



Analysis of the sustainability of artificial soil constructions for urban landscaping.

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Soil should be considered more in urban landscape construction since soil can have a positive and negative influence on urban landscape planting. On the one hand, the soil is the main source of nutrients and physical support for plants. On the other hand, plants can be also affected by urbanization and different anthropogenic factors in soil such as soil contamination, salinization, acidification and over compaction. Due to these different anthropogenic factors, emission of greenhouse gases can increase which influence not only the landscape sustainability but also urban climate. The research aimed to analyze the sustainability of artificial soil constructions for urban landscaping purposes. The following research steps were taken: 1) inter and intraseasonal dynamics in CO₂ fluxes from different soil construction was measured and 2) chemical and biological properties of artificial soils were analyzed. The research was carried out at two experimental sites with the different experimental design. The first research sites included soil constructions with different soil substrates such as turf, turf sandy loam, turf + podzolic soil, red marine soil + black turf and black marine soil + black turf with 2 different depths 5 cm and 20 cm. The second site included standard soil constructions exposed by different anthropogenic loads (contamination, salinization, and acidification).

The results of the CO₂ fluxes from different artificial soil constructions show that turf soil with a depth of 20 cm had the highest average amount of CO₂ fluxes (34.72 gCO₂ /m² per day) and the chemical analysis shows that potassium and phosphorus were less than 100 mg/kg. The least average amount of CO₂ was monitored on black marine soil and turf mixture and the nutrients such as potassium and phosphorus were more than 100 mg/kg. These results show a good way of restoring turf for urban landscaping use.

The result for the seasonal CO₂ fluxes measurement shows that the soil contaminated with heavy metal (Cd) had an average amount of 32.98 gCO₂ /m² per day, soil contaminated with heavy metal (Pb) was 29.17gCO₂ /m² per day, CO₂ fluxes from salinized soil was 27.17 gCO₂ /m² per day and CO₂ from the acidified soil was 33.92 gCO₂ /m² per day. The result of the chemical analysis was less than 100 mg/kg. From all these results it can be said that these soils have a lack of nutrients and the CO₂ fluxes also are high which that these soil need to be restored before using for urban landscaping.