Pesticide use on farms can be a source of exposure for nearby residents.

Background: Pesticides used in agriculture may expose populations living nearby. Costa Rica is a major bananaexporting
country, its production depends on extensive pesticide use.

Methods

We selected ten proximal and two non-proximal schools and placed polyurethane foam passive air samplers outdoors at each school, during four consecutive periods. At three of these schools, we also placed an active air sampler during the first 24 h of each sampling period. We collected passive dust samples by placing a glass Petri Dish at the inside of each school. We subsequently performed a chemical analysis of 18 pesticides, using gas chromatography with mass detector.

Objective: To evaluate environmental pesticide exposure, we measured levels of current-use pesticides in air and dust from 12 schools in Matina County, Costa Rica, with passive sampling methods.

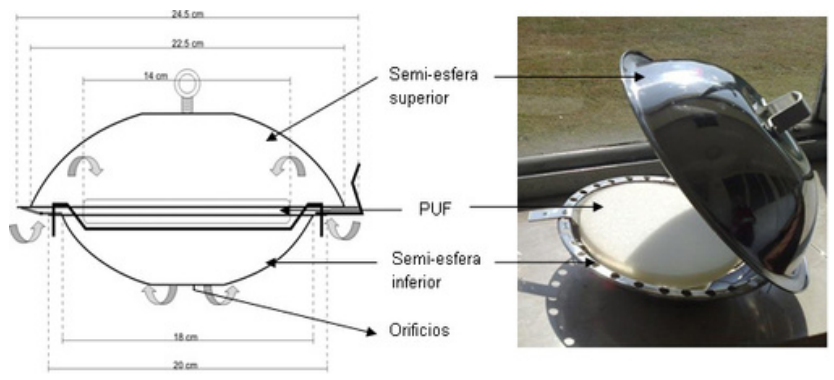
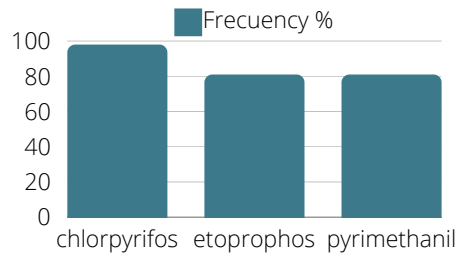


Figura tomada de: Astoviza M., Cappelletti N., Bilos C., Colombo J. Concentración de pesticidas organoclorados en aire del sur de la cuenca del Plata: un año de muestreo. 2013. AUGDOMUS. 5: 180-196, ISSN: 1852-2181.



Results: With passive air samplers we detected ten different pesticides: two insecticides, two nematicides, and six fungicides, of which nine reported to be used on banana plantations. More than half of the samples contained at least five pesticides.

Chlorpyrifos was detected most-frequently, in 98% of samples, followed by the nematicides etoprophos and the fungicide pyrimethanil that were both detected in 81% of samples.

Chlorpyrifos concentrations were five times higher in proximal as compared to non-proximal schools: mean = 18.2 ng/m3 (range =6.1–36.1) and mean=3.5 ng/m3 (range=<0.5–11.4) and varied more between schools than in time (intra-class correlation coefficient = 0.80). In general, results from passive and active samplers showed similar exposure patterns; yet median concentrations tended to be higher in passive samplers.

In dust samples, mostly fungicides were detected; chlorothalonil was detected most frequently, in 50% of samples.

Discussion: Passive air sampling is a promising technique to characterize environmental exposure to current-use pesticides; more studies are needed to characterize the sampling rates, reproducibility and optimum sampling times for passive samplers. School environments near banana plantations are contaminated with multiple pesticides that include insecticides, nematicides, and fungicides, which is of concern.

Reference: Córdoba, L., Solano, K., Ruepert, C., & van Wendel de Joode, B. (2020). Passive monitoring techniques to evaluate environmental pesticide exposure: Results from the Infant's Environmental Health study (ISA). Environmental Research, 184 (September 2019), 109243. https://doi.org/10.1016/j.envres.2020.109243