

Sorption of pendimethalin by humin fraction isolated from Mollic horizon of Chernozems

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Rok wydania

2024

Czasopismo

Journal of Elementology

Numer woluminu

29

Strony

37-55

DOI

10.5601/jelem.2023.28.4.3211

Kolekcja

Naukowa

Streszczenie

The aim of the work was to investigate the interactions between selected plant protection products and the humin fraction (HM), which is the most recalcitrant component of soil organic matter. The soil material ($n = 5$) used for the study was collected from the mollic horizon of two Chernozems differed in physicochemical properties. HM was obtained in the solid state after extracting humic acid (HA) and fulvic acid (FA) in NaOH and digesting the mineral fraction in an HF-HCl mixture. For investigation the pure active substance of pendimethalin (PE) and its two commercial products (Penfox 330 EC and Stomp Aqua 455 SC) were used, which were dissolved in hexane and added to the HM. The batch sorption experiment was carried out in accordance with OECD Guidelines for the Testing of Chemicals No.106. Spectroscopic methods (UV-Vis-nearIR and fluorescence) were used to assess the molecular characteristics of HM exposed to pesticides. The study showed significant differences in the molecular structures of the tested HM as a result of interactions with the pesticides used. The PE has a different effect than commercial products. The obtained results prove that the composition of commercial products significantly modifies the strength and ability of organic matter to bind pesticides. This is probably related to the presence of adjuvants that are more competitive in forming bonds with the active sorption sites of HM, and thus strengthen or weaken the process of forming pesticide-HM complexes.

Słowa kluczowe

pesticides, humin, batch sorption experiment, UV-Vis, Vis-nearIR, fluorescence

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	http://dx.doi.org/10.5601/jelem.2023.28.4.3211

Plik został wygenerowany dnia 2026-10-11 19:03:12

Adres w repozytorium <https://old.chem.uni.wroc.pl/pl/repozytorium/xYcR2sp>.