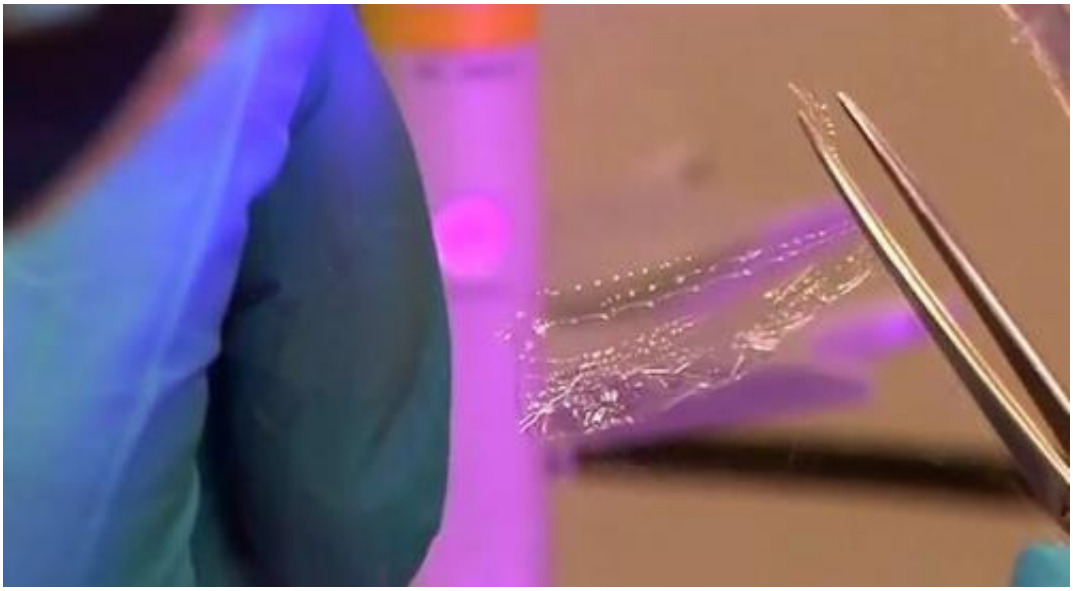
New partnership looks to industrialize spider silk production

September 15 2011, by Bob Yirka



(PhysOrg.com) -- For thousands of years, human beings have looked with envy upon the silk webs spun by spiders; not only are they stronger than steel but they are tougher too (a vest made of spider web material can stop bullets better than Kevlar) and can be stretched farther than rubber before breaking. It's only in recent years however, that anyone has been able to recreate the webs made naturally by spiders, and now, the company that did it, AMSilk, is teaming up with the Fraunhofer Institute for Applied Polymer Research to figure out a way to mass produce the stuff.

The problem with trying to mass produce spider web material up to now was in building and maintaining spider farms that could produce in sufficient quantities to make it cost effective. AMSilk took another approach, in that they embarked on a mission to figure out how to create spider silk without having to use actual spiders.

To do that, they began studying the genes of spider silk, which is essentially a protein, and then sought out a means for manipulating a harmless variant of the *E. Coli* bacteria to reproduce it for them in what is known as a bio-reactor (a similar process has been used for years to make other proteins such as insulin).

And that's exactly what they did; they embedded the spider silk gene into the bacteria causing it to produce the spider silk protein; as the bacterium multiplies so too does the spider silk protein. Thus to produce their silk product all they have to do is cultivate a bunch of the bacteria and then feed it a solution of sugar, salt and a few other micronutrients, then reap the rewards of their efforts. Though this method, they've been able to produce products for clients on a semi-custom basis rather than as a means of mass production.

To get around this problem AMSilk is teaming up with Fraunhofer's (who have expertise in creating spin processes for development of biopolymers) hoping that together they can figure out a way to produce their home-grown spider web material in quantities large enough to compete with other synthetic products, such as Kevlar.

The partnership is expected to run two years, by which time, both companies expect to be mass producing spider silk for applications ranging from medical implant coatings, to spring-back type automobile parts.

More information: Press release