symposium 2022

*Biotechnology for resource
sustainability and circular economy*



Book of Abstracts

20-23 November 2022

Rendezvous Hotel Scarborough, Perth,
Western Australia (WA) and online

Edited by: Kaksonen AH, Watkin W, Cheng KY, Boxall NJ

*Hosted by
the Commonwealth Scientific and
Industrial Research Organisation (CSIRO)
in collaboration with Curtin University*

IBS 2022

20-23

November

Perth, Australia



Citation

The 24th International Biohydrometallurgy Symposium, Perth and online 20-23 November 2022. Biotechnology for resource sustainability and circular economy. Book of Abstracts. Edited by: Kaksonen AH, Watkin W, Cheng KY, Boxall NJ, Campbell B, Oppermann L. CSIRO, Australia.

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P-T5-004

Microbial bioremediation of residual heavy oil waste from power plants (Serbia) and its reuse: example of circular economy

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Abstract: In this study the *ex-situ* bioremediation of waste heavy residual oil fuel was examined. Microbial consortium was isolated from the polluted site at Belgrade Heating Plants (Serbia) and was added to the projected biopile. The nutrients, aeration-periodic mixing was used during process. The biopile was inoculated and biostimulated for 150 days. As a result, the total petroleum hydrocarbons (TPH) decreased by approximately 80 times. Also, the content of humic acids increased which indicated the beginning of pedogenesis phase – soil formation (soilification). Level of humic acids during process at the end is higher about 40%. Also, bioremediation microorganisms from the inorganic matrix (river sand) generate clay minerals (content increases by about 50%) which are characteristic of the soil. At the same time, due to the microbial generation of organic acids, the concentration of carbonate minerals from sand (calcite and dolomite) decreases. All these indicators confirm the efficiency of bioremediation and the simultaneous formation of man-made soil (MMS) as new resource for agriculture, landscaping and reforestation. The obtained soil was used for the stabilization of municipal waste as an overlay at this time. In conclusion: bioremediation that generates some useful geo-material is a great example of a circular economy that is different from the usual ones (such as aluminum can and paper recycling).

Keywords: biopile, bioremediation, heavy residual fuel oil, total petroleum hydrocarbons, municipal waste, circular economy

Acknowledgements: This paper is co-financed by the Agreement on the Implementation and Financing of Scientific Research NIO in 2022 of Ministry of Education, Science and Technological Development of the Republic of Serbia (Grants No: 451-03-68/2022-14/200032; 451-03-68/2022-14/200126; 451-03-68/2022-14/200134; 451-03-68/2022-14/200026).