

Chemical testing by molecular biological methods

Progress report

1.1.2007-31.12.2007

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ABSTRACT

This project develops alternative methods for the assessment of Endocrine disruptive activity in chemicals and environment. The tests can be applied in environmental monitoring and chemical testing (such as described in REACH). The test system will be simple: it will require no specific expertise, training or instrumentation. Tests are based on yeast cells that contain a human receptor gene that controls the expression of luciferase gene and the receptor defines the specificity of the strains. The yeast strains developed will be evaluated with industrial waste and chemicals and environmental samples followed with comparison the results with the data available from literature and from collaborators. The evaluation of the strains will be done in cooperation with foreign partners. Moreover, new partners (especially industrial partners where chemical industry and forest industry are the most obvious candidates) will be identified prior the study.

Special emphasis will be put on the robustness and ease of the use of the test system since it should work reliable in different laboratories and also outside of the laboratories. The experience obtained with bacterial test shows that by using microbes it is possible to construct test that is both robust and easy to use.

During the project two PhD degrees will be produced. The PhD students are subject to active training by not only the senior group members but also by the foreign and domestic co-operation partners, both students will spend at least six months abroad in the collaborative laboratories. They will also participate actively to international meetings and workshops.

After the project we will have a test system for the assessment of Endocrine disruptive activity. It will have the following features:

- Simple to use (without special training)
- Robust enough (to be able to measure waste waters and waste chemicals)
- Sensitive enough (suitable for pre-screening before more intensive analysis)
- Cost-efficient

RESULTS SO FAR

The work has started in many fields. The storage tests for the cells have shown promising results since the drying of the cells seems to be possible by using simple protocols. The storage of the cells in longer time is still an open question but will be addressed in 2008.

Development of the measuring protocols is on-going with some collaborators by using different samples. According to the results, the sample can be e.g. municipal wastewater (untreated or treated) or sludge from waste water treatment plant, just to mention some.

Genetic work for the modification of the measuring strains has been completed and the protocols has been tested. The screening of the mutant libraries for the new receptors is about to start.

IMPACT OF THE RESEARCH

Since the work has been on-going only for a year, the major societal impact is yet to be established. However, the work and the possible applications have been discussed with some companies and research institutes (for details contact the PI)

PROGRESS AS COMPARED TO THE PLAN.

Generally the work has progressed according to the plan. The construction of fibre-optic biosensors has progressed slower than it was planned. That will be looked in 2008.