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Bioaccumulation of microplastics in the terrestrial food chain: an example from home gardens in SE Mexico

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Plastic in the aquatic environment has been studied since many years and is a well known problem. Plastic in the terrestrial environment is a neglected issue of high importance in regions with waste mismanagement. Therefore, we studied the bioaccumulation of plastics in the terrestrial food chain in home gardens of SE Mexico, a typical example for many countries in development.
Plastic waste is not regularly collected and people burn it and burry the residues or the plastic waste directly into the soil of their home gardens, causing the risk of plastic fragmentation, formation of microplastics (MP) in the soil and accumulation in the food chain.
To assess the risk, we sampled soil, earthworm cast and chicken feces as well as chicken gizzard and crop in 10 home gardens of Campeche, SE Mexico in September 2016. We analyzed their (micro)plastic content. (Micro)plastics were present in soil with 0.87±1.9 particles g-1, in earthworms casts with 14.8±28.8 particles g-1 casts and in chicken feces with 129.8±82.3 particles g-1 chicken feces), showing a magnification factor of 17±14.6 between the soil and the earthworms casts, and of 149±41.8 between the soil and the chicken feces. Macroplastics were also found in chicken gizzard (57±41.1 particles per chicken) and in the crop (32.4±15.1 particles per chicken). Chicken gizzard is a specialty in the Mexican kitchen and the intake of the present plastics form a strong risk for human health.