

Application of hydrothermal carbonization for a sustainable valorization of sewage sludge

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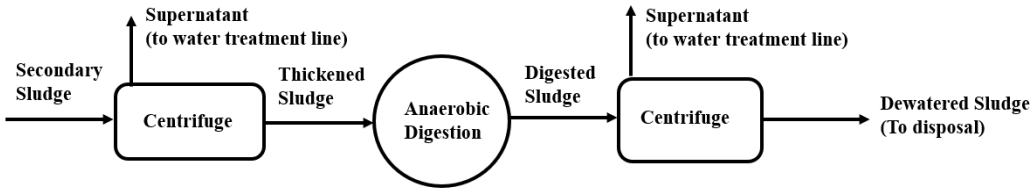
Starting from December 2016, sewage sludge in Tuscany can not be disposed of in agriculture



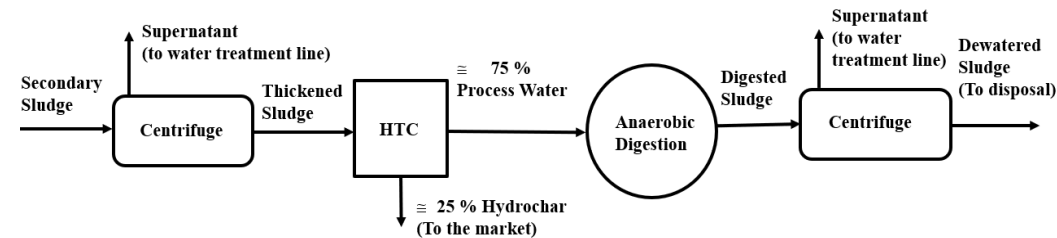
GOALS

- Study of integration between WWTPs and HTC technology;
- Recovery of process water through anaerobic digestion.

Current sludge treatment line of San Colombano WWTP (Florence, IT)



New sludge treatment line of San Colombano WWTP integrated with HTC



METHODS



- Experiments:
 - HTC process: 208°C, 2 hours, 5 wt% as initial solid concentration of the sludge;
 - Analytical determination of COD, nitrogen and phosphorous;
 - BOD tests to estimate the biodegradable COD (bCOD).
- Model:
 - ASM No. 3 implemented in the software WEST (DHI);
 - Scenarios with SRTs in the range 9-28 days.

RESULTS AND CONCLUSIONS

- Model results for different scenarios:

SRT (d)	28		21		14		9	
HTC	No	Yes	No	Yes	No	Yes	No	Yes
Energy for aeration (kWh/d)	3575	3746	3563	3846	3490	4046	3324	4270
Biogas (Sm ³ /d)	2688	2318	3007	3040	3369	4513	3665	7348

- A relevant fraction of COD resulted to be biodegradable (bCOD \cong 84 %) in aerobic conditions;
- In conclusion, the new sludge treatment line would enhance the biogas production while converting the solid phase of the sludge in (hydro-)char.

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