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## Is plastic mulching a risk for Deoxynivalenol/Nivalenol soil contamination in strawberry cultivation?

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Mulching is a widely used management in agriculture due to its effects on soil temperature and humidity regulation, which results in improved yield rates and product quality. In this study we investigated the Deoxynivalenol/Nivalenol (DON/NIV) content in soil samples from two different mulching systems: organic (OM) vs. plastic (PM). The last was studied in 2-years (2-y PM) and 4-years (4-y PM) coverage. In total 36 soil samples were collected from irrigated strawberry-fields. Data was correlated with mycobiome abundance and soil physicochemical parameters. Mycotoxin content in dried soil was analysed via LC-HRMS. Total colony-forming unit (CFU) was indicative of fungal biomass. Soil physicochemical parameters (water content, dissolved organic carbon (DOC), pH, total C and N) were analysed using previously validated method.

In general, DON/NIV concentrations in soil samples from PM were higher than those from OM. Particularly in the 2-y PM treatment with conc. ranging from 1.6-20.9 and 0.9-9.6 (ng/g dry soil) for DON and NIV, respectively (10/12 positive samples). In the 4-y PM, only 50% of the samples tested positively, ranging from 1.9 – 7.4 for DON and 1.0 – 4.1 (ng/g dry soil) for NIV. In OM, the lowest mycotoxin concentrations and detection frequency were observed: Range: 1.1 – 2.4 (ng/g dry soil), 4/12 positive samples. Contradictory, the highest CFU values were observed in OM samples:  $5.7 \times 10^5 \pm 1.3 \times 10^4$  (CFU/g dry soil). In the 2-y PM, the mycobiome decreased significantly, but seems to recover in the 4-y PM treatment:  $2.7 \times 10^5 \pm 7.0 \times 10^4$  (CFU/g dry soil). Variations on mycobiome statistically correlated with DOC,  $C_{tot}$  and pH ( $p < 0.05$ ). The mycotoxin concentration in soil under PM was associated with variations on DOC, total C and N.

The type and duration of the mulching influence the soil physicochemical parameters, resulting in a reduced soil fungal abundance after 2-y PM, but in a high DON/NIV concentration. Further studies are needed to assess whether these findings may be reflected in commodities cultivated under plastic.

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