

THE EVALUATION OF FACTORS AFFECTING SORPTION OF PENTACHLOROPHENOL IN SOIL

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Abstract

The release of persistent organic pollutants (POPs) derived from different industrial processes represents an important source of environmental contamination. Pentachlorophenol (PCP) is a highly chlorinated organic compound that has been extensively used as a broad spectrum biocide, particularly in the wood preservation industry. Due to its stable aromatic ring structure and high chlorine content, PCP is persistent in the environment, and it has become one of the most widespread contaminants in soil, sediments and water. In soil, the fate of POPs is governed by their interactions with reactive soil colloids. The soil properties as well as the chemical properties of the pollutants, control its bioavailability and transport, thus, affecting further remediation processes. The main objective of the present work was to study the sorption of pentachlorophenol in soil, collected from Iasi area (Romania). The experiments were performed in batch mode. Interest was directed towards the effects of contact time (0-72 h), initial pollutant concentration (5 - 20 mg L⁻¹), pH and temperature (10 - 50°C). The sorbed amounts of PCP increased with increase in contact time and initial concentration and reached the equilibrium after 24 h. Pentachlorophenol sorption increase with temperature in the range of 10-25°C, suggesting an endothermic process, and decrease when the temperature increased from 25 to 50°C. The results indicated that lower temperature (i.e. 10 to 25°C) was favorable for the sorption process. The high temperature (50°C) might affect the physicochemical properties of soil therefore; the sorption PCP on soil was significantly reduced.

Key words: soil, pentachlorophenol, sorption, pesticides