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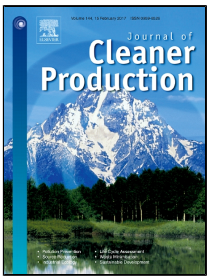

On the evaluation of the global impact of control strategies applied to wastewater treatment plants

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On the evaluation of the global impact of control strategies applied to wastewater treatment plants

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Abstract: The paper presents the effects of the main control actions used in wastewater treatment plants on the three main indicators used for performance evaluation: water quality, operational cost and, especially, greenhouse gas emissions. In this way we can evaluate how these control actions can be combined in order to achieve a global positive effect on the plant operation. Also, this paper proposes an integral indicator for performance evaluation, which takes into account all three indicators mentioned for plant assessment. This indicator has been defined in a manner which tries to capture the overall performance of the plant, without relying on the subjectivity in granting different weights to the constituent elements of the evaluation criteria. The control of nitrate in the second anoxic tank using internal recirculation flow rate and control of the suspended solids concentration in the fifth tank using wastage flow rate offers the best compromise on the three elements considered for performance evaluation of a wastewater treatment plant: water quality, operational cost and CO_2 emissions.

Highlights:

- Evaluation based on water quality, operational cost and greenhouse gas emissions.
- Control strategies impact on the overall performance in wastewater treatment plants.
- Integral global evaluation of control strategies for wastewater treatment plants.

Keywords: Control strategies evaluation, Greenhouse Gas emissions, Environmental impact assessment, Wastewater treatment plant operation, BSM2G, CO_2.