

## Hospital Wastewater Treatment by Ultrafiltration Membrane System

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**Abstract :** Although there have been several studies related to collection, temporary storage, handling and disposal of solid wastes generated by hospitals, there are only a few studies related to liquid wastes generated by hospitals or hospital wastewaters. There is an important amount of water consumptions in hospitals. While minimum domestic water consumption per person is 100 L/day, water consumption per bed in hospitals is generally ranged between 400-1200 L. This high amount of consumption causes high amount of wastewater. The quantity of wastewater produced in a hospital depends on different factors: bed numbers, hospital age, accessibility to water, general services present inside the structure (kitchen, laundry, laboratory, diagnosis, radiology, and air conditioning), number and type of wards and units, institution management policies and awareness in managing the structure in safeguarding the environment, climate and cultural and geographic factors. In our country, characterization of hospital wastewaters conducted by classical parameters in a very few studies. However, as mentioned above, this type of wastewaters may contain different compounds than domestic wastewaters. Hospital Wastewater (HWW) is wastewater generated from all activities of the hospital, medical and non medical. Nowadays, hospitals are considered as one of the biggest sources of wastewater along with urban sources, agricultural effluents and industrial sources. As a health-care waste, hospital wastewater has the same quality as municipal wastewater, but may also potentially contain various hazardous components due to using disinfectants, pharmaceuticals, radionuclides and solvents making not suitable the connection of hospital wastewater to the municipal sewage network. These characteristics may represent a serious health hazard and children, adults and animals all have the potential to come into contact with this water. Therefore, the treatment of hospital wastewater is an important current interest point to focus on. This paper aims to approach on the investigation of hospital wastewater treatment by membrane systems. This study aim is to determined hospital wastewater's characterization and also evaluates the efficiency of hospital wastewater treatment by high pressure filtration systems such as ultrafiltration (UF). Hospital wastewater samples were taken directly from sewage system from Şişli Etfal Training and Research Hospital, located in the district of Şişli, in the European part of Istanbul. The hospital is a 784 bed tertiary care center with a daily outpatient department of 3850 patients. Ultrafiltration membrane is used as an experimental treatment and the influence of the pressure exerted on the membranes was examined, ranging from 1 to 3 bar. The permeate flux across the membrane was observed to define the flooding membrane points. The global COD and BOD5 removal efficiencies were 54% and 75% respectively for ultrafiltration, all the SST removal efficiencies were above 90% and a successful removal of the pathological bacteria measured was achieved.

**Keywords :** hospital wastewater, membrane, ultrafiltration, treatment

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