

## Assessment of Physical, Chemical and Radionuclides Concentrations in Pharamasucal Industrial Wastewater Effluents in Amman, Jordan

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**Abstract :** This study was conducted to assess the physical, chemical, and radionuclide concentrations of pharmaceutical industrial wastewater effluents. Fourteen wastewater samples were collected from pharmaceutical industries. The results showed a marked reduction in the levels of TH, Mg, and Ca concentration in wastewater limit for properties and criteria for discharge of wastewater to streams or wadies or water bodies in the effluent, whereas TSS and TDS showed higher concentration allowable for discharge of wastewater to streams or wadies or water bodies. The gross  $\alpha$  activity in all the wastewater samples ranged between (0.086-0.234 Bq/L) lowered the 0.1 Bq/L limit set by World Health Organization (WHO), whereas gross  $\beta$  activity in few samples ranged between (2.565-4.800 Bq/L), indicating the higher limit set by WHO. Gamma spectroscopy revealed that K-40, Cr-51, Co-60, I-131, Cs-137, and U-238 activity are  $\leq 0.114$  Bq/L,  $\leq 0.062$  Bq/L,  $\leq 0.00815$  Bq/L,  $\leq 0.00792$  Bq/L,  $\leq 0.00956$  Bq/L, and  $\leq 0.151$  Bq/L, respectively, indicating lowest concentrations of these radionuclides in the pharmaceutical industrial wastewater effluents.

**Keywords :** pharmaceutical wastewater, gross  $\alpha/\beta$  activity, radionuclides, Jordan

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