SCR-THE-030

ADVANCED SCREENING TECHNOLOGIES
DNA-binding & Cell-Based Assays

• Context

Among the existing screening analytical strategies, antibody-based assays are using the specific binding of an antigen by its homologous antibody, while cell-based assays are using a biological response measured in a living cell line. Another kind of assays, so-called DNA-binding assays, is using the specific recognition of a DNA template by an activated receptor. All these types of assays are based on the detection of the presence of one or more chemicals in a sample extract prepared according to an appropriate procedure. Desirable features for screening tests are high throughput capabilities combined with a low rate of false negative results and cost effectiveness.

• General objective(s)

The main objective of this theoretical module is to describe the main basic principles of DNA-binding and cell-based assays mediated throught the aryl-hydrocarbon receptor, applied to the measurement of environmental contaminants such as dioxins and PCB in food matrices.

• Main items

DNA-binding / Reporter gene assay / q-PCR / dioxins / PCB

• Pedagogical objectives

✓ Know and understand the main chronological steps of a DNA-binding assay
✓ Know and understand the main chronological steps of a reporter gene assay based on luciferase expression (cell-based assay)
✓ Know and understand the q-PCR technique

• Pedagogical tools

✓ PowerPoint slide show

• Duration

✓ 1 hour

• Pre-requisite

✓ Basics of molecular biology (Cell Biology, DNA structure and replication)
✓ Knowledge of the chemistry of contaminants of interest (REG-THE-010)
✓ Theoritical lecture on antibody-based assays (SCR-THE-010)