

## **Interaction of Benzo(a)pyrene with the natural organic matter of soil using three-dimensional (3-D) fluorescence spectroscopy with Parallel Factor Analysis**

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Benzo(a)pyrene (BaP) is a polycyclic aromatic hydrocarbon arising mainly from the incomplete combustion of organic material. It is toxic and has mutagenic and carcinogenic properties. It is classified as a priority pollutant by The United States Environmental Protection Agency (US-EPA). After its emission in the atmosphere, and due to its physico-chemical properties, BaP will be deposited in the soil. Its aromaticity gives it the capacity to be studied by fluorescence spectroscopy so that of the Natural Organic Matter (NOM). In this study we used fluorescence excitation-emission-matrix (FEEM) with Parallel Factor analysis (PARAFAC) to study the interaction between NOM of soil and BaP. Soil sample was treated with Tetrasodium pyrophosphate along with Sodium hydroxide to obtain the Humic Substances, which afterwards were physically fractioned under acidic pH into solid Humic Acid and liquid Fulvic Acid. Three concentrations of BaP solution were added to each soil fraction. We compared the results of PARAFAC analysis of the samples containing BaP and the original NOM fractions. In the samples containing BaP, four fluorophores (components) were found, the fourth identified as BaP. Out of the three other fluorophores characteristic of NOM, two were found similar in all NOM fractions whereas only one fluorophore had some variations in its spectral characteristics. The presence of BaP changed the fluorescence of NOM. These modifications were depending on the type of soil fraction.