



## Assessment of the aerobic granulation process through quantitative image analysis

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The present work aims to monitor the aerobic granulation process through quantitative image analysis. The image processing and analysis programme developed by Amaral (2003) [1] for bright field microscopy was used to obtain the aggregates content and the aggregates morphology.

Aerobic granulation of activated sludge was achieved in a sequencing batch airlift reactor (SBAR) fed with acetate as sole carbon source. The SBAR was operated in 4 hour cycles, with 2 minutes settling time that promoted the selection of biomass with a minimum settling velocity of 11 m/h. Compact aggregates with granular characteristics, i.e. aggregates with equivalent diameter higher than 0.25 mm, were identified after 4 days of operation. The system was monitored through influent and effluent characterisation in terms of solids and substrate concentration, and biomass characterisation in terms of concentration, settling ability, density, and aggregates morphology. Aggregates size was divided in four classes: (i) larger granules with equivalent diameter above 1 mm, (ii) smaller granules with equivalent diameter between 0.25 and 1 mm, (iii) intermediate size aggregates with equivalent diameter between 0.025 and 0.25 mm, and (iv) smaller aggregates with equivalent diameter below 0.025 mm. The obtained results allowed to successfully monitor the aerobic granulation, essentially the aggregates size distribution provided valuable information on aerobic granulation progress.

The obtained results showed that quantitative image analysis is a powerful tool to monitor the aerobic granulation process.

[1] Amaral AL, (2003) PhD Thesis, U.Minho, Portugal.