



BACTERIAL POPULATIONS IN BIOREMEDIATED ANTHRACENE-CONTAMINATED SOILS

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Mixing soil or adding earthworms (*Eisenia fetida* (Savigny, 1826)) accelerated the removal of anthracene, a polycyclic aromatic hydrocarbons (PAHs), from a pasture and an arable soil, while a non-ionic surfactant (Surfynol® 485) inhibited the removal of the contaminant compared to the untreated soil ¹. It was unclear if the treatments affected the soil bacteria and consequently the removal of anthracene. Therefore, the bacterial community was monitored by means of 454 pyrosequencing of the 16S rRNA gene in the pasture and arable soil mixed weekly, amended with Surfynol® 485, *E. fetida* or organic material that served as food for the earthworms ². In both soils, the removal of anthracene was in the order: mixing soil weekly (100%) > earthworms application (92%) > organic material application (77%) > untreated soil (57%) > surfactant application (34%) after 56 days. There was no clear link between removal of anthracene from soil and changes in the bacterial community structure. On the one hand, application of earthworms removed most of the contaminant from the arable soil and had a strong effect on the bacterial community structure, i.e. a decrease in the relative abundance of the Acidobacteria, Chloroflexi and Gemmatimonadetes compared to the unamended arable soil and an increase in that of the Proteobacteria, while mixing weekly removed all anthracene from the arable soil, but had little or no effect on the bacterial community structure. On the other hand, application of the surfactant inhibited the removal of anthracene from the arable soil compared to the untreated soil, but had a strong effect on the bacterial community structure, i.e. a decrease in the relative abundance of Acidobacteria, Bacteroidetes, Chloroflexi, Gemmatimonadetes and Planctomycetes and an increase in that of the Bacteroidetes and Proteobacteria. Additionally, the removal of anthracene was similar in the different treatments of both the arable and pasture soil, but the effect of application of carrot residue, earthworms or the surfactant on the bacterial community structure was more accentuated in the arable soil than in the pasture soil. It was found that removal of anthracene was not linked directly to changes in the bacterial community structure.

1. Delgado-Balbuena L, Aguilar-Chávez AR, Luna-Guido ML, Dendooven L. (2013). Mixing of an anthracene-contaminated soil: A simple but efficient remediation technique? *Ecotox Environ Safe* 96:238–241.

2. Delgado-Balbuena L, Bello-López JM, Navarro-Noya Y, Luna-Guido ML, Dendooven L. Changes in the bacterial populations when anthracene-contaminated soils are remediated. *Submitted*.