Evaluation of Conventional Activated Sludge System and Membrane Bioreactor Technology at Al-Ansab Sewage Treatment Plant

Buthaina AL Weheibi

Abstract

The wastewater is essentially the water supply of the community after it has been used in a variety of applications. From the point of sources, wastewater may be defined as a combination of the liquid or water-carried wastes removed from residences, institutions, commercial and industrial establishments. Several environmental and health impacts resulting from wastewater pollution have been identified and actions need to be taken through wastewater treatment.

The main objective of this study is to evaluate two wastewater treatment methods that are implemented at Al Ansab Sewage Treatment Plant which are Conventional Activated Sludge System (CAS) and Membrane Bioreactor Technology (MBR). The emphases of the research project are to characterize the strength of influent raw sewage, distinguish the concentration load in biological treatment tank, compare the quality of treated effluent to Ministry of Environment and Climate Affairs (MECA) Standard Specifications and calculate the removal performance of each parameter.

The study was conducted at three locations which are Influent Raw Sewage, Biological Aeration Tank and Treated Effluent. The experimental work was carried out by samples collection and tests analysis of wastewater constituents. The obtained results showed that raw sewage of CAS STP can be categorized as high strength concentration, while as medium strength concentration for MBR STP. Both STPs produce very good quality of treated effluent since most parameters showed compliance with MECA standards. The removal efficiency achieved at CAS plant for TSS, TN and BOD are 97%, 57% and 98% respectively, while that accomplished at MBR plant are 98%, 82% and 98% respectively. However, the removed amounts of the TSS, TN and BOD in CAS plant were 437, 40 and 442 kg/1000 m³ respectively compared to 147, 37 and 206 kg/1000 m³ respectively, for MBR plant. Thus, the CAS plant was able to remove higher amounts of pollutants compared to the MBR plant. Eventually, if the limitations of CAS plant are covered as the suggested recommendations, it can achieve the treated effluent quality produced by MBR.

Hence, Conventional Activated Sludge can be considered as optimum technique in wastewater treatment based on very good quality produced.