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Applying genotoxicology tools to identify environmental stressors in support of river management

Oberholster PJ
Hill L
Jappie S
Truter JC
Botha A

ABSTRACT:

Although bioassay approaches are useful for identifying chemicals of potential concern, they provide little understanding of the mechanisms of chemical toxicity. Without this understanding, it is difficult to address some of the key challenges that currently face aquatic ecotoxicology. To overcome this, the toxicity potential of the water samples was assessed and surviving organisms (Physa acuta) were used for protein activity measurements and gene expression profiling by making use of complementary DNA amplified fragment length polymorphism (cDNA-AFLP) analysis. From the data it was evident that the impacts of specific pollutants (e.g. sewage) on organisms at the cellular level could be identified, and that the expressed stressor genes can be used as bioindicators/markers/genetic signatures or fingerprints during identification of point source pollution. From an ecosystem management point of view these insights could assist with the forecasting and reduction of environmental risks on catchment level by implementing suitable management interventions.