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Performance of the first stage of the French system of vertical flow constructed wetlands with only two units in parallel: Influence of pulse time and instantaneous hydraulic loading rate (Article)

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Abstract

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The technology of vertical flow constructed wetlands - French system for treating raw wastewater depends on several hydraulic factors, one of them being the duration of the pulse feeding and the resulting instantaneous hydraulic loading rate. This paper analyses two scenarios in the same system, the first of a faster feeding by pump and the second of a slower feeding by siphon, both with instantaneous hydraulic loading rate values lower than the literature recommendations. The system treated raw wastewater from a population equivalent of 100 p.e. in Brazil, and was comprised by only the first stage and two units in parallel. The shorter duration of feeding time and higher instantaneous hydraulic loading rate were associated with significantly higher chemical oxygen demand and total Kjeldahl nitrogen removal efficiencies, but with no significant differences in terms of biochemical oxygen demand (BOD) and suspended solids (SS). Oxygen concentrations and redox potential in the effluent were evaluated, together with the effluent flow rate profiles. The removal efficiencies were associated with the accumulation of solids in the upper part of the filter resulting from seven years of operation and to the operating hydraulic conditions, which are important elements in the performance of the system. © IWA Publishing 2018.

SciVal Topic Prominence

Topic: Constructed wetland | Wetlands | Wetlands CWs

Prominence percentile: 99.393

Author keywords

Effluent flow rates | Feeding by pump | Feeding by siphon | Pulse loading

Indexed keywords

Engineering controlled terms: Biochemical oxygen demand | Efficiency | Effluents | Feeding | Nitrogen removal | Optical pumping | Oxygen | Redox reactions | Siphons | Turbines | Wastewater treatment | Wetlands

Engineering uncontrolled terms: Biochemical oxygen demands (BOD) | Effluent flow rate | Hydraulic loading rates | Oxygen concentrations | Pulse loading | Removal efficiencies | Total Kjeldahl nitrogens | Vertical flow constructed wetlands

Engineering main heading: Loading

EMTREE drug terms: nitrogen

GEOBASE Subject Index: biochemical oxygen demand | chemical oxygen demand | constructed wetland | effluent | operations technology | oxygen | performance assessment | pollutant removal | pump | redox potential | wastewater | wastewater treatment

EMTREE medical terms: Article | biochemical oxygen demand | Brazil | chemical oxygen demand | constructed wetland | effluent | environmental aspects and related phenomena | feeding behavior | flow rate | instantaneous hydraulic loading rate | oxidation reduction potential | oxygen concentration | pulse time | suspended particulate matter | time | waste water | sewage | wetland

Regional Index: Brazil | France

MeSH: Biological Oxygen Demand Analysis | Brazil | Waste Disposal, Fluid | Waste Water | Wetlands

Chemicals and CAS Registry Numbers:

nitrogen, 7727-37-9;

Waste Water

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