

Biodegradable coffee ground composites for 3D printed innovative urban designs

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- Collaboration with EPFL's Laboratory of Landscape Development (LAND)
- Interaction with a student group project in the course MSE-433 'towards sustainable materials'



The objective of the project is to demonstrate prototype biodegradable composite elements manufactured from local waste streams for innovative urban elements. Such materials are viewed as alternatives to traditional materials used for various city infrastructures such as tree pits within holistic urban ecology programs.

In the semester project focus will be put on composites based on coffee grounds and a biodegradable polymer matrix such as polylactic acid (PLA). The raw material constituents will be compounded with controlled concentrations, to produce filaments for fused deposition modeling. Model specimens will be printed for basic mechanical characterization, and optimized composites will be selected to print prototype parts relevant for tree pit applications designed in collaboration with LAND. Attention will also be paid to the porosity of the composite and parts, to tailor their interaction with the environment.

The project will run in parallel to a student group project during the Spring semester, which will evaluate the circularity, environmental footprint and economic viability of the proposed technology.