REMEDIAL CAPACITY OF VEGETATION IN A CONSTRUCTED WETLAND FOR WASTEWATER TREATMENT

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Introduction. Currently pollution has increased in water pools (rivers, lakes and canals) due to inadequate management of wastewater discharge. The wastewater contains high concentrations of (soluble and suspended organic matter, ammonia, nitrogen, phosphates, sulfates and fats, among others). Wastewater treatment is essential to prevent risks to human health and the environment. Constructed wetlands (CW) are systems designed for secondary wastewater treatment where the interaction of plants microorganisms and filtering material improved the water quality (1).
The aim of this study was to assess remedial capacity of vegetation in a pilot CW in the UAM Iztapalapa facilities and its relationship with plant growth.

Methods. The CW spreads over 200 m^2 into the university *Campus*, it is used as a secondary treatment of wastewater generated by the university community. The first stage consists of an anaerobic UASB reactor (60 m^3). The CW is fed by UASB effluent. The wetland vegetation includes *Phargmites australis* and *Cyperus papyrus* 20 and 75 individuals, respectively. The plant growth was measured periodically with 8 replicates. For physicochemical analyses water samples were collected from the CW influent and effluent during 135 days. Contaminants: ammonia (NH_4^+), orthophosphate (2) (PO_4^{3-}) and nitrate (NO_3^-) were evaluated by colorimetric methods.

Results. The CW had a hydraulic retention time of 19 days. Figure 1 shows the variation of the concentration of contaminants over time. The removal efficiency for NH_4^+, PO_4^{3-} and NO_3^- was 30.5%, 10.5% and 67.7%, respectively. Average NH_4^+ concentrations in the influent and effluent (230-160 mg/L) were higher than those of PO_4^{3-} (28-25 mg/L) and NO_3^- (8-3 mg/L). Our results agree with those reported (3): the nitrogen in the influent of CW was found as organic or ammonia, with small amounts of NO_3^-. The amount of PO_4^{3-} in the effluent was virtually equal in the influent, in most cases the absorbed PO_4^{3-} by the vegetation was small in relation to that provided by wastewater.
The Table 1 shows the average degradation rate of ammonia over time.

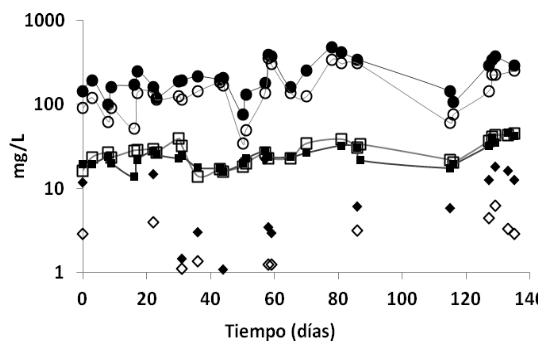

Figure.1. Results of the variation in time of the concentration of NH_4^+ (●, ○) PO_4^{3-} (■, □) and NO_3^- (♦, ◊) in the influent (black figure) and effluent (white figure) CW.

The plant growth rate changing with time is shown in Table 1. The reduction after 85 days may be related to the physiological response of plants to winter temperature (4) that submitted after this lapse.

Table 1. Plant **g**rowth rate (cm/d) and ammonia degradation rate (mgNH_4^+/L·d) over time.

Time (days)	35	75	150
Growth rate (cm/d)	0.38 (±0.21)	0.45 (±0.15)	0.11 (±0.06)
Degradation rate (mgNH_4^+/L·d)	3.37 (±1.8)	3.18 (±2.26)	4.62 (±2.6)

Conclusions. The NH_4^+ is the pollutant with highest removal efficiency in our CW. The plant growth rate was constant and decreased at the end of experiment. No relationship was found between the amount of N removed and plant growth.

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