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# Dissipation of terbuthylazine, metolachlor and mesotrione in soils with contrasting texture

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Herbicides play an important role in the crops production, but their use may result in residues with undesirable effects on the environment. The determination of the herbicide dissipation rate in agricultural soil is an important issue for monitoring their environmental fate. As soil composition is one of the factors affecting herbicide persistence, this study aimed to evaluate the dissipation of three herbicides, terbuthylazine (TERB), metolachlor (METO) and mesotrione (MESO) in soils with contrasting texture.
The field trial was conducted at the Padua University Experimental Farm (45.3° N, 12.0° E) in the Po Valley, north-east Italy in 2012. The persistence of three herbicides has been studied in three diverse soil textures (clay, sand and loam soil) at two different depths (0-5 and 5-15 cm). A randomized complete block design was used for this experiment with six plots (2 m × 2 m) for each of 3 treatments. TERB, METO and MESO were applied in May on maize as a formulated product (Lumax®) with hand-held field plot sprayer at a dose of 3.5 L/ha. Soil organic carbon content was the highest in clay texture (1.10%) followed by loam soil (0.67%) and sandy soil (0.24%).
The soil was sampled with a soil auger before herbicides treatment, and soon after treatment soil samples were taken to assess initial concentration, then at increasing times from spraying to evaluate field dissipation kinetics (t50). The dissipation of the herbicides in the treated plots was followed for nearly 2 months after their application. The herbicides were analysed by liquid chromatography-mass spectrometry.
The dissipation of TERB, METO and MESO could be described by a pseudo first order kinetics. Within the herbicides, TERB showed the highest t50, followed by METO and MESO. Considering the tested soil, the highest t50 value was found for clay soil texture for TERB and METO, whereas for MESO there was no difference among different soils. Significant differences were found within the 2 soil depths for TERB and MESO only in sandy soil, for METO only in loam soil. In detail, considering the average of both depths, TERB and METO degraded slowly in clay soil (22 days and 16 days respectively) followed by loam soil (14 days and 7 days) and sandy soil (12 days and 5 days). On the other hand, MESO did not show significant differences (ranging from about 4 days in clay soil to 5 days in loam soil). These results suggest that soil texture have a large influence on the dissipation of TERB and METO, whereas no influence was observed on MESO.