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Evaluationof Heavy Metals Toxicity of Pharmaceuticals Industrial Wastewater by Pollution Indexing and Chemometric Approaches

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Abstract: Water is the most important resource for life. Water quality and quantity is the main global issue. Water scarcity dueto increased demand of water by different sectors for business, industrial uses and agricultural activities has pressurized the sources of water. Industrialization has created the most challenging issues of water pollution by different types of organic, inorganic and heavy metals which discharged into the water- bodies. Pharmaceutical also contain different types of chemical constituents which released directly into the water-bodies without processing. Out of the inorganic and organic pollutants, heavy metals are the most important toxicant which severelyaffects the water quality. In this study, water samples of two pharmaceutical industries (A and B) were subjected to physico-chemical and heavy metal investigations.The obtained mean values of parameters were further processed for Chemometric statistical assessment viz. Principal Component Analysis (PCA)/ Factor Analysis (FA). The heavy metal toxicity was assessed by the indexing method such as Heavy Metal Pollution Index (HPI) and Heavy Metal Evaluation Index (HEI). The PCA/FA showed that two factors F1and F2 values in the case of industry A and B were capable to explain 100% of total variances. The HPI valuesfor industry A and B were108.78 and 52.14 respectively and HEI values were 4.15 and 8.67 respectively.The result revealed that the industry A falls in the category of high metal pollution category and low water quality and industry B showed low heavy metal pollution and low water quality.
Keywords: Physico-chemical, chemometric, cluster analysis, heavy metal pollution index, heavy metal evaluation.

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