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Comparison of harvesting methods for the cyanobacteria *Microcystis aeruginosa*

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Microcystis aeruginosa is a well-known cyanobacterium that has been spreading all over the world due to increased temperatures and eutrophication of water bodies caused by intensive anthropogenic activities. This toxin-producing microorganism is frequently responsible for diminishing water quality and causing intoxication of humans and animals. Due to this, its intracellular cyanotoxin – microcystin (MC) – is commonly used as tool for molecular and cell biology studies or as a standard in human and environmental risk assessment assays. Moreover, MC is a promising anticancer/antitumor drug candidate and a possible antimicrobial, antifungal, antialgal and insecticide agent. Despite MC's potential application in several biotechnological fields, its high production costs significantly contribute for the prohibitive selling prices (28000 e/mg). Thus, improvements in process' cost-effectiveness is needed, especially in terms of downstream processing techniques which are probably the major bottlenecks of cyanobacteria production at large

scale, commonly representing 20-30 % of the total costs.

Bearing this in mind, this study aimed at optimizing harvesting of *M. aeruginosa* induced by pH change and compares the optimal conditions obtained with the use of three different flocculant agents: chitosan, ferric chloride, and aluminium chloride. Harvesting induced by pH was assessed by testing pH values ranging between 2 and 14. Despite the fact that harvesting efficiencies above 90 % were obtained for most pH values, pH 2 was the one where higher sedimentation rate was observed and consequently the chosen method to compare with the three flocculants. Aluminium chloride addition was found to be the most efficient method, reaching 93 % of sedimentation efficiency within the first 2 h. These results are in agreement with zeta potential measurements where cells presented nearly neutral (approx. 0 mV) charge, while positive or negative charges were achieved using the other three methodologies.
