# Investigation on nitrate removal efficiency of Karun agro-industry agricultural wastewater at surface flow constructed wetland with cultivated vetiver grass

**Saeb Khoshnavaz**[1*]
**Saeed Boroomand Nasab**[2]
**Hadi Moazed**[3]

*1. Ph.D. Student, Department of irrigation and Drainage. Shahid Chamran University, Ahwaz, Iran*
*3. Water Sciences Engineering, Shahid Chamran University, Ahwaz, Iran*

[*]**Corresponding author**
Saeb.khoshnavaz@gmail.com

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**Abstract**

Nitrate loadings from agriculturalwastewater causes serious damage to water quality in many parts of the world. In this study, the removal of nitrate pollution of agricultural wastewater in Karun Agro-industry unit studied with surface flow constructed wetland (FWS-CW) using hydroponic and soil as media. In order to investigate the effect of plant cultivated in CWs(floating and emergent cultivated), temperature and hydraulic retention time (HRT) on the performance of FWs-CW treating wastewater, nine parallel pilot-scale units of dimensions 3m in length and 1m in width and 0.8m depth were constructed. Continuous flow of wastewater introduced in the system from December 2012 until March. The three units were cultivated with vetiver on the floating platform, three units had soils as media and the rest were kept unplanted(Control).The study was divided into 6 phases of 6 months, using 3, 5 and 7days HRT. Average weather temperature varied from about 8.92 to 31.25◦C. Concentration of nitrate measured at the inlet and outlet of the system and data analyzed using SAS to see the significance relationship between factors. The average nitrate concentration of the wastewater entering the unit was 20±3.76 mg/l. The results indicated that removal performance of the constructed wetland units; different HRT and changes in temperature were significantly different. The treatment efficiencies of 3, 5 and 7days HRT were average of 14.24-37.52, 16.32-41.27 and 16.42-50.51%, respectively. Moreover, results from this study indicated that the emergent vetiver cultivated, floating vetiver cultivated and control wetland, removed 43.09,28.36 and 15.66 % nitrate respectively and a high removal rate regularly occurred in long-term operating (HRT=7days) efficiency in total CWs.

**Keywords:** Agriculturalwastewater treatment, Nitrate, Constructed wetland, Vetiver grass.