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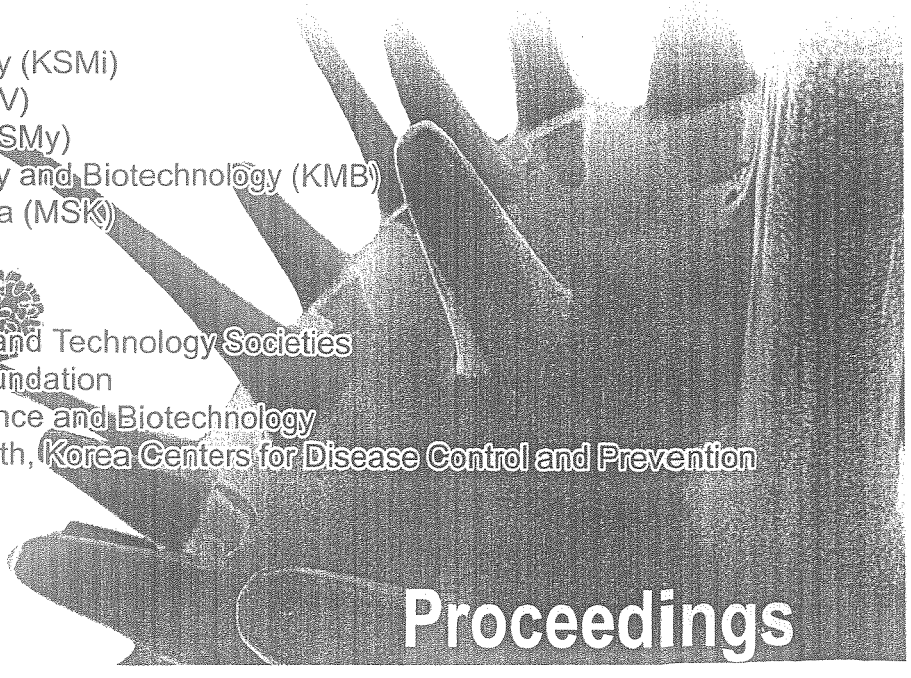

Proceedings

B049

Analysis of Microcystin Using Electrochemical Biosensor with Nanocrystal

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Microcystins are a prevalent cyanotoxin produced by the massive occurrence of cyanobacteria which cause a harmful algal bloom (HAB). The presence of microcystins poses a health threat to humans due to their physiological effect in the liver as primary target organ. Current analytical techniques for assessing microcystin suffer from certain drawbacks in applicability to the routine environmental monitoring. Therefore, biosensor for electrochemical analysis of microcystins has been developed owing to the distinguish advantages. With this aim, the reliable electrochemical biosensor has been explored using the monoclonal antibody as a bio-tracer labeling with quantum dot (QD) acting as a transducer of converting immunological recognition into electrochemical signal. Consequently, the electrochemical response of QD is interpreted by anodic stripping voltammetry. Therefore, the broad detection range can be achieved with six orders of magnitude ranged from 0.01 ppb to 25 ppm. The lower detection limit ensures below WHO guideline 1 ppb of microcystin in drinking water. QD-linked antibody shows great promise for useful electrochemical bio-label in development of biosensor. Converting immunoassay into electrochemical biosensor with the Ab/QD label will open the door to environmental monitoring system.

Keywords: Microcystin, Monoclonal antibody, Quantum dot, Electrochemical biosensor

B050

Comparison of Membrane Filtration and Enterolert Method for Detection of Enterococci in Fresh Swimming Water

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Enterococci are commonly found in the feces of humans and other warm-blooded animals. Although some strains are ubiquitous and not related to fecal pollution the presence of enterococci in water is an indication of fecal pollution and the possible presence of enteric pathogens. The significance of finding enterococci in recreational fresh or marine water samples is the direct relationship between the density of enterococci and the risk of gastrointestinal illness associated with swimming in the water. We study enterococci by enzyme substrate enterolert method and membrane filtration method (mEI agar-EPA method 1600) in 4 fresh swimming waters during swimming season. As a result the enterolert method was found to be more sensitive than membrane filtration method especially when was affected by rain. Although the rain has stopped and two days passed still maintain great number of enterococci. Because of relationship between waterborn diseases, variation number of enterococci is important for a safe recreation.

Keywords: Enterococci, enterolert, swimming water

B051

Microbial Community Patterning for a Stream Polluted with Domestic Wastewater Using Self-Organizing Map (SOM)

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A stream of different pollution levels was pattern-recognized by analyzing benthic microbial communities through self-organizing map (SOM) technique. The sampling sites were selected based on different levels of domestic wastewater pollution. Restoration and reference sites were also included. Physico-chemical environmental monitoring parameters were also measured at all the sampling sites. Grouping of collected samples revealed the impact of different sources of pollution. Microbial taxa (86 taxa) were diverse at the clean sites while microbial communities tolerant at polluted sites. SOM results showed that the sampling sites were essentially categorized into 4 areas of SOM map depending on sampling dates. Their distribution on the SOM map appeared to be significantly affected by the seasonal environmental parameters (e.g., temperature, available organic nutrients and light intensity). However, this type of distribution was less obvious as the sampling number increased, reflecting more site-specific characteristics. Bacterial populations in broad gradient of pollution were *Acinetobacter, Exiguobacterium, and Janthinobacterium*. The populations in narrow gradient of pollution were *Brevibacillus, Brevundimonas, Caulobacter, Klebsiella pneumoniae and Hymenobacter*. This indicates some microbial populations (particularly more site specific ones) could reflect the pollution status of domestic wastewater.

Keywords: Microbial community, Self-organizing map (SOM), Stream, Domestic wastewater

B052

Thermophilic Microbial Population Dynamics in a Petroleum-Contaminated Site Treated With Electrical Resistance Heating-Soil Vapor Extraction (ERH-SVE)

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In this study, we examined the soil microbial diversity and population dynamics in a petroleum contaminated site which was successfully treated by electrical resistance heating-soil vapor extractions (ERH-SVE). T-RFLP (terminal-restriction fragment length polymorphism) analysis for 16S rDNA showed that the degree of diversity in the ERH-SVE treated soil was significantly lower than that for the non-treated petroleum-contaminated soil. When microbial community structure and population dynamics were analyzed using bacterial 16S rDNA amplification, cloning and sequencing, a significant shift of microbial community structure was observed in the ERH-SVE treated soil, compared to the non-treated petroleum-contaminated soil. In the petroleum-contaminated soil, *Proteobacteria* was the major population while *Firmicutes* became the most abundant division in the ERH-SVE treated soil. Thus, these results revealed that the developed heat (60°C) by the ERH-SVE resulted in a selection of the thermophilic populations, which in turn reduced the microbial diversity in the ERH-SVE treated soil. Considered together, we could evaluate that the ERH-SVE provided a negative impact on microbial ecology (reduced diversity) although the treatment was successful in removing the target pollutants from the site. Thus, our study recommends an additional ecological remediation to recover the damaged soil ecology by the ERH-SVE application.

Keywords: ERH-SVE, microbial diversity, community structure