

Cloning and Expression of Spider Silk proteins in *E. coli* and purification using Ion Exchange Chromatography

Saifaddin Al-Sadi

Silk is a naturally produced fascinating protein. It has been attractive for human since thousands of years and the ancient Chinese civilization traded the silk produced by silkworms with other civilizations via Silk Road for centuries.

Although spider silk is similar to the silk produced by silkworms, spider silk has many unique properties. Spider silk is considered to be one of the strongest and toughest materials produced in nature. It has many unique properties that make it a very promising biomaterial and it has properties that even surpass many industrially produced polymers and fibers like Kevlar. Additionally, the spider silk protein could make different material forms like fibers, particles, capsules, films, gels and foams. Each material form could be use in many different applications.

The spider usually produce more than one type of spider silks from different glands, the most attractive one for scientists in this field is the dragline silk. The main obstacle for extensively use the spider silk in different applications is the mass-production. There are different reasons behind this, and the main one is the difficulties of domestication of spiders. Spiders are unsocial organisms; they tend to eat each other. Furthermore, it is not possible to keep millions of spiders in cages to produce spider silk.

The aim of my project work was to create four new constructs of miniaturized spider silk and purify them. The bacterium *E.coli* has been used in production. Three of them were successfully constructed, expressed and purified. The three created constructs appear to be very promising for future development and potential large scale production.

Degree Project in Biology 30 ECTS, Master of Science (2 years), 2011.

Department of Anatomy, Physiology and Biochemistry/Swedish University of Agricultural Sciences

Supervisors: Scientist Anton Lindqvist and Assoc. Professor My Hedhammar