

Highlights

- The study examines Chlorpyrifos's aqueous sorption kinetics and equilibria parameters in Teflon Lined Centrifuge Container walls and tropical soils and its persistence in these soils.
- Varying methanol fractions were used in batch sorption kinetics experiments, and the Solvophobic theory was employed to predict sorption coefficients K^W and K_{OC} indirectly.
- Degradation experiments on ten soils under flooded and field capacity moisture conditions shed light on the influence of biotic and abiotic processes.
- K^W value for container walls is 0.19 mL/g, while soil K^W values range from 46.53 to 56.71 mL/g.
- K_{OC} values range from 1551 to 1890.
- Degradation half-lives range from 18 to 52 days for sterilized flooded soils, 30 to 132 days for unsterilized flooded soils, 18 to 21 days for sterilized field capacity soils, and 32 to 33 days for unsterilized field capacity soils.
- The Groundwater ubiquity index demonstrates that Chlorpyrifos does not leach in the selected soils, ranging from 1.013 to 1.536.