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Abstract: Due to stringent environmental regulations and standards on wastewater reuse and disposal, conventional treatment processes may not be able to cope with the new stringencies. Therefore, alternative processes need to be implemented in the wastewater treatment industry, provided that their technical and economic feasibilities are taken into consideration. The technical feasibility of a treatment process is determined by investigating the performance of that process under different operational conditions. In this study, the performance of immersed membrane bioreactor (IMBR) in treating synthetic municipal wastewater was investigated using laboratory-scale experimental setup at different mixed liquor suspended solid (MLSS) concentrations of 3,000, 5,000, 10,000, and 15,000 mg/l and organic loading rates (OLR) ranging between 0.11 and 1.19 kg COD/kg MLSS/day. The results showed that COD removal efficiency that was affected by the MLSS concentration was in the range of 80 to 98%. Increasing the MLSS concentration was found to increase the COD removal efficiency. With respect to the cumulative permeate flux, the results showed that it was ranging between 27 and 36 $l/m^2/hr$. The hydraulic retention time, which was affected by the permeate flux was in the rage of 12 to 15 hours. Sludge production was found to be on the average of 0.26 mg VSS per mg COD, which is 35% less than that reported for conventional activated sludge processes. The organic shock loading investigation showed that the IMBR process was not significantly affected by increasing the OLR values. Phenol and chromium were found to have short-term detrimental effect on the performance of the process and the COD removal efficiency was found to resume to its original values whence the toxicants were ceased. In general, the results of the investigation revealed that immersed membrane bioreactors, are potential alternative wastewater treatment processes, particularly, when the reuse of wastewater is considered as a vital option.