

International Doctorate in Civil and Environmental Engineering

**Characterization and valorization of products from hydrothermal
carbonization of bio- residues**

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Abstract
<p>The overall objective of the research is to study the application of hydrothermal carbonization technology (HTC) on different bio-residues (sewage sludge and organic wastes). HTC is a relatively new alternative for wastes management. This process is a carbonization of biomass under autogenous pressure and temperature at the lower region of liquefaction process. It was described for the first time in 1913 by Bergius, but only very recently it has been applied on new feedstocks, such as sewage sludge. HTC transforms the biomass in a solid-liquid suspension (slurry) and in a small gaseous fraction (mainly CO₂). Slurry is then divided in two products: a solid coal-like material (hydrochar), and a liquid phase (process water).</p> <p>The research project has the goal to study the feasible valorisation pathways for the process water derived by HTC treatments. In particular, the study is focused on its chemical characterization and on the investigation of the aerobic and anaerobic biodegradability. Further, the recovery of nutrients from hydrochar is deepened.</p>