

Use of Recombinant Bioluminescent Bacteria and DNA Chip for Arsenic Toxicity Monitoring

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Arsenic is widely distributed in the environment because of its natural existence and its use by human activities. Arsenic is known to exert toxic effects, such as carcinogenicity, teratogenicity, cytotoxicity, and genotoxicity. Arsenic is also considered to be an endocrine disruptor and might pose possible adverse effects on humans and wild animals. To assess the impact of arsenic on public health and ecosystem balance, recombinant bioluminescent bacterial strains were applied. In the test using bioluminescent bacteria, inducible strains showed no significant responses to the both arsenite and arsenate. However, the EC₂₀ values were lower for arsenite than that for arsenate, which is consistent with the fact that arsenite is more toxic than arsenate. Meanwhile, the DNA microarray can be used as a rapid screening tool to assess the toxicological properties of a chemical, based upon the gene expression patterns induced upon exposure to environmental toxicants. With the low density DNA chip the gene transcriptional responses after exposure to As(III) were examined according to time. The expression patterns differed depending upon the time with *cysK* being the most highly expressed gene among the 96 functional genes.