



## Saline domestic sewage treatment in constructed wetlands: study of plant selection and treatment characteristics

Feng Gao<sup>a,b</sup>, Zhao-Hui Yang<sup>a,c,\*</sup>, Chen Li<sup>b</sup>, Wei-Hong Jin<sup>b</sup>

<sup>a</sup>College of Environmental Science and Engineering, Hunan University, Changsha 410082, China

<sup>b</sup>College of Marine Science, Zhejiang Ocean University, Zhoushan 316000, China

<sup>c</sup>Key Laboratory of Environmental Biology and Pollution Control, Hunan University, Ministry of Education, Changsha 410082, China

Email: yzh@hnu.cn

Received 3 August 2012; Accepted 11 September 2013

---

### ABSTRACT

A series of investigations was conducted to treat saline domestic sewage using constructed wetlands. Twelve emergent plant species were planted in experimental units and fed with saline domestic sewage. All species were classified into three clusters using cluster analysis based on the average values of relative growth rate, nutrient uptake, root biomass and activity. The species of Cluster I, including *Canna indica*, *Phragmites australis* and *Scirpus validus*, had strong potential for the purification. The above plants were employed again to treat saline domestic sewage under different influent salinities concentrations. For the influent salinity of 0.5, 1.0 and 1.5‰, average treatment performances of planted units were found to be 61.5–70.5% for COD, 59.3–68.4% for  $\text{NH}_4^+\text{-N}$ , 61.9–70.4% for TN and 40.4–47.3% for TP. With increasing influent salinity to 2.0‰, the removal efficiencies were dropped significantly. It was similar to the change of the soil enzyme activity in the experiment units. Activities of urease and cellulase declined significantly when influent salinity increased to 2.0‰. The lower soil enzyme activity in the treatments receiving wastewater at 2.0‰ indicated that saline domestic sewage had an adverse effect on microbial activities.

**Keywords:** Constructed wetland; Saline sewage; Salt-tolerant plant; Pollutant removal; Enzyme activity

---

\*Corresponding author.