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DETERMINATION OF DESIGN CRITERIA OF AN H-IFAS REACTOR IN COMPARISON WITH AN EXTENDED AERATION ACTIVATED SLUDGE PROCESS

N. Mehrdadi , A. A. Azimi , G. R. Nabi Bidhendi, B. Hooshyari



Abstract:

Advanced compact wastewater treatment processes are being looked for by cities all over the world as effluent standards are becoming more stringent and land available for treatment plants more scarce. In this investigation, a new biofilm process for this purpose was studied. The design and operational criteria of a full scale extended aeration activated sludge system was compared with an H-IFAS reactor which has been operated at a pilot scale. The objective was to define the feasibility of using the H-IFAS (Hybrid Integrated Fixed Film Activated Sludge) reactor for upgrading the existing wastewater treatment plants with conventional processes. The results showed that besides the considerable difference between the organic loading of the two processes, H-IFAS reactor has a very good capability to reduce simultaneously the concentration of nitrogen and phosphorus. Organic degradation rate in extended aeration and H-IFAS systems were 0.3 and 6.22 kgCOD/m³.day at 23.48°C, respectively. Nitrification, denitrification and phosphorus removal rate for the H-IFAS reactor were 343.28 g N/m³.day, 338.17 gN/m³.day, and 204.78gPO₄-P/m³.day, respectively. At the same conditions, these criteria for extended aeration activated sludge processes were obtained as 75gN/m³.day, 28.5 gN/m³.day and 7 gPO₄-P/m³.day), respectively.

Keywords:

"IFAS , MBBR , H-IFAS , nitrification , denitrification , biological phosphorus removal , extended aeration"

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