Improving hydrogen biomethanation in a CSTR reactor fed with primary sludge: (preliminary) results of a pilot-scale test

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It is well known that primary sludge produced in a wastewater treatment plant can successfully be stabilized by anaerobic digestion. However, it is possible to increase the efficiency of the sludge treatment lines also considering the great potential brought by the introduction of hydrogen flows produced by excess of energy peaks resulting from the increasingly present renewable sources.

This work investigates the benefits of introducing a hydrogen flow into a 10 L CSTR reactor fed daily with primary sludge working in anaerobic and mesophilic conditions. The data obtained from the test were used to verify the hydrogen biomethanation efficiency; the resulting capacity in converting biogas into methane; the technical-economic feasibility at full scale considering the thermal self-sufficiency of the system supported by the exothermic process of hydrogen biomethanation.