APPLICATION OF IMAGE ANALYSIS TECHNIQUES IN BIOTECHNOLOGY

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Image analysis is commonly used nowadays in a wide range of applications due to the development of faster computers, advanced frame grabbers, and sophisticated software.
Although the availability of commercial sophisticated software some efforts have been made at CEB-IBQF in software development using MATLAB programming environment. This programming approach permits to tailor the software to our specific needs. In-house software currently in use and development include: automatic differentiation of flocs and granules through fractal dimension; monitoring methanogenic auto-fluorescence; determination of the reduction in mobility of ciliates exposed to toxics; automatic quantification of filamentous bacteria; automatic counting of viable/non-viable yeasts by epifluorescence microscopy with acridine orange as dying agent.

Other developments cover automatic determination of the number of yeast flocs and their size distribution, dynamics of bacterial adhesion, estimation of the tortuosity of porous media, and automatic detection, counting of ink spots in recycled paper simultaneous and monitoring of lactic acid bacteria and yeast during Vinho Verde fermentation using phase contrast microscopy coupled to image analysis.