

OPTIMAL STRATEGIES MINIMIZING THE CONTROL OPERATION COSTS IN BIOCELL COMPOSTING

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We present a recent optimal control problem for composting in biocell [1], whose aim is to find suitable strategies that minimize the total costs due to the control operation and to the minimization of soluble substrate concentration. The problem is based on a mathematical model, taking account of (i) degradation of soluble substrate by an aerobic bacterial biomass; (ii) solubilization of insoluble substrate; (iii) biomass decay phenomenon. The control is acted by monitoring the effects of oxygen concentration in the cell atmosphere on the degradation term. The operation cost is modeled by linear and quadratic function of the effort. We will show that optimal strategies in the linear case lead to a higher reduction of soluble substrate and to a major effort with respect to the quadratic case.

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References

- [1] G. Martalò, C. Bianchi, B. Buonomo, M. Chiappini, V. Vespri. (2019). *Optimal Control Strategies for Composting Processes in Biocells with L_1 - and L_2 -type Cost Objectives* (in preparation).