



Phosphorus contents and availability of technogenic substrates for soil construction

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Urban areas lack of green and of soil substrates to support this green. A great variety of solid waste materials can be seen as technogenic substances (TS) for the construction of soil-similar plant substrates. Biomass production in the city and the use of waste materials as nutrient sources can help to close regional nutrient cycles.

The most important waste materials have been studied for their phosphorus contents, availabilities and diffusion rates in the rhizosphere by combining their analyzed chemical and physical properties.

Compost, concrete, green wastes, paper mill sludge, street-sweepings, mix of rubble, bricks, track ballasts and charcoal have (i) been analyzed their P release properties (HF extraction, Olsen-P, adsorption isotherms); (ii) the physical properties (water retention function, saturated hydraulic conductivity) were analyzed at 80 % of the proctor density; (iii) The P availability of the TMs to the roots were simulated for different pressure heads ($pF = 1.3, 1.8$ and 3.0) using HYDRUS 1-D. We compared the results for TS with these for agricultural soils. P_{tot} varies from 710 to 21 000 $mg\ kg^{-1}$ for bricks and compost, while P_{Olsen} varies from 19 to 1 090 $mg\ kg^{-1}$ for charcoal and green wastes. The diffusion rates of TSs ($pF = 1.3$) are up to 10 times higher compared to those of soils, with green wastes showing highest and bricks the lowest P diffusion rates.

We conclude that the investigated TS are appropriate for construction of soil similar planting substrates because of their P delivery potential and their favourable physical properties.