# ABSTRACT

Global population is increasing on daily basis, and climate change has resulted in decline of freshwater supplies and availability, posing a significant global problem. The combined effluent from tanneries has a high concentration of chemical compounds, including hazardous chemicals and heavy metals. The objectives of this study were to compare the physical, chemical and biological methods to evaluate most efficient, cost effective and environment friendly treatment techniques for treatment of combined tanneries effluents. Different physical, chemical and biological treatments were performed for tanneries combined effluents on lab scale at different dilutions. Analysis of variance (one-way ANOVA) was performed to compare the significant level of these different treatments. Four dilutions (10%, 20%, 30%, and 40%) of the tanneries combined effluent were prepared. After performing the experiments, the treatment efficiency for the physical treatments was 52.4%. The chemical treatments showed the removal efficiency up to 48.3%. The biological treatments showed the removal efficiency of 95.58%. The percentage removal of physiochemical parameters (COD, BOD, TDS, TSS, EC and turbidity) of tanneries' combined effluent by physical treatments was 95.47%. For chemical treatments it was 98.28% and for biological treatments it was 97.39% respectively. The pH, DO and temperature of the sample of tanneries effluent were already according to the permissible limit of NEQ's. The chemical treatment was shown to be the most successful in lowering the physiochemical parameters of tanneries combined effluent. It is conclude that, the biological treatment of tanneries combined effluent is cost-effective and environmental- friendly process for the removal of heavy metals that were present in tanneries effluent. The comparison between physical, chemical and biological processes for the treatment of tanneries combined effluent in all aspects is shown by the order; Biological > Chemical > Physical. There is need to carried out the detailed study for energy economics, and costs associated with each treatment method (Physical, chemical, biological), that's why best and cost efficient method can be easily determined.