

# Ozone and two temperature-phased anaerobic digestion to improve sludge treatment and energy production

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## Abstract

Energy balance and sludge treatment and disposal are currently the main issues for Wastewater Treatment Plants (WWTPs), which, in the mid-term, are expected to be net-positive energy facilities. With regard to waste sludge issue, the anaerobic digestion (AD) leads to both sludge stabilisation and reduction, and energy production from the biogas generated. Different methods to improve  $m^3$  of biogas / kg Volatile Solids (VS) loading are currently under study involving pre-treatments of waste activated sludge (WAS), modifications of the AD process or post-treatments of digested sludge. This paper focuses on the first results obtained in the lab scale tests about the effect of the ozone and the Temperature Phased Anaerobic Digestion (TPAD) process on the sludge treatment improvement. In particular, the WAS after thickening floatation from the Castelló de la Plana WWTP is ozonated as a pretreatment in order to allow for its lysis and solubilisation and facilitate the hydrolysis step in the AD. The ozonated sludge and primary sludge are then mixed and fed into the anaerobic digesters. The digested sludge is lysed via ozonation and recycled into the digesters. The mass balance and energy balance of the different possible configurations combining pre-ozonation, TPAD and post-ozonation will be calculated.

## Keywords

Digested sludge; ozone; temperature phased anaerobic digestion; waste activated sludge.

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