Storage and degradation of poly-ß-hydroxybutyrate in activated sludge under aerobic conditions - DTU Orbit (16/12/2018)

Storage and degradation of poly-ß-hydroxybutyrate in activated sludge under aerobic conditions

This research analyses the accumulation and degradation of poly-b-hydroxybutyrate (PHB) in experiments with pulse addition of acetate to samples of activated sludge from pilot-plant and full-scale wastewater treatment plants. The experiments are divided into two periods: a feast period defined as the time when acetate is consumed and a famine period when the added acetate has been exhausted. In the feast period the significant process occurring is the production of PHB from acetate. The produced PHB is utilised in the famine period for production of glycogen and biomass.

According to modelling results approximately 90% of the total potential growth occurs in the famine period utilising the stored PHB. The degradation rate for PHB in the famine period is found to be dependent on the level of PHB obtained at the end of the feast period. It was found that multiple order kinetics gives a good description of the rate of PHB degradation. The examined sludge of low SRT origin is found to degrade PHB faster than long SRT sludge at high fractions of PHB. The observed yield of glycogen on PHB in the famine period is in the range of 0.22–0.33 g COD/g COD depending on the SRT. The storage pool of glycogen in the examined sludge is more slowly degraded than PHB (COD/COD/h). # 2001 Elsevier Science Ltd. All rights reserved.

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