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Soil quality of a degraded urban area

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Human activities cause modifications of the soil characteristics, leading to a significant reduction of the soil fertility and quality.

The aim of this study was to evaluate the relationships between microbial activity or biomass and chemical characteristics (i.e. heavy metal and organic matter contents) of a degraded urban soil.

The study area is located in an urban park (about 10 ha, called Quarantena) near to the Fusaro Lake of Campi Flegrei (Southern Italy); the Park was established in 1953 to shelter animals coming from any place of the Planet and execute veterinary checks before their delivery to different European zoos. In 1997, the park was abandoned and nowadays in it a large amount of urban wastes accumulates. Surface soils (0-10 cm) were sampled at three points: two of them covered by Holm Oak specimens (P1 and P2) and one covered by herbaceous species, particularly legumes (P3). P1 was localized at the border of the park and next to a busy road; P2 at the centre of the Quarantena Park; P3 at a gap area near the Fusaro Lake.

The results showed that the soil sampled at P1 showed the highest Cr and Ni concentrations; the soil sampled at P3 had high levels of Cu and Pb, exceeding the threshold values of $100 \mu\text{g g}^{-1}$ d.w. fixed by the Italian law for urban soils, probably due to boat traffic, fishing practice and agricultural activities; the soil sampled at P2 had intermediate values of metal concentrations but the highest amount of organic matter (more than 20% d.w.). Despite of metal contamination, P1 and P3 showed higher soil microbial biomass and activity as compared to P2. Therefore, at this site, the organic matter accumulation could be due to the scarce litter degradation.

In conclusion, although the studied area was not too large, a wide heterogeneity of soil quality (in terms of the investigated chemical and biological characteristics) was detected, depending on the local human impact.