Recombinant expression of NT-2Rep-CT spider silk minispidroin

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Spider silk fiber is very durable and can be used in a variety of industries, ranging from biomedicine to military. It is not possible to obtain this fiber naturally, on an industrial scale, so it is produced using artificial spidroin. In order to produce the fiber, it is important to obtain a sufficient amount of spidroin, so it has been hypothesized that recombinant expression of NT-2Rep-CT will produce sufficient amount of the minispidroin for silk spinning in further studies. The review of the literature summarizes the information on the composition, structure of spider silk and production of artificial silk fiber using NT-2Rep-CT protein . Quantitative measurements of NT-2Rep-CT protein expression under different conditions were performed. As a result, a larger amount of protein was expressed. The following methods were used for the purification: sonification, chromatography, dialysis and concentration. The composition of the obtained proteins was checked using SDS-PAGE. It was discovered that most spidroins can be obtained by expressing them at 25 °C for 16 hours. The amount of protein in different stages of the experiment was compared, and it was found out that after Superdex chromatography the protein is sufficiently pure for further operations. The author of the research concluded that recombinant expression can produce sufficient amounts of NT-2Rep-CT minispidroin to spin a spider web for further research. Protein expression mainly depends on the expression temperature, whereas changes in IPTG concentration have a minimal effect on it. The methods used for protein purification were efficient.

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