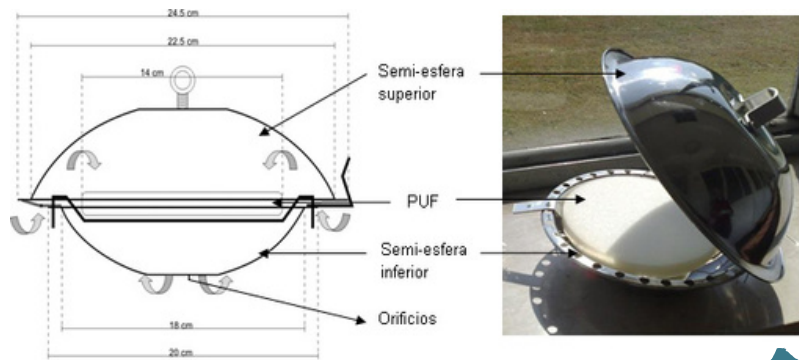
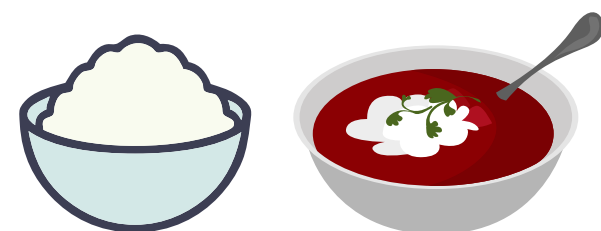
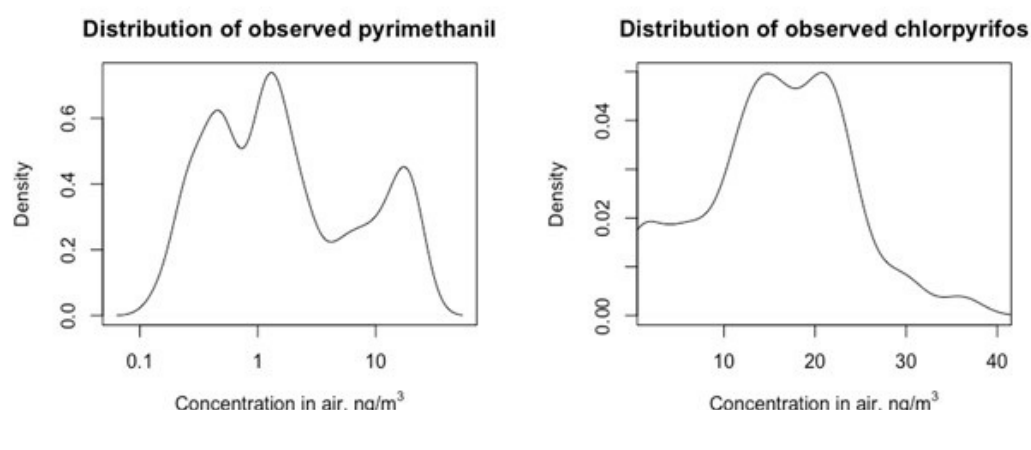


Air concentrations of pyrimethanil and chlorpyrifos and urinary metabolites in pregnant women of the Infants and Environmental Health Program (ISA), Costa Rica.

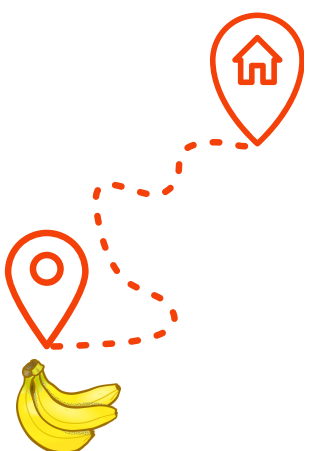
Few studies have compared pesticide levels in ambient air with urinary residues to assess exposure pathways. Therefore, we compared airborne levels of pyrimethanil and chlorpyrifos with their respective urinary residues in pregnant women enrolled in the Infants and Environmental Health Program (ISA) birth cohort in the Matina County, Costa Rica.



We obtained 448 repeat urine samples from female study participants. We extrapolated the amounts of pyrimethanil and chlorpyrifos measured with passive air samplers (PAS) in 12 area schools using a spatio-temporal model. We then compared these levels with urinary OHP (hydroxypyrimethanil) and TCPy (3,5,6-trichloro-2-pyridinol) in 915 samples from 448 women.



The results showed that a 10% increase in air pyrimethanil (ng/m³) was associated with a 5.7% increase in OHP (µg/L). In addition, women who lived farther away from banana plantations had lower OHP: -0.7% for every 10% increase in distance (meters), as well as a 23% decrease in women who ate rice and beans ≥15 times per week. In addition, each 1 (ng/m³) increase in airborne chlorpyrifos was associated with a 1.5% increase in TCPy (µg/L), and women who worked in agriculture tended to have an increase in TCPy (21%, 95% CI -2, 49).



Conclusion: The Bayesian spatiotemporal models were useful to estimate pyrimethanil and chlorpyrifos air concentrations across space and time. Our results suggest inhalation of pyrimethanil and chlorpyrifos is a pathway of environmental exposure. PAS seems a useful technique to monitor environmental current-use pesticide exposures. For future studies, we recommend increasing the number of locations of environmental air measurements, obtaining all air and urine measurements during the same month, and, ideally, including dermal exposure estimates as well.



Reference: Giffin, A., Hoppin, J., Córdoba, L., Solano, K., Ruepert, C., Peñaloza, J., Lindh, C., Reich, B., van Wendel de Joode, B. (2022). Pyrimethanil and chlorpyrifos air concentrations and pregnant women's urinary metabolites in the Infants' Environmental Health Study (ISA), Costa Rica.

