Statistical Evaluation on Water Pollution Level of Code River, Yogyakarta Based on Heavy Metals Concentrations and Sampling Locations

ABSTRACT

Heavy metal concentrations in four different media like river water, river sediment, silver rasbora fish, and water spinach can be observed to determine the level of river pollution. A statistical evaluation based on two-way analysis of variance can be used to obtain detailed information about the effects of heavy metal concentrations and four different media on the level of river pollution. This study aims to investigate the river pollution level via the effects of heavy mental concentrations and four various media based on sampling locations of Code River, Yogyakarta, Indonesia. The samples of river water, river sediment, silver rasbora fish, and water spinach are sent to Yogyakarta Nuclear Research Center for chemical analysis. The data retrieved from the chemical analysis is used in the statistics analysis. The statistical analysis results indicate an alarmingly high concentration of zinc element compared to the other elements based on the sample taken from river sediment, water spinach, and silver rasbora fish. I n a ddition, t he c oncentration o f a rsenic i n the river water is the highest compared to the other elements. Besides that, the sampling from the downstream area reveals the highest pollution level compared to the other four sampling locations. This study also compared the concentrations of As, Hg, Cr, and Zn in silver rasbora fish and water spinach with the maximum limit set by Codex Alimentarius Commission (1995). This study suggests that the silver rasbora fish and wa-ter spinach in Code River are unsafe for human consumption. The findings of this study can be used as supporting evidence for the government to take necessary actions in reducing river pollution and improving water quality of Code River, Yogyakarta, Indonesia.