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Rooftop farming on urban wastes: a first assessment of ecosystem services provided by constructed technosols

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Urban farming, especially on rooftops, is a popular and a growing topic in media as well as in the scientific literature. It is a great opportunity to meet some of the challenges linked to urban areas development worldwide. However, little attention has been paid so far to the growing media of green roofs, i.e. technosols. A better understanding of the influence of technosol choice and component links with ecosystem services is required in order to maximize environmental benefits from rooftop urban farming. Between March 2013 and 2015, a pilot project called T4P (Parisian Productive rooftoP, Pilot Experiment) took place on the rooftop of the technical University AgroParisTech. Two different units based on the use of two contrasted urban organic wastes were compared to a commercial potting soil through yield measurements, substrates characterization and leaching quantification. We performed a first assessment of several ecosystem services expected from these technosols, i.e. provisioning of food (food production), regulation of water runoff (quantity and quality of runoff), recycling of organic wastes. We identified indicators of the ecosystem services (e.g. yield, annual mass loss of mineral nitrogen) and compared their measured values to reference situations (asphalt roof, green roof or cropland). Our analysis shows the multifunctional character of technosols made from organic wastes located on urban rooftops and the ecosystem services approach appears as a fertile one to evaluate and devise constructed technosols as a component of green infrastructures.