NONPARAMETRIC STATISTICAL TESTS APPLIED TO WATER QUALITY INDICATORS

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Abstract

To minimize the risk of infections, it is essential to routinely test for bacteria and harmful contaminants, particularly in areas where water is utilized for drinking or recreational activities. To demonstrate the presence of microbiological indicators (Escherichia coli and intestinal enterococci), water sampling and analysis were conducted at Jarun Lake and Bundek Lake in Zagreb, Croatia, over a span of three years.Sampling and analysis of water are carried out according to the recommendations of competent institutions, and water quality indicators for drinking, bathing, and daily use must be within the permitted limits, which are prescribed by regulations relating to the quality of drinking and everyday water use. The purpose of this study was to identify microbiological indicators of water quality in two distinct lakes and to analyze the results using nonparametric statistical techniques.The hypothesis was examined to determine whether the levels of microbiological indicators collected from various locations in a specific lake are part of a population that has the same median.Nonparametric statistical methods are useful in water quality studies because they don't require assumptions about the underlying distribution of the data. In water quality analysis, data can often be skewed or contain outliers, which makes parametric tests (which assume a normal distribution) unsuitable. Nonparametric methods help to handle these types of data effectively.Some common nonparametric methods used in water quality assessment include: the extended median test and the Kruskal-Wallis test.The Extended Median Test (EMT) is a statistical technique used to compare multiple independent groups to determine whether they come from the same distribution, especially when the data are not normally distributed. It is an extension of the median test,a non-parametric method for comparing two or more groups. The extended median test takes into account the median of each group and is particularly useful when dealing with ordinal or skewed data.The Kruskal-Wallis test is a valuable tool for analyzing water quality data, especially when the data is non-normal or when comparing multiple groups. It helps to determine if there are significant differences in water quality parameters, enabling better water management and treatment decisions.In water quality studies, nonparametric methods are an essential toolkit, especially when dealing with real-world data that may not follow the assumptions required by parametric tests.

Keywords: *water quality,the extended median test, the Kruskal- Wallis test.*