Desalination and Water Treatment
www.deswater.com
doi: 10.5004/dwt.2019.24044

154 (2019) 283–288
June

Reduction of pathogenic microorganisms in an Imhoff tank–constructed wetland system

Mohammad Darvishmotevalli[a], Maryam Moradnia[b,a,*], Alireza Asgari[c], Mohammad Noorisepehr[d,e], Hamed Mohammadi[f]

[a]*Department of Environmental Health Engineering, Public Health School, Isfahan University of Medical Sciences, Isfahan, Iran, Tel. +989124256723; email: mohamad.darvish68@gmail.com*
[b]*Department of Environmental Health Engineering, School of Health, Kurdistan University of Medical Sciences, Sanandaj, Iran, Tel. +989100927010; Fax: +98(28) 33368778; email: moradnia@hlth.mui.ac.ir*
[c]*Department of Waste Management, Center for Research and Development, Farashetab Kian Aria (FSKAria) Co., Tehran, Iran, Tel. +989011925643; email: modiriatpasmand@gmail.com*
[d]*Department of Environmental Health Engineering, Public Health School, Alborz University of Medical Sciences, Alborz, Iran*
[e]*Research Center for Health, Safety and Environment (HSE), Alborz University of Medical Sciences, Alborz, Iran*
[f]*Torbat Jam Faculty of Medical Sciences, Torbat jam, Iran, email: hamedmohamdi36@gmail.com*

Received 23 March 2018; Accepted 2 March 2019

ABSTRACT

Microbial quality is one of the most important quality characteristics associated with wastewater reuse in irrigation. This study was conducted in order to evaluate the removal of microbial parameters including Total coliform, fecal coliform, parasite eggs and protozoan cysts removal by hybrid Imhoff tank and constructed wetland (CW) systems. This experimental study was carried out during 6 months. A total number of 144 samples were collected from influent and effluent of hybrid Imhoff tank and CW systems. Parasite eggs and protozoan cysts count were performed based on the Bailenger method. Moreover, total coliform and fecal coliform counts were carried out using the most probable number (MPN) method. It appeared that the highest removal efficiencies were, respectively, achieved to be 99.999% (5 logs) and 99.999% (4 logs) for total coliform and fecal coliform and higher than 99% for intestinal nematode parasites eggs and protozoan cysts when the Imhoff tank and CWs systems were used as series. The *p*-value was statistically significant (p-value < 0.05) for all pathogenic microorganisms removed by the hybrid system of Imhoff tank–SSFCW. It is concluded that the hybrid system of the Imhoff tank–CW is effective in removal of cysts and parasite eggs. The use of a disinfection unit will be necessary for achieving the output standards for total coliform and fecal coliform.

Keywords: Intestinal microorganisms; Constructed wetland; Wastewater

* Corresponding author.