Written on 13 September 2022 3 minutes of reading

News

Fundamental Research

Geochemistry

The IFPEN Ressources Energétiques Carnot Institute is contributing to two new projects - e-DIP and Plastisol - selected by the French National Research Agency (ANR) and the French Environment and Energy Management Agency (Ademe) with a view to pooling research on plastic pollution in soils.

The scientific community is increasingly mobilized to address the problem of plastic pollution in soils. Keen to help drive this momentum, IFPEN's teams are using their expertise to help further research in this area. This research is just one component of a much broader whole encompassing soil management, climate-soil interactions and the water cycle, as well as environmental protection and the circular economy more generally.

e-DIP : evaluating microplastic toxicity

The objective of the e-DIP project ("Dynamique environnementale et impacts des cocktails de contaminants provenant des plastiques dans les écosystèmes terrestres" - Environmental dynamics and impacts of cocktails of contaminants from plastics in land ecosystems) is to **evaluate the toxicity of microplastics** (plastics less than 5 mm in size) in different soil compartments and their impact on biogeochemical cycles depending on whether they are introduced directly or mixed with organic amendments. The project is financed by the ANR and supported by the AXELERA and VEGEPOLYS Valley. . Coordinated by UMR iEES-Paris and launched in January 2022, it brings together 10

research teams who will spend four years cooperating with experts in the fields of polymers, soil ecology, biogeochemistry, microbiology, waste management and analytical chemistry to assess the scale and impact of plastic pollution in soils.

IFPEN, via the IFPEN Ressources Energétiques Carnot Institute, **is jointly responsible for the research concerning the effect of microplastics on soil organic matter**. The objective is to study the direct or indirect (by disrupting microbial activity) impact of microplastics on soil organic matter quality using the Rock-Eval® method developed by IFPEN. The twitter e-DIP page provides updates on the project's progress.

Rock-Eval® thermal analysis is a method that can be used to rapidly evaluate the organic carbon and mineral carbon contents of rocks and soils.

Find out more:

Rock-Eval® : Thermal analysis of rocks and soils

Rock-Eval® : Supporting soil research for the climate challenge

Plastisol : defining indicators for the presence of microplastics in soils

The Plastisol project supports the e-DIP project. It is financed by the Ademe, within the framework of the "Evaluation of sustainability and matching of biomass production and usages" component of the Graine 2020 call for bids. Launched in April 2022, also coordinated by UMR iEES-Paris and bringing together the same partners, it is aimed at **defining indicators for the presence of microplastics in soils** by considering the various transformation and degradation stages these minute debris can undergo over the course of time.

Did you know?

The majority of microplastics come from organic residues, or organic waste products, contained in soils. There are several potential sources of organic waste: agricultural, urban or agro-industrial. Organic waste of urban origin, from water treatment, green space compost and some household waste fractions, is likely to contain microplastics. Organic waste of industrial origin (paper industry sludge, the pulp of fruit dregs, etc.) may also contain small quantities of microplastics.
Once in soils, **these microplastics interact with plant and microbial life, as well as any other organisms inhabiting the environment**.

Using cutting-edge methods such as Rock-Eval®, teams from the IFPEN Ressources Energétiques Carnot Institute are contributing to research concerning the detection and characterization of microplastics contained in organic waste and which ultimately end up in soils.

Alongside these two projects, the study of microplastics in sediments using the Rock-Eval® method was the subject of the publication entitled Polymer characterization using Rock-Eval® technology: a methodology for the identification of plastics in sediments. The technology is used to obtain a rapid analysis which can be consolidated using other analysis methods, such as Fourier Transform Infrared Spectrometry (FTIR), pyrolysis combined with mass spectrometry (Py/GC-MS) and transmission electron microscopy (TEM).

Plastic pollution in soils: IFPEN joins the French scientific community clearing the ground
13 September 2022

Link to the web page :