Training workshop

Analysis of bacterial diversity using PCR-DGGE method

21-24 June 2010

The training workshop "Analysis of bacterial diversity using PCR-DGGE method" took place in Olsztyn, on 21st-24th June 2010. The workshop was organized by the Department of Environmental Biotechnology (University of Warmia and Mazury in Olsztyn) in collaboration with the Centre for Biotechnology (The Silesian University of Technology) and the Foundation of Science and Oncology in Olsztyn. The workshop was attended by twenty participants from ten Polish scientific units.

Denaturing gradient gel electrophoresis (DGGE) is a molecular fingerprinting method that separates polymerase chain reaction (PCR)-generated DNA products. The polymerase chain reaction of environmental DNA can generate templates of differing DNA sequences that represent many of the dominant microbial organisms. DGGE is used to assess the microbial diversity of a biocenosis. DNA from a microbial population can be run through DGGE and the resultant gel displays a band for every microbe, an indication of species richness. DGGE is more generalized than other techniques, which requires prior knowledge of gene sequences in order to perform analysis. There is also no requirement for the DGGE sample species to be grown in a laboratory culture, which can only support a small percentage of microbial species. Furthermore, with the breadth of PCR primers available, DGGE can also be used to investigate broad phylogenies or specific target organisms such as pathogens or xenobiotic degraders.

The training programme was designed in such a way that participants were introduced to the main concepts and definitions followed with a series of lectures. Thereafter, participants practiced the thus learned concepts in the laboratory. The course consisted of 6 hours of lectures and 24 hours of practical training. The lectures were on molecular methods of microbial communities analysis, application of modern molecular techniques in natural and semi-technical environments and practical application of fingerprinting methods in a study of nitrifying bacteria. The laboratory topics were: DNA purification from environmental samples, Polymerase Chain Reaction, Denaturant Gradient Gel Electrophoresis, mathematical analysis of microbial fingerprints. Moreover, the important objectives of the workshop were to create a platform for participants to share experiences and knowledge necessary to use PCR-DGGE technique in various scientific applications, and to promote collaboration and partnership among participants.

The workshop organizing team would like to acknowledge the contributions of many committed organizations. These include: (1) Bio-Rad Poland, (2) Meranco - control, measuring and laboratory apparatus, and (3) The Silesian University of Technology.

The workshop organizers

Sławomir Ciesielski
University of Warmia and Mazury in Olsztyn

Aleksandra Ziembińska
The Silesian University of Technology