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## ENHANCED REMOVAL OF ORGANIC MATTER AND NUTRIENTS BY SEQUENTIAL BATCH REACTORS

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### Abstract

The aim of this research was to improve the removal of organic matter and nutrients from wastewater from pig farms in a combined batch reactor performed as anaerobic-aerobic sequential. For this purpose, it was suggested to include recirculation cycles of wastewater in a sequentially pulsed manner in the anaerobic treatment followed by intermittent aeration in the aerobic-anoxic treatment. This novelty implemented in both sequential reactors was studied under pilot scale conditions. The process of pulsed intermittent recirculation allowed better contact between the microorganisms and organic matter, and intermittent aeration improved the removal of nutrients, primarily nitrogen (nitrification and denitrification), total phosphorous and organic matter. The best configuration tested for the combined system was the one consisting of pulsed intermittent recirculation with 1 hour of recirculation and 3 hours rest in the anaerobic step and 2 hours of aeration and 1 hour without aeration cycle in the aerobic step. The removals achieved were  $98 \pm 1\%$  of total organic matter,  $86 \pm 5\%$  of soluble organic matter,  $96 \pm 1\%$  of total phosphorus and  $55 \pm 18\%$  of total nitrogen. Hence, it was demonstrated that a combined system with pulsed intermittent recirculation in the anaerobic stage and intermittent aeration in the aerobic stage could enhance the overall treatment of swine wastewater.

*Key words:* intermittent aeration, pulsed recirculation, sequencing batch reactor, swine wastewater

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