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MUTAGENICITY ASSAYS AND WATER QUALITY INDEXES: AN INTEGRATED APPROACH

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Water quality monitoring programs are designed to obtain quantitative and representative information on the physical, chemical, and biological characteristics of a water body over time and space. CETESB's Water Quality Program, established in 1974, comprises nowadays more than 400 sampling locations, and includes chemical, microbiological, hydrobiological, and toxicological analyses of surface water samples. Quality indexes are calculated, such as the Water Quality Index (IQA) with 9 parameters: fecal coliforms, pH, biological oxygen demand, total nitrogen, total phosphorous, temperature, turbidity, total residues and dissolved oxygen. The Water Quality for Public Supply (IAP) includes the IQA parameters along with THM, cyanobacteria cells, Cd, Pb, Cr, Hg, Ni and substances that affect the organoleptic quality of the water. In both indexes, each sample receives a value from 1 to 100 which allows classifying them on a scale that goes from very poor to very good quality. The present study intend to correlate the results obtained with the genotoxicity assays using the minimal effective dose (MED 1.5) and the classification obtained with the IQA and IAP indexes. The Salmonella/microsome test and induction of micronuclei in V79 cells were used to evaluate genotoxicity in 31 different sites, where waters are used as supply to water treatment plants. The comparative analyzes indicate that the results obtained in the mutagenicity tests show weak correlation with the quality indexes. About the IQA, most of the mutagenic activity was detected in samples that were classified as good for the index, and for the IAP the mutagenic activity is more equally distributed in all categories. This integrated approach is important to provide an overview into the water quality and the responses of different monitoring tools. The results reinforce the importance of this approach and indicate that to consider only the quality indexes to classify the water quality do not contemplate the presence of genotoxic activity in the aquatic environments and the inclusion of these variables in a quality index calculation could be considered as a new approach.