Experiments in Public Health and Environmental Science

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1. Course Description

There are many chemicals in the environment that might potentially affect health even if they are natural compounds or synthetic compounds. Among them, for example, food additives for manufacturing and preserving foods, minor ingredients contained in food containers, bacteria and metal ions mixed in foods, and chemical substances released by industrial activities should be identified and managed to an appropriate amount. This course deals with the basic techniques and principles of analyzing chemical compounds in foods and living environments.

The aim of this course is to help students acquire the DP2 and DP3 related knowledge, technique, and performance.

2. Course Objectives

By the end of the course, students should be able to do the following:
(1) Measure food additives using spectrophotometer.
(2) Analyze quantitatively metal ion in food with atomic absorption method.
(3) Detect and quantify food components by High Performance Liquid Chromatography (HPLC) and Gas Chromatography Mass Spectrometry (GC-MS).
(4) Quantify ecotoxicity of chemical compounds using microalgae.
(5) Detect coliform and bacteriophage using agar plate methods.

3. Grading Policy

Grading will be decided based on all lab reports. To pass, students must earn at least 60 points out of 100.

4. Textbook and Reference

Textbook
(1)Textbook:
A textbook will be distributed before each experiment.

(2)Recommended supplementary reader:
To carry out bioscience experiments safely, Edited by Tokyo Kagaku Jozin, Tokyo Kagaku Jozin (2018) ISBN 9784759819212 (in Japanese)

5. Requirements(Assignments)

Please bring the following items; white gown, nameplate, notebook of experiment, graph papers and calculator.

6. Note

7. Schedule

Spectrophotometric measurement of food additives including sorbic acid and nitrous acid

Quantitative measurement of ecotoxicity of chemical compounds using microalgae (1)

Quantitative measurement of ecotoxicity of chemical compounds using microalgae (2)

Quantitative analysis of iron ion in food with atomic absorption method

Analyses of food components caffeine and fatty acid, using HPLC and GC-MS (1)

Analyses of food components caffeine and fatty acid, using HPLC and GC-MS (2)

Agar plate methods using a selective medium for detecting coliform, Escherichia coli, and bacteriophage (1)

Agar plate methods using a selective medium for detecting coliform, Escherichia coli, and bacteriophage (2)