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EFFECT OF REMEDIATION TREATMENTS ON POLAR PACS IN SOILS: DEGRADATION VS. FORMATION

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The evaluation of the efficiency of remediation processes (thermal desorption, ISCO, bioremediation...) of PAH polluted soil is generally based on the measurement of specific parameters (*i.e.* 16 PAH US-EPA). Such limited characterisations do not allow evaluating the potential formation of organic by-products (especially Polycyclic Aromatic Compounds - PAC).

Different remediation treatments, most commonly used and that may be the most problematic regarding O-PAH production, have been applied to three representatives PAH contaminated soils (former gasworks, coke oven plants and wood preservation facilities soils). These treatments include chemical oxidation (hydroperoxyde oxidation (H₂O₂), Fenton like oxidation using magnetite as catalyst and permanganate (MnO₄⁻)) and biological treatment.

The experimental results with chemical treatment show that the polar oxy-PAHs were removed more slowly than the PAHs in all chemical treatments, indicating that O-PACs were simultaneously generated during the oxidation (especially for permanganate treatment). The effect was most obvious when considering the PAC contribution to the total Extractable Organic Matter (EOM).

The microbiological treatment performed on these soils shows a removal of PAHs with a removal rates controlled by the availability of the pollution. Polar PACs remediation followed the same trends as the PAHs in the coke oven soils and the gasworks soil. However, in the wood preservation soil, the removal rates of the polar PACs were significantly lower than of the PAHs suggesting a simultaneous formation of polar PACs as a result of the extensive transformation of PAHs in this soil.

Keywords: Polycyclic Aromatic Compounds, chemical oxidation, microbiological treatment, byproducts