



EDC-Seas: development of an enzymatic degradation system of dibutyl phthalate involving cellulosome-based immobilization.

IFB-Gdansk iGEM Team

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Abstract

Endocrine-disrupting chemicals (EDCs) present in water have recently raised concerns about their negative impact on human and animal health. Phthalates, which belong to the EDCs, are widely used in industry as plasticizers, improving the mechanical properties of plastic materials. However, they can be released from materials to the environment and reach drinking water, where their concentrations often exceed the limits set by the WHO as safe. In response to the problem of phthalic acid esters (PAEs) pollution, we came up with the idea of a protein complex capable of efficient degradation of those pollutants. Based on literature, we designed a system consisting of enzymes fused to dockerin domains that enable binding to scaffoldin, which facilitates immobilization to cellulose. We expect that the resulting engineered proteins will make it possible to create a cell-free water filtration system which will degrade phthalates to easily biodegradable benzoic acid.

We, IFB-Gdańsk, are the first polish team in 4 years to compete in the iGEM competition and the first team from Gdańsk, our city, in the last 10 years.

iGEM, or International Genetically Engineered Machines, is the world's largest academic competition on Synthetic Biology. Its goal is to improve the public's understanding of the field, its development and promotion of international collaboration among research teams. The competition began in 2004 at the Massachusetts Institute of Technology and now ca. 400 teams from around the world participate each year. All teams are tasked with designing and developing a way to solve a problem affecting their local community using synthetic biology. Projects range in topics from improving the environment to producing new drugs or materials to colonizing other planets.

You can learn more about EDC-Seas project here:

Website: <https://2023.igem.wiki/ifb-gdansk/index.html>

Project Promotion Video: <https://video.igem.org/w/gEg2rsa3aL2M3qiGyVwSzN>

Project Presentation Video: <https://video.igem.org/w/g389VYcmt8VzpRUvcwPe8e?start=0s>

One of the BioBricks designed and described by the team: http://parts.igem.org/Part:BBa_K4695210

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