



## Effect of pollutant concentrations on growth characteristics of macrophytes in a constructed wetland treating municipal combined sewage

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### ABSTRACT

Constructed wetlands (CWs) have been used for contaminated water treatment for more than three decades. However, the ecological effects of the pollutant loading on CWs are not well known. In this study, five wetland plants (*Phragmites karka* (PK), *Typha orientalis* Presl (TO), *Cyperus malaccensis* Lam (CM), *Schoenoplectus mucronatus* (SM), *Hygrophila pogonocalyx* Hayata (HP)) were chosen and three study sites (42 × 42 cm) were used in a CW in Taiwan. The bioaccumulation of vegetation and effects on wetland ecosystem were tested with different pollutant concentrations of municipal combined sewage. The mean concentrations of BOD<sub>5</sub>, NH<sub>4</sub>-N, and total phosphorus (TP) at the three study sites were 12.1 ≈ 44.3 mg l<sup>-1</sup>, 3.6 ≈ 19.8 mg l<sup>-1</sup>, and 0.4 ≈ 1.9 mg l<sup>-1</sup>, respectively. The results show that higher nutrient concentrations led to higher bioaccumulations of wetland plants, and the amount of biomass are significantly different in each species. The highest growth rate is observed in CM, in 5314 g-biomass (dry weight) m<sup>-2</sup>. The drying ratio (wet weight/dry weight) increases with the growth of all five species. The conclusion is that the input of nutrients within the polluted water will increase the production of wetland plants, but may possibly decrease the biodiversity due to higher competition around different species at the same time.

*Keyword:* Constructed wetlands; Wetland macrophyte; Bioaccumulation; Growth rate; Drying ratio

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