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# Plastic Debris Impairs Archaeal Abundance in Sub-Saharan Soil

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## Abstract

Microplastic is ubiquitous in soils. The Sub-Saharan environment is largely under-represented in terrestrial plastisphere research despite high levels of plastic contamination and demonstrated effects of plastic on fungal communities, i.e. enrichments of pathogenic fungi on plastic in Sub-Saharan Kenya. Thus, it is of particular interest to investigate the effects of plastic debris in this region on the prokaryotic soil microbiome and the resulting consequences. To study plastic effects on prokaryotic microbiomes, soil and terrestrial plastic debris were analysed by 16S rRNA gene amplicon sequencing. Investigation of the microbiome revealed a strong negative plastic effect on the abundance of Archaea especially on the family Nitrososphaeraceae (ammonia oxidizers). In contrast, Sphingomonadaceae and multiple Bdellovibrionaceae were indicative for the plastisphere. Matching of amplicons with the PlasticDB database for microbial plastic degraders and PICRUSt predictions provided further information about the functional capacities of examined plastisphere microbiomes such as the depletion of archaeal pathways. In addition, we used the 16SPiP database to annotate sequenced bacterial candidates to potential pathogenic bacteria, revealing the abundance of more than 15 potential pathogens in soil and plastisphere. The combined data shows a modification of the plastisphere relative to the soil microbiome, suggests plastic effects on archaeal nitrogen transformation potentials and stimulates further research on specific mechanisms of plastic-Archaea interactions.

**Keywords:** Kenya, Plastisphere Community, Bacterial Pathogens

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