



Generation of bio-silk coatings with maximized functionality

Master degree project available at KTH Biotechnology in autumn 2017

Background:

Spider silk is a natural polymer combining both strength and elasticity in a very neat way. The ability to add new functions to spider silk has opened up the possibility to use silk in applications related to medicine and biotechnology. Our group works with engineered spider silk proteins which can be produced by *Escherichia coli*. In addition, we use genetic engineering to add various functional properties to our silk (bio-silk), e.g. cell-binding ability, affinity, antimicrobial and enzymatic properties. Soluble bio-silk can be processed to fibers and mesh, in addition to the versatile surface coating format.

Aim:

The aim of this degree project is to investigate how bio-silk coatings should be produced in order to maximize the exposure and function of the added "bio module" (e.g. affinity domain).

Approach:

Parameters to explore will be, for example, coating time (short versus long), protein concentration (low versus high) and the influence of premixing bio-silk with wildtype silk at different ratios prior to coating. To determine the generality of the optimized procedure for bio-silk coatings, two different variants of bio-silk proteins will be investigated.

Methods:

During this project several biotechnological methods will be utilized, like gel electrophoresis, bio-silk materials processing, fluorescence microscopy, Surface Plasmon Resonance (SPR) and Quartz Crystal Microbalance (QCM).

Duration:

20 weeks.

Location:

KTH Royal Institute of Technology
School of Biotechnology
Division of Protein Technology

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