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Production strategies of thyroid peroxidase from *Branchiostoma belcheri* in *Escherichia coli*

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Peroxidases are catalytic enzymes that reduce hydrogen peroxide to oxygen and water and also oxidize a various substrates. They are widely used in various branches of biotechnological industry as they are also applicated in variety of high potential biotransformation reactions. Problem of using this enzyme is that it is usually difficult to obtain an enough yield of enzyme or for their high-cost production. The aim of our research is to produce thyroid peroxidase from *Branchiostoma belcheri*, for the structural studies and also because of its possible use in biotransformations. The BbePOX1 gene sequence was prepared synthetically, codon-optimized for expression in *Escherichia coli* and cloned into the pET-21a vector. The aims of the project are to select the optimal conditions for the production of thyroid peroxidase (e.g. expression vector selection, expression and purification conditions procedures, etc.). To optimize expression from vector and protein purification point of view we choose vectors for the high efficient expression of peroxidase (vector with T5 promoter and vector with fusion partner). To achieve the highest yield of protein with the highest degree of solubility and enzyme activity we have also focused on the optimal temperature of production, selection of suitable host strain, concentration of inductor, selection of cultivate media and fermentation conditions. After isolation of a sufficient amount of active recombinant thyroid peroxidase, we will be able to study its structure in the following steps, as well as potentially used it in oxidoreduction biotransformation reactions.

Biography

Monika Chovanova has completed her Master´s degree in Biotechnology at the Comenius University in Bratislava, Faculty of Natural Sciences, and Department of Molecular Biology. Theme of her diploma thesis was Heterologous expression and solubilization of synthetic peroxidase gene Mag2C8 from *Magnaporthe oryzae* in *Escherichia coli*. After graduation in 2017, she began the PhD study in the same department in the theme: Preparation of producers of biologically active substances.

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